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THE GLOBE ENCYCLOPÆDIA




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VOLUME IV.

KELP—PAS.



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The GLOBE ENCYCLOPÆDIA

Kelp (Old Eng. *gilp*, 'dust,' 'powder') is the ashy residue left in burning in the open air various species of seaweed. It was formerly very much employed as a source of soda and potash salts for manufacturing purposes, and at that time K.-burning was an important industry in the northern and western islands and coasts of Scotland. The introduction of new chemical processes, and the discovery of new sources of these alkalis, has nearly extinguished the K. industry, and it is now only prepared for the extraction of iodine and bromine as primary products. The K. of different seaweeds varies much in composition, that obtained from *Laminaria digitata* and *L. saccharina* being rich in iodine; *Himanthalia lorea* yields potash salts chiefly, while the product of *Fucus vesiculosus* and *F. nodosus* abounds in soda. These seaweeds are thrown up on the coast, or collected during low water, and after drying in the sun are ignited and slowly burned at as low a temperature as possible, to avoid the dissipation of volatile iodides. The K. is dissolved in water, and concentrated by evaporation till the carbonates, chlorides, and sulphates of sodium and potassium crystallise out; the remaining mother-liquor contains the iodine and Bromine (q. v.). Mr. E. C. C. Stanford has patented, and works near Glasgow, a process by which he avoids the use of K. proper in the preparation of seaweed products. He submits the dried seaweed to destructive distillation in closed vessels, by which, in addition to securing the whole of the iodine and alkaline salts, he obtains a residue of charcoal valuable for sanitary purposes.

Law Regarding K.—The introduction of this article in the manufacture of glass gave rise to several questions as to the right to make it. It has been found that the taking of K. is not one of the uses for which the shore is held by the crown in trust for the public, and consequently the right is not inalienable by the crown, but is transferred to the granter, where land is granted bounded by the sea or seashore.

Kel'so (anciently *Kalchu*, or *Calchou*, supposed to be from *Chalkheugh*, the name of a precipitous bank still so called), a town of Scotland, in Roxburghshire, beautifully situated on the N. bank of the Tweed, and opposite the embouchure of the Teviot, 5 miles W.S.W. of Coldstream, on the English border, and 45 S.W. of Edinburgh by rail. It consists mainly of four streets, radiating from a spacious market-place, on which stands the town-hall, built in 1816, and many well-built houses and elegant shops. The principal feature is the ruined Tironensian Abbey (1128–1152), partly in Norman and partly in Early Pointed style, shaped like a Greek cross, with the axis surmounted by a massive square tower 91 feet high, resting on four lofty centred arches, and four piers of clustered columns. It was the first endowment of David I., and its abbots long disputed precedence with the priors of metropolitan St. Andrews, and even with the parent-house of Tiron in France. The abbey was destroyed by the English under the Earl of Hertford in 1545. On the opposite bank stood Roxburghe Castle, a famous Border bulwark, the slight remains of which are all that is left of what was formerly one of the four chief Scottish towns. A fine bridge connects K. with its southern suburb of Maxwellheugh. Floors Castle, the splendid seat of the Duke of Roxburghe, designed by Vanburgh in 1718, lies one mile N. of K., amid policies of unwonted beauty. K. has slight industries, but is the seat of important corn and cattle markets, and has four annual fairs. Pop. (1871) 4564.

Kem'ble, John Philip, a great English actor, son of a theatrical manager, was born at Prescot, Lancashire, February 1, 1757, and educated at Roman Catholic schools, at Sedgeley Park and Douai, France. He made his debut at Wolverhampton in 1776, and played for seven years in country theatres. He first appeared at Drury Lane on September 30, 1783, as Hamlet. K. was manager of Drury Lane, 1790–1801, and subsequently of Covent Garden. He retired in 1817, and died at Lausanne, in Switzerland, February 26, 1823. K.'s place as an actor is second only to Garrick's. Noble in appearance, stately in elocution, grand in manner, he was the most classical of tragedians. He had a cultivated literary taste, and was the author of *Lodoiska*, an opera, *Belisarius*, a tragedy, and several comedies and essays. See Boaden's *Life of J. P. Kemble* (1825).—**Charles K.**, brother of John and of Mrs. Siddons, was born at Brecknock in Wales, November 25, 1775, and educated at Douai. He made his debut at Drury Lane in 1794, and left the stage in 1840, on being appointed Examiner of Plays. He died November 12, 1854. K. had a handsome appearance, and excelled in genteel comedy. His daughter, Miss Fanny Kemble (born in 1811), has maintained the dramatic traditions of her house.—**John Mitchell K.**, son of Charles K., was born at London in 1807, and educated at Trinity College, Cambridge, where he graduated B.A. in 1830. Three years after, he published *The Anglo-Saxon Poem of Beowulf:* a translation of Beowulf, 'with a copious Glossary, Preface, and Philological Notes' (1837); *Codex Diplomaticus Ævi Saxonici* (6 vols. 1839–48); *The Anglo-Saxon Charters* (1843); *Dialogue of Salomon and Saturnus* (1848); *Considerations upon the Government of England* (1849); and, in the same year, *The Saxons in England*, into which he garnered the best sheaves of his sustained research. *State Papers and Correspondence* appeared (1857), and *Horæ Ferales* was making its appearance when he died at Dublin, March 26, 1857. It was afterwards published in 1863, under the editorship of Latham and Franks.

Kem'pen, a town in the province of Düsseldorf, Prussia, 27 miles N.W. of Düsseldorf, has manufactures of silks, cottons,

linens, and hosiery, and was the birthplace of Thomas à Kempis. Pop. (1875) 5390.—**K.** or **Kempno,** a town in the province of Posen, Prussia, on the Silesian frontier, 47 miles N.E. of Breslau, with breweries, wax-refineries, and tanneries, and a brisk trade in horses and cattle. Pop. (1875) 6267.

Kem'pis, Thomas à, or **Thomas Hamerken** (*Malleolus*), born at Kempen near Düsseldorf, about 1380, was the son of a labouring man and a village schoolmistress. He studied grammar and plain chant with 'The Brothers of Common Life' at Deventer, and in 1399 entered as a novice among the canons-regular of Mount St. Agnes near Zwoll. Here he devoted himself to copying such works as the Bible, the Missal, and the works of St. Bernard. Fifteen years were spent on a copy of the Bible in 4 vols. folio. He also wrote some devotional works, of which the best known are the *Soliloquium Animæ*, and the *Hortulus Rosarum*, both translated into English by Flower in 1853. There are also modern Oxford editions of K.'s works in Latin. He died July 24, 1471. See Busch, *Chronicon Windeshemense.* It was long supposed that K. was the author of *De Imitatione Christi*, perhaps the most popular of all devotional works, which Corneille translated into French verse, and on which Dr. Chalmers wrote an essay prefixed to Payne's translation in 1822. This book was also attributed to John Gerson, Chancellor of Paris University (1363–1429). But it is now almost certain that a similar book of the same name was in the family library of the ancient Italian family De Advocati or Avogadro of Biella ('Defenders of the Church' from the 7th c.) long before K. was born; and the evidence of the *Codex Aronensis*, and of other old MSS. and printed editions, is to the effect that it was written by John Gersen, or John of Cavaglia, Abbot of Vercelli. See *Mémoire sur le Veritable Auteur de l'Imitation*, by the Chevalier de Gregory; Introduction to Benham's Translation (Macmillan & Co. 1874), and *Authorship of the De Imitatione Christi*, by the Rev. S. Kettlewell (Lond. 1877).

Kemp'ten, a town of Bavaria, on the Iller, 66 miles S.E. of Munich, is a walled place divided into two quarters, the upper of which (Neustadt), inhabited by Catholics, arose round the abbey founded by Hildegarde, wife of Karl the Great, has the finely-domed church of St. Peter, whilst the lower or Protestant quarter (Altstadt) was formerly a free imperial city, and is now the seat of trade; its cotton-works employing 37,000 spindles and 680 looms, besides which there is a considerable trade in linen. Pop. (1875) 12,681. K. is the ancient *Campodunum*, and on its southern side is a lofty Roman tower, the medieval Hilarmont, now known as the Burghalde. The town was stormed by the Imperialists in the Thirty Years' War (1633), and again by the French in the War of the Spanish Succession (1703), and near it the French were defeated by the Austrians, September 17, 1796.

Ken, Thomas, an English prelate and hymnist, born at Berkhampstead, Herts, July 1637, and educated at Winchester and New College, held the livings of Brixton in the Isle of Wight (1666), and of Wordhay, Hants, the latter with a prebend of Winchester (1669). In 1675 he visited Rome, and on his return was chaplain successively to Mary of Orange at the Hague (1679), to Lord Dartmouth at Tangier (1683), and to Charles II. (1684). Raised to the bishopric of Bath and Wells, he attended Charles in his dying moments, as also Monmouth on the scaffold, was one of the 'Seven Bishops' (1688), but as a nonjuror was deprived of his see (1689), and retired to Longleat in Wiltshire, where he died March 19, 1710. K.'s *Works* (4 vols. 1721) are mostly forgotten, but his Morning and Evening Hymns live on the lips of thousands. See his Life by J. L. Anderdon (Lond. 1853).

Ken'dal, or **Kir'by Kendal** (*i.e.*, 'Kendal in the dale of the Ken or Kent'), a town of England, in Westmoreland, on the Kent, 20 miles N. of Lancaster by rail. It has a large parish church, restored in 1868, a market-house, a grammar-school (founded in 1525), a mechanics' institute, a museum, a theatre, &c. The chief industrial products are linseys, carpets, hosiery, doeskins, tweeds, lining-stuffs, paper, leather, iron-wares, beer, fish-hooks, and combs. There is an important weekly market. Pop. (1871) 13,446. K. sends one member to parliament. It was a market-town by licence of Richard I., and by a settlement of Flemings in the reign of Richard III. became the seat of a flourishing manufacture of woollen cloths, which are still well known as 'Kendals.' The town was incorporated by Elizabeth in 1576. Interesting antiquities are the ruined castle of the barons of K., and the Castle Law Hill, crowned by an obelisk erected in commemoration of the Revolution of 1688.

Ken'ilworth, a market-town of England, in Warwickshire, 4 miles N. of Warwick by rail, is chiefly famed for its castle, built in the reign of Henry I. Here Edward I. founded a second Round Table, and Edward II. was deposed. John of Gaunt enlarged it, and through his son, Henry IV., it reverted to the Crown. Conferred by Elizabeth on Dudley, Earl of Leicester, it was for seventeen days the scene of the gorgeous entertainment given to that sovereign (1575), described in Scott's *Kenilworth.* Cromwell dismantled it in the Civil War, but its ruins are still the finest in England. Pop. (1871) 3335.

Kenn'icott, Benjamin, D.D., a biblical critic, born at Totnes, Devonshire, 4th April 1718, succeeded his father in the mastership of a charity school, till in 1744 some gentlemen subscribed to send him to Wadham College, Oxford. As an undergraduate he published *Two Dissertations on the Tree of Life and on the Oblations of Cain and Abel* (1747), which gained him a fellowship at Exeter College. He received a pension of £200 (1761); was successively appointed Radcliffe librarian (1767), prebendary of Westminster (1770), canon of Christchurch, and rector of Culham; and died at Oxford, September 18, 1783. His first great work, *The State of the Hebrew Text of the Old Testament Considered* (Oxf. 1753), gave an account of all the Hebrew MSS. known to be extant, and prepared the way for his *Vetus Testamentum Hebraicum cum variis Lectionibus* (Oxf. 1776), which was based on a collation of 600 Hebrew and 16 Samaritan codices. He was the author of nine other works, mostly on textual criticism.

Ken'sington Gardens, a beautiful wooded park, forming an extension W. of the Serpentine of Hyde Park, London. The grounds (210 acres), which are intersected by fine avenues radiating in the form of a star, are a favourite and fashionable lounge. To the W. is Kensington Palace, the birthplace of Queen Victoria. In the south-eastern angle stands the magnificent Albert Memorial.

Kent ('the land of the Cantii'), a maritime county in the S.E. of England, is bounded N. by the Thames and the Thames' estuary, S. by Sussex, W. by Surrey, and E. by the Straits of Dover. Area, 1627 sq. miles; pop. (1871) 848,294. It is a bold promontory, terminating in the Isle of Thanet (q. v.), and the coast, low and sandy in the N. and S., presents to the W. between the N. and S. Forelands, and opposite the Goodwins (q. v.), a line of high chalk cliffs. On the N. lies the Isle of Sheppey (q. v.). The surface is for the most part undulating, and is traversed from E. to W. by the North Downs (see DOWNS), but in the S. is low and unbroken, including the Weald and the Romney Marsh. The formation is Tertiary in the N., chalk and greensand in the E. and centre, and wealden, a freshwater deposit, in the S. K. is watered by the Medway, the Stour, and the Darent, has a mild climate, and a singularly fertile soil, producing an unusual variety of crops. In 1876 there were 240,205 acres under corn crops; 81,712 under green crops; 61,179 under clover, sanfoin, and grasses in rotation; and 294,377 in permanent pasture, exclusive of heath or mountain-land; also 30,076 horses, 66,284 cattle, 957,707 sheep, and 59,658 swine. The chief crops were wheat, oats, barley, beans and peas, turnips, hay, potatoes, mangold, and garden stuffs; while 44,755 acres were under hops. The orchards yield cherries, plums, filberts, &c., for the London markets. The county returns six members to parliament. The county town is Maidstone; other places are Canterbury, Greenwich, Woolwich, Chatham, Sheerness, Gravesend, Margate, Ramsgate, Tunbridge Wells, Dover, Hythe, and Folkestone. K. is especially rich in historical associations; its principal ecclesiastical structures are the cathedrals of Canterbury and Rochester, Aylesford Priory, and St. Radigund's Abbey near Dover. See Hasted's *History of K.* (4 vols. 1778-99).

Ken'tigern, St., or **Mungo** (*i.e.*, 'dear friend' of St. Columba), the successor of St. Ninian as apostle of Cumbria (q. v.), according to tradition was born 518 A.D. of a virgin, St. Thenew, daughter of Llew or Lothus, a semi-pagan prince of Lodoneis or Lothian. Educated by St. Servanus at the monastery of Culross, he was ordained bishop of the newly-founded see of Glasgow at the age of twenty-five, and laboured ten years for the conversion of the heathen, the recovery of

apostates, and the confirmation of the faithful, till in 553 Morken of Strathelwyd expelled him from his kingdom, to seek a refuge in Wales, where he founded Llanelwy or St. Asaph. He was recalled in 573 by Rhydderch Hael (Roderick the Liberal), was for eight years bishop at Hoddelm, returned to Glasgow in 581, and paid seven visits to Rome during the papacy of Gregory I. (590–604). The date of his meeting with Columba at the Molendinar is uncertain, but must be placed before 597, that being the year of the latter's death. K. himself died in 603, and over his grave rose the cathedral of Glasgow, the arms of which city perpetuate three renowned miracles of this its patron saint. We have two lives of K., written the one by a foreign ecclesiastic during the episcopate of Herbert of Glasgow (died 1164), the second and longer by Joceline of Furness some twenty-five years later, both of which were edited by Bishop Forbes of Brechin in vol. v. of *The Historians of Scotland* (Edinb. 1874). Joceline's book is a string of conventional miracles, varied by contests with the secular power, in which the saint always comes off victorious. It is valuable, however, as the only record, with any show of authenticity, of the obscure history of Cumbria, and as forming a link between the legendary and historic periods —Arthur and Laloecen (Merlin) appearing in its pages side by side with characters whose history is beyond challenge.

Ken'tish Fire, rounds of applause, a term which owes its origin to the No-Popery meetings held in Kent, to protest against the Roman Catholic Relief Bill (1828–29).

Kentish Rag, a tough calcareous durable building stone, developed in the Hythe Beds, a local formation belonging to the Lower Greensand of the Cretaceous Period.

Kent's Cavern, a celebrated cave in the limestone rock near Torquay, Devonshire. It consists of two parallel series of galleries, the shorter of which is over 250 feet in length. Its floor deposits have been very fully described by a committee appointed by the British Association in 1864. Flint and bone implements, such as chisels, spoons, spear-heads, rings, potsherds, &c., have been obtained, evidently contemporaneous with the remains of living or recently extinct animals. The bones of the following mammals have been discovered in the red cave-earth which forms the fifth deposit in descending order: cave-lion, wild-cat, cave-hyæna, wolf, fox, badger, cave-bear, grizzly bear, brown bear, mammoth, rhinoceros, horse, bison, Irish elk, red-deer, reindeer, hare, water-vole, bank-vole, and beaver.

Kentuck'y, a central state of American Union, in the Mississippi valley, is bounded N. by Ohio, Illinois, and Indiana; S. by Tennessee; E. by Virginia and W. Virginia; and W. by Missouri. Area, 37,680 sq. miles; pop. (1870) 1,321,011. The Mississippi forms the western and the Ohio the northern boundary. The surface is table-land in the W., hilly in the S.E., where the Alleghanies have an elevation of 3000 feet, and in the centre is occupied by the valleys of the K., Licking, Green, Cumberland, Tennessee, and other rivers. The formation is Tertiary in the W., and Devonian and Silurian in the S. The coalfield of Illinois is continued into K., and has an aggregate area of 14,000 sq. miles in the latter State. Among other minerals extensively distributed are iron, lead, silver, salt, lime, and sandstones. The principal geological attractions in K. are the salt spring of Big Bone Lick, 60 acres in extent, with its thousands of huge fossil skeletons, and the famous Mammoth Cave, which is only one of thousands that are not so widely known. Saltpetre, gypsum, and syenite abound in the caves. The climate is generally delightful, and the soil is extremely fertile, yielding (1873) rich crops of Indian-corn, wheat, rye, oats, barley, cotton (1080 bales), flax (237,268 lbs.), hemp (7777 tons), tobacco (105,305,869 lbs.), maple, sugar, potatoes, &c. Other large products are silk-cocoons, wool, cheese, and butter. In January 1876 the number of cows in K. was 244,700; of other cattle, 389,600; of sheep, 683,600. The chief manufactures are iron and iron goods, tobacco and cigars, machinery, leather, and woollens, and there is extensive flour and saw milling, mining, brewing, and distilling. In 1875 there were 1519 miles of railway in operation. Frankfort is the capital. K. is an Indian name, meaning 'the dark and bloody ground.' The country was first settled by Boone (q. v.) in 1769, was organised as a territory in 1790, and admitted as a state two years later. It was frequently the scene of active hostilities, and its inhabitants were almost equally divided in sentiment during the Civil War.

Keokuk, a city of Iowa, U.S., on the W. bank of the Mississippi, near its confluence with the Des Moines, 90 miles S.E. of Iowa, with which it is connected by rail. It is at the foot of the lower rapids, and at the head of navigation for the larger steamers. From its position in the extreme S.E. corner of the state it is called the 'Gate City.' It has twenty churches, a medical college, a court house, public library, &c. The chief occupation is pork-packing, and there is a large wholesale trade in dry goods, groceries, &c. A splendid iron rail and highway bridge 2300 feet long spans the Mississippi. The government is constructing a ship canal 9 miles long skirting the lower rapids. Pop. in 1850, 2478, in 1860, 8136, and in 1870, 12,766.

Kep'ler, Johann, the celebrated astronomer, was born at Magstatt, near Weil in Würtemberg, December 27, 1571. He studied at Tübingen with a view to entering the Church, but under the tuition of Mæstlin, Professor of Mathematics there, and a disciple of Copernicus, he became a devoted student of mathematical and astronomical science, and resolved to abandon theology. In 1594 he became Professor of Mathematics at Grätz in Styria. His first publication was a calendar for 1595, and in 1596 appeared his *Mysterium Cosmographicum*, which abounds in fanciful analogies between the different parts of the universe. In 1599 he quitted Grätz on account of religious persecution, and on the invitation of Tycho Brahe went to Prag to aid that astronomer in his labours. On Tycho's death in 1601 K. was nominated Astronomer to the Emperor Rudolph, and in 1614 settled at Linz. After the death of his patron he was constantly in pecuniary difficulties, notwithstanding his many efforts to obtain a liquidation of his claims upon the imperial treasury. It was in 1630, on one of these fruitless endeavours, that he was seized with the fever which ended his life on November 13, in Ratisbon. K.'s great work is his *Astronomia Nova* (1609), containing the remarkable book *De Motibus Stellae Martis*, which prepared the way for Newton's later discoveries. The reduction by him of Tycho's observation of Mars, begun with a view to the publication of the Rudolphine Tables, soon showed the impossibility of representing the revolution of Mars by uniform circular motion, and led to the discovery of his *first* law, that planets move in ellipses, of which the sun forms a focus. His *second* law, that the *radius vector* of a planet sweeps over equal areas in equal times, was a happy conjecture based upon the observed fact that at the apsides the times of describing equal small arcs were nearly proportional to the distances of the planet from the sun. The *third* law, that the square of the periodic time is proportional to the cube of the mean distance from the sun, was discovered only after numerous efforts to establish other numerical relations which his lively fancy had suggested. Newton showed that the mathematical consequence of the second law was that the planets moved under the action of a force directed to a fixed point, and that the first law led as infallibly to the conclusion that this force varied inversely as the square of the distance from the centre. See GRAVITATION. His other chief works are *Paralipomena ad Vitellionem* (1604); *Epitome Astronomiæ Copernicæ* (2 vols. 1618–22); *De Cometis* (1619); and *Tabulæ Rudolphinæ* (1627), which are famous as the first tables calculated with elliptic elements. His manuscripts were purchased for the library of St. Petersburg, but have never been published. One volume of his correspondence entitled *Epistolæ ad J. Keplerum* was edited by Hausch in 1718. The best edition of K.'s works is that by Frisch (8 vols. Frankf. 1858–71). See Breitschwert, *K.'s Leben und Wirken* (Stuttg. 1831); Brewster, *Lives of Galileo, Tycho de Brahe, and Kepler* (Lond. 1841). Later German biographies are those of Reitlinger (1868) and Reuschle (1871).

Ker'guelen Land, or **Desolation Island**, is in the S. Indian Ocean, and was discovered by the French navigator Ives Joseph de Kerguelen Tremarec in 1772. Christmas Harbour, at the N. extremity, is in 48° 11′ S. lat., 69° 3′ E. long. The island is 100 miles long and 45 miles broad on an average, but is deeply indented by inlets. Its surface is rugged, and lakes are numerous. Fossil wood is plentiful, and coal is also said to exist. See *Notes of a Voyage to K. L. to observe the Transit of Venus, December* 1874, by the Rev. S. J. Perry (Lond. 1876).

Kerguelen's Island Cabbage is a perennial cruciferous plant first brought into notice by Captain Cook, and since his day has proved a very acceptable addition to the rations of

[illegible]

Kerman or **Kirman**, [illegible]

Kermanshah, [illegible]

Kermes, or **Alkermes**, the name given to the dried bodies of female insects of various species of *Coccus*, which, like the cochineal insect yield a bright red dye-stuff. The Kermes dye has been known and used in the most remote antiquity. It is referred to in Scripture as well as by many classical writers, but the introduction of cochineal, after the discovery of America, has very largely superseded it; and it is now only used locally in the East, and in the countries in which the insects occur. Four species are used: *Coccus ilicis* or common K.; *C. polonicus*, or Polish grains; *C. pagani* and *C. ueaurii*; and these find their principal use among the Moors, Turks, Persians, &c.

Kermes Mineral, a [illegible]

Kerner, Andreas Justinus, a German poet, born at Ludwigsburg, September 18, 1786, studied medicine [illegible] Died February 21, 1862. As a poet, [illegible] and [illegible] (1811), *Geschichten Besessener neuerer Zeit* (1834). His medical works [illegible] are mainly devoted

[illegible]

[illegible] country is well and hilly, and contains many old forts. The Irish was conspicuously loyal during the Mutiny of 1857.

Kerry, Irish Gael. *Ciarraidhe*, the county belonging to the tribe of Ciar, a son of the legendary King Fergus; a county in the S.W. of Munster, Ireland, is bounded N. by the estuary of the Shannon; S. by Cork and the Kenmare River; W. by the Atlantic; and E. by Cork and Limerick. Area, 1,185,213 statute acres; pop. (1870) 196,556. The coast-line, 220 m. in length, is deeply indented by Tralee and Dingle Bays, and is [illegible] the Slieve-nagh, the Brackers, Valentia, and other [illegible]. K. is for the most part mountainous, containing in Mangerton, Purple, and Carrantuohill the highest peaks in Ireland, [illegible] 3414 feet. The mountain ranges are of red or grey [illegible], overlaid in the lower parts by stratified limestone. Fine marbles are extensively exported to London from Valentia. The hydrography comprises the rivers Laune, Maine, [illegible], and the famous Lakes of Killarney (*q.v.*). In 1871 the surface included 152,689 acres of tilled land, 638,149 of pasture, 15,101 of plantation, 31,882 of water, and 348,047 of mountain, bog, and waste. The climate is mild; the chief crops are barley, potatoes, turnips, oats, and flax. Other important products are [illegible], butter, and cider. The county sends two members to Parliament. Tralee is the capital, and other towns are Killarney, Listowel, and Dingle. K. is traversed by the Great South-Western Railway to Tralee.

Kersey, a coarse woollen fabric, usually ribbed, principally manufactured in the N. of England, though originally made at Jersey, of which name K. is probably a corruption.

Kertch, a seaport of the Crimea, on the Strait of K., forms with Yenikale, 5 miles higher up the strait, one township, having a total pop. (1870) of 22,449. K., which is built in the form of an amphitheatre at the foot of Mount Mithridates, was sacked by the Allies in 1855, and the importance of its port was much diminished by the closing of the Black Sea to the Russians (1850), but is now reviving. In 1875 1983 vessels of 760,623 tons entered, and the value of imports (tobacco, tea, ironware, &c.) was £57,661; of exports (grain, butter, horses, cattle, &c.) £135,663. K. is the ancient *Panticapæum*, a Milesian colony, and in its museum is a splendid collection of antiquities discovered in the neighbourhood. It was the capital of the kings of Bosporus, was annexed to the Roman empire (63 B.C.), and fell successively under the Huns (375 A.D.), Genoese (1280), Turks (1475), and Russians (1774).

Kestrel (*Tinnunculus alaudarius*), a familiar species of British hawks, distinguished by the peculiar attitude in which it hovers motionless in mid-air, with wings and tail outspread, on the watch for prey. From this peculiarity it has received the name of 'windhover.' The colour is an ashen grey above, marked with streaks of deeper grey; brown tints prevailing in the female. The average length is 14 inches; the females being larger than the males. The nest is usually placed on rocky heights and in ruined buildings. The eggs number three or four, and are of a reddish-brown colour.



Kestrel.

The K. preys largely upon field-mice, moles, and other quadrupeds.

Keswick, an ancient market-town of England, in the county of Cumberland, on the Greta, and near the head of Derwentwater, may be considered the capital of the Lake district, and is a central point for tourists. Brewing, tanning, and the manufacture of woollens, hardware, and lead pencils are the chief industries. Southey resided here for forty years at Greta Hall. Pop. (1871) 2777.

Keszthely, a market-town of Hungary, in the comitat of Szalad, 70 miles N.E. of Kanizsa, and at the western end of the Balaton Lake. In the castle converted into a Præmonstratensian monastery) is a splendid library, and a large agricultural training college is directed by the fathers of the order. Pop. (1869) 4888.

Ketch'up, or Cat'sup, a sauce much used with meat and fish, the name of which is said to be derived from the Japanese *Kitchap*. Common or mushroom K. is prepared by mixing and stirring together fresh mushrooms and common salt for two or three days, after which the juice is lightly squeezed out. To every gallon of juice obtained half an ounce of cloves and mustard seed are added, and an ounce each of allspice, ginger, and black pepper. The mixture is gradually raised to the boiling point and left to macerate for fourteen days, when the liquid is strained off and is ready to bottle for use. Many other varieties of K. are prepared, among which may be mentioned *walnut* K., *tomato* K., *oyster* K., and *wine* K.

Kett'ering, a market-town of England, in Northamptonshire, 13 miles N.E. of Northampton, has manufactures of boots, stays, farm implements, silk, &c. At Geddington, 3 miles N.E. of K., is one of the ten Eleanor Crosses. Pop. (1871) 7184.

Kettle-Drum, the chief musical instrument of percussion. A pair of kettle-drums are commonly used in the orchestra, tuned to the tonic and dominant of the key.

Keu'per, the highest member of the Triassic, or New Red Sandstone series. In Britain it rests upon the Bunter Sandstones (q. v.), but on the Continent it is separated from these by the Muschelkalk (q. v.). Its base consists of dolomitic conglomerate, which passes into thinly laminated sandstones and marls, and the whole is surmounted by the Red Marl Series, which frequently contains beds of gypsum and rock salt. The fossil species are few in number. *Encrinus liliiformis* and *Terebratula vulgaris* are characteristic crinoids. Belemnites, ammonites, and crustacea are represented; fishes and reptiles (*Mastodonsaurus, Nothosaurus*, crocodiles, &c.) occur, and the *Microlestes antiquus* may be cited as a characteristic Continental mammal.

Kew (a corruption of *Kayhoo*, 'the quay on the spit of land'), a parish in Surrey, on the Thames, opposite Brentford, 7 miles W. of Charing Cross. Pop. (in 1871), 1033. The Royal Botanic Gardens, 300 acres in extent, form one of the attractions of London, and contain the finest collection of exotic plants in the world. There are many conservatories, a palm house, 362 feet by 100; a winter garden, 212 feet by 137; a museum, and an observatory.

Key, Delivery of. In a sale of merchandise, deposited in a cellar or wareroom, delivery of the key of the place in which the goods are deposited is held to be equivalent to actual delivery of the articles to the purchaser. Possession by the seller of a master-key does not alter the case. In the transference of goods in a bonded warehouse, certain entries in the custom-house books are directed to be made by special statute.

Key (mus.) (1) A lever or other mechanical contrivance in the pianoforte, organ, flute, &c., by which the performer can operate on distant parts of the instrument. (2) The *wrest*, by which instruments with metal pegs are tuned. (3) The sign in notation usually called by the equivalent name *clef*. (4) That relation of six principal tones to a seventh (called the key-note), which is the foundation of modern music. On the pianoforte, seven white notes (or digitals) upwards from C (inclusive) constitute a pattern; other keys are to consist of similar intervals. If the minor mode be regarded as a distinct K., seven notes upwards from A, all white except G (which is altered to G♯), will give a pattern. But there is no separate signature for the minor K., either in the above form or in that in which two notes are sharpened in the ascending, and restored in the descending scale.

Key, or Ké Islands (pron. K), a small group in the Banda Sea, between 5° and 6° S. lat., and in about 133° E. long. They consist chiefly of two islands, Great and Little K., the former of which measures 50 miles by 10. The islands are very mountainous and densely timbered. They are inhabited by Papuans, and by a mixed race who profess Mahommedanism. The inhabitants trade in trepang, wild nutmegs, and tortoise-shell, but especially excel in boatbuilding. They annually turn out some hundreds of boats, some of 30 tons each, of which Mr. A. R. Wallace says they 'can hardly be surpassed for beauty of form and goodness of workmanship.' See *The Malay Archipelago* (vol. ii. p. 107).

Keys. In executing a Caption (q. v.) in Scotland, a Messenger-at-Arms (q. v.) may break open the doors. This in the writ is called using the Queen's K. See ENGLISH LAW, DWELLING-HOUSE, CAPIAS.

Keys, in Heraldry, as the emblem of St. Peter, are often borne—indorsed, interlaced, or in saltire—in the arms of sees or religious bodies dedicated to that saint. Borne singly, the key is commonly in pale, with the wards in chief.

Keys, Power of the, is the authority claimed by the Christian priesthood to administer the ordinances of the Church, and communicate or withhold its privileges; and is so called from the words of Christ to Peter in Matt. xvi. 19. It is maintained that the power here promised was afterwards conferred on St. Peter and the other apostles by Christ (John xx. 22, 23). In the Roman Catholic Church the P. of the K. is applied to the power of granting Absolution (q. v.) in the sacrament of penance; the claim to do which has a better foundation on Matt. xvi. 19 than Protestants are willing to allow. Archbishop Tillotson got rid of the difficulty by supposing that the power of knowing men's hearts must have been one of the miraculous gifts of the early Church. The phrase also means the supreme authority of the Church, which is vested in the Pope. St. Peter's keys represent his power in heaven, earth, and hell. In the Papal arms the golden key represents the power of absolution, the silver one that of excommunication.

Key West (a corruption of the Span. *Cayo Hueso*, 'bone reef'), a town of Florida, U.S., on an island of the same name, has a good harbour, seven churches, and three cigar-factories, which employ 2500 Cuban refugees. Fishing and sponge-gathering are the other principal industries. The pop., which has been much increased of late years by immigrants from Cuba and the Bahamas, is estimated at 9000.—The *island*, 7 miles long by 1 to 2 wide, is of coral formation, and nowhere attains an elevation of 20 feet above sea-level.

Khamgaon, a town in the district of Akola, Berars, India, 370 miles E. of Bombay, with which it is connected by a branch railway, 8 miles long, opened in 1870, joining the Great Indian Peninsula system: pop. (1867) 9432. K. is officially described as 'the largest cotton mart in all India.' It despatches annually about 100,000 bales, collected from the surrounding country. In 1870, there were nine European firms, two factories for cotton cleaning, three steam-presses, and four half presses worked by hand. Each pressed bale contains about 3½ cwt. The native traders are chiefly Marwaris from Rajputana, and representatives of Bombay firms. Besides cotton, there is a considerable trade in English piece-goods, salt, opium, and ghee; wheat is imported. The town only dates from 1820.

Khan (properly *khaghan*, and given as *cham* by our older writers), a Mongolian title of supreme authority, assumed by Genghiz (q. v.), and adopted by his successors; also, a Persian word for a Caravanserai (q. v.), introduced into English through the crusaders in 'bal*cony*' and 'barbi*can*.' The cant *ken*, 'a house,' brought probably by the Gypsies, has passed into several provincial dialects, and is employed by Giles Fletcher in his *Christ's Victorie on Earth*, st. 52, l. 2—

'To crowne the bouring *han* from day to night.'

Khandesh', a district of Bombay, British India, occupying the valley of the Taptee river, but in other parts mountainous; area, 10,162 sq. miles; pop. (1872) 1,028,642. This is one of the great cotton growing tracts, and there is a Government model farm, which is not a financial success. The yield of cotton per acre is returned at only 23 lbs. The chief town is Dhulia.

Kha'nia. See CANEA.

Khar'geh. See EL-KHARGEH.

Kharkov' (formerly the *Slobodish Ukraine, i.e.*, 'the borderland'), a government in the S. of Russia, lies to the N. of Jekaterinoslav, and has an area of 20,737 sq. miles, and a pop. (1870) of 1,681,486. It is watered by the Donez, a tributary of the Don, and by its affluents, one-fourth of the surface yielding grain, while 13 per cent. is covered with dense forest. Besides grain the chief crops are tobacco, potatoes, flax, and hemp, and there is great abundance and variety of fruits. The principal

Khokan', a khanate of Central Asia, lying between the Russian government and Sír-Daria in the N., and Kashgaria in the S. It is about 160 miles long and 60 wide, is separated by the Thian-Shan mountains in the S. from the basin of the Amu-Daria, and lies chiefly in the valley of the Sír-Daria, with an average elevation of 1500 feet above the sea. The climate is one of extremes, and the soil is extremely fertile and well irrigated, yielding abundance of rice, wheat, cotton, barley, hemp, flax, tobacco, madder, &c. K. is famed for the richness and variety of its fruits; all the towns and villages are embowered in orchards and mulberry groves. In 1872 over 200,000 lbs. of silk were exported to Russia. Other products are turquoise, iron, coal, petroleum, and naphtha. The inhabitants, mostly Uzbeks and Tajiks, are extensively engaged in sheep-shearing. —**K.**, the capital, is situated on the Sír-Daria, has 360 mosques, is guarded by a mud-wall and a ditch, and has a pop. of 5000. Other towns are Namangan and Andijan. The khanate of K. was formerly of far greater size, but the western part, with the cities of Tashkend and Khojend, was annexed by Russia in 1865–66. According to a Russian report, it had in 1872 an area of 28,270 sq. miles, and a pop. of 800,000. After the war of 1866, Russia replaced the Khan Khudayer, who was thenceforth little more than a vassal of the Czar. A rebellion in 1874 against the khan, stirred up by Yakub Khan, Amir of Kashgar, led to another Russian invasion, under General Kaufmann, and the annexation of most of K. to the N. of the Sír-Daria in 1875.

Khorasan', the north-eastern frontier province of Persia, lies between the Khivan Desert on the N.E., and the Great Salt Desert on the S.W., and is bounded E. by Afghanistan, W. by the province of Mazanderan. Area, 150,000 sq. miles. The province is mountainous, consisting of narrow valleys, shut in by bare rocky hills, of which there are three distinct systems —the Elburz range in the N., a spur of Mount Elvand in the W., and in the S. a continuation of the Hindu Kush. The only rivers of importance are the Atrak, Tejand, and Pulabre-sham. The climate is extremely varied, as also is the soil, the northern districts being the most fertile, and yielding abundance of corn, gram, and rice. Among the manufactures are arms, stoneware, woollen and cloth goods, carpets, and velvets. Meshid (the capital), Astrabad, Yezd, and Nishapur, are the chief towns. The pop., of which we have no trustworthy estimate, is a mixed one, comprising Persians in the centre, Kurds and Turkomans in the N., and Arabs in the S.

Khorsabad'. See NINEVEH.

Khos'ru (Gr. *Chosroës*) **I.**, surnamed **Nushirvan** ('noble-mind'), one of the greatest rulers of the Sassanid dynasty in Persia, succeeded his father Kobad in 531 A.D. during a war with the Greeks, and two years after wrested from Justinian an annual tribute of 440,000 pieces of gold. In 540 began a second war, of varying issues, which lasted till 562, when Justinian agreed to pay a tribute of 40,000 pieces of gold, retaining Colchis and Lazica. A third war dates from 571, but before its close K. died, March 579. Persian writers make K. a model of wisdom and justice, and his last lessons to his son and successor Hormuz IV. have been celebrated by Saadi and several other poets.—**K. II., Purvis** ('Generous'), succeeded his father Hormuz IV. in 591, and was the most powerful of all the Persian rulers. In a career of victory (603–616), he spread his empire from Chalcedon to Ethiopia and Yemen; but the successes of Heraclius (q. v.) as quickly turned the scale. K. lost all his conquests, and his own son Siroes imprisoned and murdered him, 28th February 628. See Sir J. Malcolm's *History of Persia* (Lond. 1815, 2d ed. 1828), Richter's *Historiko-Kritischer Versuch über die Arsaciden und Sassaniden-Dynastie* (Leips. 1804).

Khundwa' (Khandwa), the chief town of the district of Nimar, Central Provinces, British India, 352 miles N.E. from Bombay; pop. (1872) 14,119. It is a station on the Great Indian Railway, and the terminus of the Indore State Line, which is now (1877) being continued through Rajputana; as such, it is the centre of a growing transit trade. K. is a place of great antiquity, the town being built on a mound which is full of ruins of old Jain buildings. It was burned by Tantia Topee during the Mutiny in 1858.

Khuzistan', a province of Persia, in the extreme S.E. corner, is bounded N. and E. by Luristan and the Bakhtiari mountains, S. by Fars and the Persian Gulf, and W. by the Shat-el-Arab and the pashalic of Bagdad. Area, 25,677 sq. miles. In the S. is a chain of limestone hills, ranging in height from 2000 to 5000 feet, and the whole province is well watered by numerous important streams—the Karun, Dizful, Kerkhah, &c. Next to cattle-rearing agriculture is the chief occupation, rice, tobacco, corn, and cotton being extensively grown. Among the articles of trade are tents, woollens, naphtha, and cottons, and dyeing is an important industry. Shuster (the capital) and Dizful are the principal towns. The pop. of K. is composed mainly of nomad tribes, those in the S. being of Arabian descent.

Khy'ber (*Khaibar*) **Pass**, the defile which leads from the N.W. frontier of India into Afghanistan, about 33 miles in length, and in one place not more than 10 feet wide. It is bordered by precipitous hills, occupied by wild tribes of the Afredee stock; the rock is mostly slate, and a mountain torrent runs down the pass. It commences at Kadam, 10 miles W. of Peshawur, and terminates at Duka at the entrance to the plain of Jellalabad. The K. P. is the most practicable route into Afghanistan. During the Afghan war of 1839–42, it was repeatedly forced by the British, and formed the scene of their most disastrous loss. Traders only now pass, on condition of paying a fixed black-mail. See Havelock's *War in Afghanistan* (Lond. 1840).

Khyrpore' (*Khairpur*), the chief town of the native state of the same name in Scinde, India, 15 miles E. of the Indus; estimated pop. 10,000. The state of K. has an area of 6109 sq. miles; pop. (1872) 130,350. The land revenue, which is paid in kind, at the rate of one-third of the gross produce, amounts to about £45,350. The exports have been returned at £52,500, the imports at £27,500. The country, which extends from the left bank of the Indus into the desert of Rajputana, is only cultivated where irrigated by canals. The ruling Mahommedan family of Beluchi origin, established in 1783, was the only branch of the Ameers of Scinde allowed to exist after the British conquest in 1843. See *Gazetteer of Scinde* (Lond. 1874).

Kiach'ta, a town of Russia, Siberia, in the government of Trans-Baikal, touching the frontier of the Chinese Empire, and 180 miles S.E. of Irkutsk. It is guarded by a fortress, has government and customs buildings, and was the sole mart for the Chinese trade from its foundation in 1727 till the treaty of Pekin (1860), which permitted commerce along the whole frontier. The trade, which is carried on by fairs, sometimes amounted in value to eight million dollars, but has greatly decreased of late. Pop. 5000.

Kiang-Chu, or **Kiung-Chow**, a port of China, on the N. side of the island of Hainan, opposite Hoi-on on a peninsula of the mainland. It was declared open to foreign commerce in 1858, but it was only formally opened by proclamation of 24th March 1876. Its chief exports are sugar (much of which comes from Hoi-on), leather, ground-nut cakes and oil, sesamum and melon seed, and betel nuts; its imports, opium, cotton and woollen goods. In the half year ending 30th September 1876 the port was entered by 23 steamers of 11,955 tons, and cleared by 22 of 10,996. Most of the trade is with Hong-Kong. Pop. about 200,000.

Kiang-Si, a province in the S.E. of China, lies W. of the Tajüling Mountains. It is watered by the Kia-Kiang, which enters the large lake Pojang-hu in the N. by innumerable branches. The surface is hilly, and the Yang-tsi-Kiang forms part of the N. boundary. The chief town is Nan-Chang. See CHINESE EMPIRE.

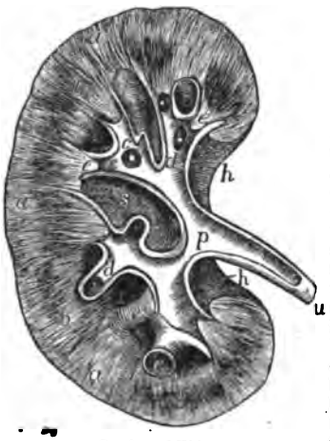
Kiang-Su, a province of China bordering on the Yellow Sea, at the delta of the Yang-tsi-Kiang. It is the richest and most populous province in the capital; its surface is low and flat, and the soil is extremely fertile, yielding much sugar and rice. It is watered by the net-work of streams into which the Yang-tsi divides, and by the Höei-ho, which expands into several large lakes. Nan-King, is the capital, and the treaty ports are Chin-Kiang and Shanghai. See CHINESE EMPIRE.

Kidd'erminster, a town of England, in the county of Worcester, on the river Stour four miles from its confluence with the Severn, and 125 N.W. of London by rail. It is the chief English centre for the manufacture of the finest Brussels and velvet-

pile carpets, employing over 400 power-looms, and producing goods to the annual value of some £700,000. K. has also considerable worsted spinning, damask silk weaving, paper-making, iron and brass founding, brewing, and tanning, and returns one member to Parliament. Pop. (1871) 20,814.

Kid'napping is the offence of carrying off a child or adult. When free from certain intent, K. is only a misdemeanour punishable with fine and imprisonment. See ABDUCTION.

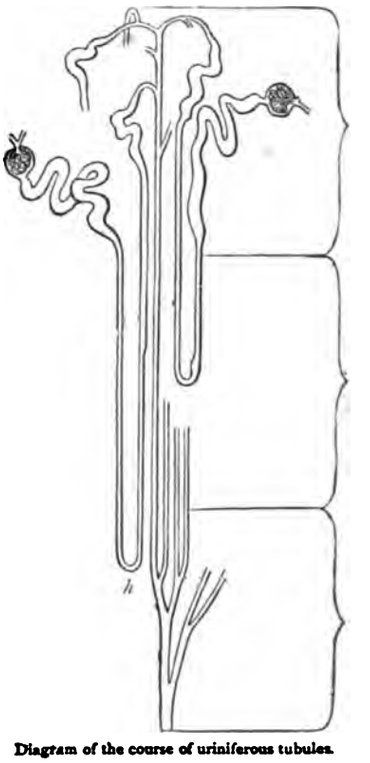
Kid'ney is a glandular organ concerned in the secretion of urine. In the human body there are two, situated one on each side of the vertebral column, at the upper and back part of the abdomen. They are on a level with the last vertebræ of the dorsal region and the upper two or three lumbar vertebræ. The *right* has in front of it the peritoneum, the ascending part of the colon or large bowel, and also at its upper part a portion of the liver. The *left* has in front of it the descending part of the colon, and is in contact, to the left, with the spleen. Each K. is about four inches in length, two inches in breadth, and about one and a half inches in thickness. Each has a convex border externally, and a concave border near the middle line. In this concave border there is a marked fissure or cleft, and to this the term *hilus* (*h*) is applied. In this hilus the renal artery, vein, and the duct or tube, the *ureter* (*u*), which carries away the urine from the K., are situated. The nerves and lymphatic vessels also enter into the substance of the K. through this fissure. On dividing the K. into two equal parts, by cutting it from its convex to its concave border, two distinct parts can be noticed. A part next the hilus, the medullary part, and a part further away, the cortical part (*a*). The medullary part is darker in colour than the cortical, and appears distinctly striated, these striæ converging to certain points near the hilus. Hence the appearance of a number of pyramids, the apices of which are directed towards the hilus, and the bases towards the cortical part. Attached to the sides of these pyramids, about midway between the apices and the bases, and completely enveloping the apices, we have the commencement of the excretory duct or ureter. This duct within the hilus is dilated into a bag, which is moulded upon the papillæ, and thus appears to have on it cup-like depressions. This bag-like dilatation of the ureter is called the *pelvis* (*p*), and the cup-shaped depressions, *calyces* (*c*). The cortical portion of the K. is not striated; it covers the medullary portion, and portions of it extend downwards between the pyramids. It has a granular appearance and is easily torn.



Section of Kidney.

On examining the medullary portion by means of the microscope, the striated appearance is found to be due to this part being made up of tubes, the uriniferous tubules, placed side by side. These tubes communicate with the pelvis of the K. by a number of openings situated upon the apex of each papilla, and in the bottom of the calyces. Traced into the substance of the K. these tubes are found to become convoluted when they pass beyond the limits of the medullary portion into the cortical portion, and finally they end by the bag-like enlargements, the *Malpighian corpuscles*. These tubules have a diameter varying from $\frac{1}{3\,0\,0}$th to $\frac{1}{1\,5\,0}$th of an inch, and the *Malpighian corpuscles* a diameter of $\frac{1}{1\,1\,0}$th of an inch.

The tubules are seen to be composed of an outer wall of connective tissue, the basement membrane, and lining this internally, epithelial cells which, in the straight portion of the tube, are columnar in form, but in the convoluted portion, are more or less globular. The Malpighian corpuscles have also this basement membrane, but the epithelium is of a scaly or flattened form. The kidneys are supplied with blood by two large arteries, *the renal arteries*. Before entering the hilus of the K. each artery breaks up into two or three branches, which again subdivide, and pass into the substance of the K. between the pyramids. On arriving near the bases of the pyramids, the branches communicate by means of arches which are formed here between contiguous vessels. From these arches branches are given off which pass onwards between the straight tubes, and finally pierce the wall of the Malpighian corpuscles. At this point the artery receives the name of *afferent* vessel. Within the corpuscle the afferent vessel breaks up into a loop of capillary vessels. The blood in these is collected into a single vessel, the *efferent* vessel, and this pierces the capsule of the corpuscle. After leaving the Malpighian corpuscle this efferent vessel breaks up into a capillary plexus which surrounds the convoluted tubes, and this plexus pours its blood into larger vessels, the commencement of the *renal vein*. By means of this vessel the blood is conveyed to the *inferior vena cava*, and so to general circulation.


Diagram of the course of uriniferous tubules.

Recent observations have shown that, surrounding the smaller vessels, we have spaces filled with lymph which communicate with the general lymphatic system. Further, the convoluted tubules do not directly become continuous with the straight tubules, but after ceasing to run a convoluted course, they dip down and form a loop, the lower end of which is situated in the medullary part, and then ascend into the cortical part again. This looped tube joins at a right angle with the straight tubule. See diagram (*h*).

Each K. is enclosed in a fibrous capsule. This capsule is so loosely connected with the substance of the K. that it can readily be separated, except at the hilus, where it becomes united to, and continuous with, the pelvis. The pelvis and ureter consist of a fibrous coat, a middle coat of muscular fibres, and an external coat of columnar epithelium.

The nerves which are distributed to the kidneys are derived from the lesser splanchnic nerves, and from the renal plexus. The manner in which they terminate in the K. has not been made out, but from the effect which has been produced upon cutting them in the lower animals, it is very probable that they are distributed in the main part to the muscular coat of the arteries, and regulate the amount of contraction or dilatation of these vessels. Certain of the nerves are also probably distributed to the lining of the tubules, and regulate the activity of the secreting cells.

The chief modifications in the structure of the K. of mammals consist in the absence or alteration in the shape of the pyramids. In many mammals the K. consists of an aggregation of a number of smaller kidneys, each of these presenting a division into a medullary and a cortical part. The general character of the fluid secreted by the kidneys will be considered under article URINE, but it is necessary here to state that we have in urine

water containing in it certain organic and inorganic substances. The organic substances are chiefly urea and uric acid; the inorganic, chlorides of sodium and lime, sulphates of potass and soda, and phosphates of lime and magnesia. The organic substances are separated from the blood by the action of the cells lining the convoluted tubes by a process of secretion. The water and inorganic salts are separated from the blood by a process of filtration, this process occurring within the Malpighian corpuscle. Anything which alters the amount of pressure within the *afferent* or *efferent* vessels, will alter the amount of water and inorganic salts separated. Normally, the *efferent* vessels have a smaller calibre than the *afferent*, and hence there will be a greater pressure in the afferent than in the efferent. Again, the pressure normally is greater within the blood-vessels than in the Malpighian body. If, by any means, the pressures in the afferent and efferent vessels and the Malpighian body be equalised, the process of filtration will be stopped. The separation of the water and salts is influenced by physical conditions. The separation of the urea and uric acid is a vital process, dependent upon the functional activity of the epithelial cells lining the tubules.

Diseases of the K.—The kidneys are subject to various affections, the most important of which is that known as *Bright's Disease* (q. v.), characterised by intense congestion, with exudation and hæmorrhage into the tubes, and desquamation of the epithelium. Inflammation of the K. or Nephritis is also of frequent occurrence, and one or more of the tissues may be affected, as the nerves, the vessels, the parenchyma, or the interstitial connective-tissue. In addition, the cortical substance, the pyramidal, the pelvis of the kidney, or all parts together may be affected, and the affection may be partial or diffused. The parenchymatous tissue is generally implicated, in the first instance, and afterwards, the interstitial tissue, which sometimes undergoes fatty or amyloid degeneration. The diagnosis of these affections is difficult during life, and can be effected only by chemical tests and microscopic examinations of the urine. Most of these affections may terminate in suppuration, which may also depend upon morbid conditions of the blood, external violence, retention of urine, or calculi in the kidney or ureters. The most frequent symptoms of D. of the K. are more or less pain in the region of these glands, shooting along the ureters; a sensation of numbness down the thigh; pain in and retraction of the testicle; frequent desire to void urine, and more or less febrile symptoms. D. of the K. are all of a very serious nature, more especially those of an acute form; but even the chronic forms greatly impair health, and ultimately cause premature death. Suppuration is the most rapidly destructive of all the lesions, and is generally considered to be a fatal disease. Neuralgia of the kidneys is not of very frequent occurrence, and the affection, so termed, usually depends upon the passage of a concretion through the ureter, one of the most painful of all diseases. The pain comes on in paroxysms, with intervening periods of comparative ease, and is usually accompanied by vomiting, profuse perspiration, and a small and feeble pulse. *Suppression of Urine*, or *Ischuria*, although generally a mere symptom of other diseases, is in some cases an independent or idiopathic affection, there being either a complete cessation of the secreting action of the kidney, or such a diminution as to indicate morbid action. If no urine be separated from the blood, the urea retained acts as a poison on the nervous system, causing coma or intense stupefaction, which invariably terminates in death, unless the action of the kidneys be restored. For further information on D. of the K., see BRIGHT'S DISEASE, ADDISON'S DISEASE, DIABETES, CALCULUS, NEPHRITIS, and URÆMIA.

Kidney Bean. The common K. B., French bean, or haricot, is *Phaseolus vulgaris*, largely cultivated for human food both in tropical and temperate regions. Its native country is supposed to be India, from whence it may have come to Europe through the conquests of Alexander the Great. It varies from a low, almost bushy sub-erect plant, to one with stems that twine 6 to 10 feet. As far back as English trustworthy garden records go, it has been grown in that island for the pods, which in the young green state are the most delicate legume in cultivation. They also make an excellent pickle. On the Continent of Europe the ripe seed, called haricots, is largely used, and when properly selected and cooked they are strongly recommended as an article of food, from their digestive and antibilious qualities. The scarlet runner (*P. multiflorus*) is grown for the same purpose as the K. B., and is remarkably prolific. The pretty ripe beans, however, are unwholesome, or even in some degree poisonous, and the root contains a narcotic poison. It is a native of Central America, whence it is stated to have been introduced into Europe in 1633. The genus *Phaseolus*—distinguished by the keel of its flowers being prolonged into a very long beak, which forms a complete or nearly complete spiral—numbers in all about sixty species, mostly tropical, but many besides the above are widely cultivated, such as *P. Mungo*, with nearly cylindrical pods, in India and Africa; *P. lunatus*, in all hot climates; *P. perennis*, in America; *P. rostratus*, cosmopolitan within the tropics.

Kidney Vetch, the name given to the genus *Anthyllis*, belonging to the tribe *Loteæ* of the natural order *Leguminosæ*, from the former reputation of the commonest species, *A. vulneraria*, in kidney complaints. The genus numbers about twenty species, distributed through Europe, Asia, and N. Africa, and the above named is not very rare in Britain in dry pastures, &c. It is a good sheep fodder.

Kie'kie, the native name for *Freycinetia Banksii*, belonging to the *Pandanræ* (screw palms), a lofty climber growing in the northern island of New Zealand. The bracts and young spikes make a very sweet preserve; the narrow leaves, 2 feet long, are used for basket-making.

Kiel, a seaport in the province of Slesvig-Holstein, Prussia, on an excellent harbour at the head of Kieler Hafen, 55 miles N. of Hamburg, has an important trade, manufactures of tobacco, sugar, oil, soap, woollen goods, and machinery, and a university (founded in 1665), with a library of 140,000 vols. Since 1864 its harbour has become an important station for Prussian war-ships. In 1875 there entered the port 3977 vessels, of 332,883 tons, and cleared 4000, of 322,729 tons. K., founded in the 11th c., entered the Hanseatic League in the 14th c. On the division of the duchies it fell to Gottorp, becoming in 1713 the seat of the duke and of the Government, but by the deed of exchange in 1773 was joined to the Danish part of Holstein. On the 14th January 1814, Denmark concluded peace here with England, and also with Sweden, which then lost Norway.

Kiel'ce, a government of the former Russian province, known as the kingdom of Poland, bounded W. by Piotrkov, N. and E. by Kadom, and S. by Galicia. Area, 3897 sq. miles; pop. (1870) 518,730. K. is one of the fairest and most fruitful parts of Poland; more than half the surface is cultivated, and one fourth is forest. The chief industries are iron-smelting, tanning, and the preparation of brandy, beer, and flour.—**K.**, the chief town, 100 miles S.S.W. of Warsaw, and surrounded by high mountains, is a bishop's see, and has some copper-mines, great corn-markets, and considerable trade in iron, flour, and wood. Pop. (1870) 11,000.

Kie'pert, Heinrich, a geographical scholar and chartographer, was born at Berlin, 31st July 1818, and studied (1836–40) at the university of that city, where he showed the peculiar bent of his mind in designing and lithographing many maps of ancient Greece and Italy for the use of his fellow-students. In 1841 he was sent by Ritter, along with Schœnborn and Lœw, on a scientific expedition in Asia Minor, and in 1845 was appointed Director of the Geographical Institute at Weimar. He was called to the Statistical Bureau of Berlin in 1865. His chief works are an *Atlas von Hellas* (new ed. 1871), *Neuer Hand-atlas über alle Theile der Erde* (2d ed. 1867, 40 sheets), *Bibel-atlas* (2d ed. 1854), *Atlas Antiquus* (5th ed. 1869), and *Erdkarte* (1863, 38 sheets. These are all more remarkable for their fulness, freshness, and accuracy, than for their beauty of engraving.

Kiev, or **Kief** (*Kijev*, Polish *Kijov*), one of the four governments of the Ukraine, Russia, is surrounded by the governments Minsk, Tshernigov, Poltava, Kherson, Podolia, and Volhynia. Area, 19,687 sq. miles; pop. (1870) 2,144,276. K. is a fruitful, undulating plain, bounded on the E. by the river Dnieper, which receives from it Pripet, Teterev, Irpin, Ros, and Tjasmin. Corn-growing, cattle-rearing, and beet-sugar manufacture are the chief industries. One quarter of the surface is forest.—**K.**, the chief town, on the Dnieper, 267 miles N. of Odessa, has numerous churches (including two cathedrals, one of which, St. Sophia, is the earliest monument of Russian ecclesiastical architecture), great barracks, an arsenal, an exchange, a theatre, and a university (St. Vladimir, founded in 1833), and carries on important manufactures, chiefly of leather, crockery, chemical

preparations, and mineral waters. There is an extensive fair every January. Pop. (1870) 70,820. K. is one of the oldest towns in Russia, was wrested from the Khazars in 864 by comrades of Rurik, and made the capital of Russia by Rurik's successor. Christianity was here proclaimed to be the national religion of Russia in 988, and the place continued to be the seat of the Russian rulers till 1300. It passed under Lithuania in 1320, and in 1650 under Poland, and reverted to Russia in 1686.

Kikin'da, or **Nagy-Kikinda**, chief town of the comitat of Torontál in Hungary, 130 miles S.S.E. of Pesth by rail, is the centre of an agricultural district with large cattle-rearing. Pop. (1869) 18,834.

Kil'da, St., the most westerly of the Hebrides, Scotland, lies 60 miles W. of Harris, is 3 miles long by 2 broad, and has a precipitous coast, indented by two accessible bays. Area (including several small islets), 4000 acres; pop. (1871) 71. The surface is hilly, rising in one point to a height of 1380 feet, and affording pasture for some black cattle and a breed of Spanish sheep whose wool is of considerable value. There was formerly an export of grain, but now the inhabitants import supplies, and rough weather, by preventing vessels from approaching the island, often cause great hardship—notably in the winter of 1876–77. A curious and touching evidence of the stern religiosity of the islanders was furnished by the fact that when the relief vessel approached late on a Saturday night, they marched down to the shore with their minister at their head, and besought the captain *not to break the Sabbath*, but to wait till Monday before landing provisions (*Scotsman*, May 17, 1877). The chief occupations are fishing and fowling, and the exports are wool, salted fish, oil, and feathers. St. K. belongs to the parish, and is under a resident baron bailie. Gaelic is the common language.

Kildare', an inland county in the province of Leinster, Ireland, is bounded N. by Meath, E. by Dublin and Wicklow, S. by Carlow, and W. by Queen's County, King's County, and Westmeath. Area, 654 sq. miles; pop. (1871) 83,614, being a decrease of 30,874 since the census of 1841. With the exception of low offshoots of the Dublin and Wicklow Mountains in the E., and the conical Hill of Allen (560 feet) in the W., the surface is generally flat. The Boyne, Barrow, and Liffey are the chief rivers, and the Bog of Allen (q. v.) covers 36,000 acres in the N.W. of the county. The soil is a deep fertile loam; the climate, owing to the vast extent of bog, is the moistest of any inland Irish county. In 1871, 138,146 acres were under tillage, 218,035 in pasture, 7585 of plantation, and 53,741 waste, bog, mountain, &c. The rearing of stock and manufactures of cotton, woollen, and linen goods, with paper-making, brewing, and distilling, are the leading industries. K. contains limestone and sandstone, and sends large quantities of peat to Dublin. It is traversed by the Great Southern and Western Railway, and by the Grand and Royal Canals. The chief towns are Athy, Naas, Newbridge, and K. The county sends two members to Parliament. Amongst its antiquities are five round towers, three stone crosses, and numerous ruins of castles and religious houses.

Kildare (Irish Gael. *Cill-dara*, 'church of the oak,' see Joyce's *Irish Names and Places*, vol. i. pp. 106–7), a market-town of Ireland, in the county of the same name, 30 miles S.W. of Dublin by rail. The place is now much decayed, but its former importance is attested by a ruined castle and cathedral, a round tower 132 feet high, and many other antiquities. A weaving-mill, with 150 power-looms, is the only large manufactory. Pop. (1871) 2391.—The *Curragh of K.*, 3 miles E. of the town, is the most famous racecourse of Ireland. It is 6 miles long by 2 broad, and on it a camp has been formed for 10,000 men.

Kil'ia, a fortified river-port of Moldavia, on the left bank of the K. channel of the Danube, 20 miles from its mouth, has extensive fisheries, and is famed for its caviare. Pop. 6400.

Kil'ian, St., the first apostle of the Franks, was an Irish monk who in 686 A.D. left his native land to devote himself to missionary labours, along with twelve companions, among them the presbyter Coloman and the deacon Donatus or Totman. Coming to Würzburg in the Austrasian kingdom, he was made first bishop of that place by Pope Conon (687), converted and baptized Gosbert, the Frankish duke, but was murdered (689) by Geilna, wife of the duke and at the same time his brother's widow, whose marriage K. had pronounced unlawful. He is buried in the Neumünster Kirche at Würzburg, and his anniversary falls on July 8th.

Kilimandja'ro ('the Great Mountain'), the highest mountain in Africa, near the western border of Zanzibar, in the range forming the watershed between the basin of the Nile and the Indian Ocean. It is covered with perpetual snow, and is thought to be about 20,000 feet high.

Kilkenn'y, an inland county of Ireland, in the province of Leinster, is bounded N. by Queen's County, E. by Carlow and Wexford, S. by Waterford, and W. by Tipperary. Area, 796 sq. miles; pop. (1871) 109,479. The surface is hilly, Mount Brandon in the E. attaining a height of 1696 feet, while in the W. are the Walsh Mountains. The chief rivers are the Barrow (q. v.) and its navigable tributaries the Suir and Nore. The soil is argillaceous, affording good tillage and pasture land. In 1871 there were 118,373 acres under tillage, 286,948 in pasture, 11,281 of plantation, and 90,074 of waste, bog, mountain, &c. Agriculture and stock-rearing are the chief occupations, and a once important woollen manufacture has now greatly declined. Anthracite coal of a sulphurous quality is raised from fourteen collieries, and limestone, sandstone, and a fine black marble are extensively quarried. K. returns two members to Parliament. Its only towns with a pop. of over 2000 are K. and Callan. At Dunmore is a remarkable stalactite cavern, and among the antiquities of the county may be noticed the abbeys of Jerpoint and Graig, Grandison Castle, five round towers, and the cromlech of Kilmogue.

Kilkenny, the capital of the county of the same name, Ireland, and itself a county, is situated on the Nore, 28 miles N. of Waterford by rail. It has a Protestant cathedral, dating from the 13th c., restored in 1864; a Roman Catholic cathedral, erected in 1857; and the Black Abbey Church, which, after lying in ruins since the Reformation, was restored in 1864 for the use of the order of St. Dominic. There are several other religious buildings, the ancient castle of the Ormonds, a Roman Catholic college, and a grammar-school, at which Swift, Congreve, and Farquhar were educated. The linen and woollen manufactures of K. have greatly declined, and its chief source of wealth is now a fine black marble, which is largely quarried in the neighbourhood. Pop. of parliamentary borough (1871), 17,012. K. returns one member to Parliament. K. takes its name from a St. Cainneach or Canice, who is mentioned by Adamnan, in his *Life of Columba*, and who died in 598. See Joyce's *Irish Names and Places* (vol. i. p. 140). Strongbow founded a castle here (1172), which was destroyed by Donald O'Brien (1193), but rebuilt by William le Mareschal (1195). A great council of barons of the Pale was held at K. in 1294, and its parliament of 1367 passed the Statute of K., abolishing Brehon Law (q. v.). Richard II. was entertained here by the Earl of Ormond (1399), who had purchased the place in 1391. It was taken by the Lancastrian Earl of Desmond in the Wars of the Roses, and surrendered to Ireton, after repulsing three assaults by Cromwell (1650).

Killar'ney (Irish Gael. *Cill-air-neadh*, 'the Church of the Sloes'), a market-town of Ireland, in the county Kerry, near the N.E. angle of the largest of the lakes of the same name, and 12 miles S. by E. of Tralee by rail. After Tralee it is the chief town in Kerry, and has a modern Roman Catholic cathedral, and several handsome hotels for the reception of the numerous visitors to the famous lakes. There is a slight industry in the carving of articles from the arbutus tree, which grows here wild as in Italy. Monthly fairs are held here. Pop. (1871) 5195.—The **Lakes of K.** are three in number, and are romantically situated at the N.E. base of the Macgillycuddy's Reeks. They are linked together, and are drained by the Leane, through Castlemain harbour, into Dingle Bay. The lower lake, which is the most northerly, is by far the largest, having a length of 5 miles and a breadth of 3. The upper lake is hemmed in by lofty mountains, opening here and there in beautiful glens, and is studded with woody islets.

Killiecrank'ie, The Battle of, was fought in the pass or defile of Perthshire from which it takes its name, 27th July 1689. The forces of William III., 4000 strong, under General Mackay, were defeated by a wild onset of 2500 Jacobite Highlanders, led by Graham (q. v.) of Claverhouse, then Viscount

Dundee. But the death of Claverhouse in the moment of victory 'broke the only bond which held the Highlanders together, and in a few weeks the host which had spread terror through the Lowlands melted helplessly away.'

Kilmar'nock, a town in the district of Cunningham, Ayrshire, Scotland, 12 miles N.N.E. of Ayr, on a small river of the same name which joins the Irvine close by the town. It is one of the principal stations on the Glasgow and South-Western Railway, and is the southern terminus of the Kilmarnock and Barrhead line, opened in June 1873. K. has a fine town hall, an opera house, an athenæum, a large fever hospital, several endowed schools (the Kay's schools), a public park (obtained in 1877), to be adorned with a statue of Burns, and numerous handsome churches. It has extensive engineering works, carpet manufactories, woollen mills, breweries, tanneries, &c., and is the centre of a rich mineral field. The calico-printing for which the town was noted some thirty years ago is nearly extinct, but block-cutting for floorcloths, wall-papers, &c., is carried on to some extent. The district of Cunningham has long been famed for its 'butter and cheese,' and K. is now the seat of the greatest cheese show in the United Kingdom. In October 1876 the 22d annual exhibition of dairy produce, and the 14th cheese fair, was held, when 460 tons of cheese were 'pitched,' representing a value of £35,000. K. owes its name to a St. Marnock (8th c.), but is first mentioned in the 12th c. It was made a royal burgh in 1591, and figures honourably in the Covenanting period. The first edition of Burns's poems was published here in 1786 (reprint and *fac simile* by M'Kie, Kilmarnock, 1867), and the 'Kilmarnock wabsters' are touched off in one of his pieces, the *Ordination*, with more humour than mercy. K. unites with Dumbarton, Port Glasgow, Renfrew, and Rutherglen in electing a member to Parliament. Pop. (1871) 22,952. About a mile N. of the town are the ruins of the Dean Castle (destroyed by fire in 1735), the seat of the once renowned family of the Boyds, Earls of K. See M'Kay's *History of K.* (3d ed. 1864).

Kil'ogramme, a French measure of weight equivalent to 1000 grammes or 2·2046 lbs. avoirdupois.

Kilrush ('the Church of the Wood or the Peninsula'), a seaport and market-town in Clare, Ireland, on a small inlet of the Shannon estuary, 36 miles W. of Limerick and 142 miles W.S.W. of Dublin, is a favourite bathing-place, and has a sheltered harbour, with considerable trade in fish, corn, turf, and farm-produce. K. has some manufactures of coarse linens and woollens, and quarries of stone and slate. Pop. (1871) 4424.

Kilsyth', a town in Stirlingshire, Scotland, 13 miles N.E. of Glasgow, and near the Edinburgh and Glasgow Railway, with stone quarries, and extensive mines of coal and iron. Weaving and paper-making are also carried on. Pop. (1871) 4895. K. was the scene of a crushing defeat of the Covenanters under Baillie, by the Marquis of Montrose, August 15, 1645.

Kilwinn'ing, a town in the district of Cunningham, county of Ayr, Scotland, 3 miles N.W. of Irvine, and a station on the Glasgow and Ayr Railway whence a branch line runs to Ardrossan. It is a very ancient place, and consists mainly of one long irregular street. K. carried on at one time an important industry in hand sewing or embroidery, but the inhabitants are now chiefly engaged in mining. In the immediate neighbourhood are the Eglinton ironworks, employing (1877) 1000 men. Here are the remains of the famous Tironensian Abbey of K., founded in 1140 by the Constable Hugh de Morville, and dedicated to St. Winning (8th c.), from whom the town takes its name. Its last abbot was Gavin Hamilton of the Rosslock family, an ardent opponent of John Knox. The abbey was destroyed in 1560 by order of the Scottish estates, and little survives to enable one to form an adequate idea of the design and magnitude of the structure, or of the richness and splendour of the execution. The present parish church (built 1775) occupies part of its site. The old abbey-steeple (103 feet high) fell August 2, 1814, a few minutes before a band of masons was to have gone to its top to make repairs. K. is perhaps best known as the birthplace of Free Masonry (q. v.) in Scotland. It still continues the ancient game of archery, and has an annual contest for shooting at the Papingo. This game has been practised here for upwards of four centuries. In the neighbourhood is Eglinton Castle, the principal seat of the Earls of Eglinton (see MONTGOMERY, FAMILY OF), and the scene of a memorable tournament in 1839. Pop. (1871) 3598.

Kim'berley, Earl of, an English statesman, born January 7, 1826, succeeded his father as third Baron Wodehouse, May 29, 1846. He was Under Foreign Secretary, 1852–56; Envoy at St. Petersburg, 1856–58; Under Foreign Secretary, 1859–61; Lord-Lieutenant of Ireland, 1864–66; Lord Privy Seal, 1868–70; and Colonial Secretary, 1870–74. His administration of Ireland during a critical period was firm and able. He was created Earl of Kimberley, June 1, 1866.

Kim'chi, R. David ben Joseph, born at Narbonne in 1160 (died about 1235), was a celebrated Jewish commentator, grammarian, and lexicographer. He was the first to discover the distinction between the long and short vowels, and defended a natural and grammatical exegesis at a time when his brethren were almost all enamoured of Haggadic, Cabalistic, and astrological interpretations. His principal work was *Michlol* ('perfection'), which consisted of a Hebrew grammar and a lexicon. Besides which he wrote commentaries on the Pentateuch, the earlier Prophets (Joshua to Kings), the later Prophets (Isaiah, &c.), the Psalms, Ruth, Chronicles, and Job, and a Refutation of Christianity.

Kimm'eridge Clay, the lowest member of the Portland or Upper Oolites (see OOLITIC SERIES), consisting chiefly of blue slaty clays with intermediate bands of sand or calcareous grit. It yields a bituminous clay known as *K. coal*, which burns with a yellowish smoky flame. Fossil remains of the various invertebrate groups and of fishes and reptiles are found—the most characteristic being the lamellibranch species *Gryphea virgula* and *Ostrea delioidea*.

Kimm'eridge Coal Money, a name given to the circular discs of Kimmeridge shale found abundantly in Dorsetshire by antiquaries, who were long puzzled as to the origin and use of the discs. They are now believed to be the refuse parts of the solid pieces of shale from which the Britons and Romans turned bracelets and armlets.

Kim'polung, a town of Wallachia, Roumania, 79 miles N.W. of Bucharest, and 18 S.E. of the Törzburg Pass, in the Carpathians, by which it carries on an active trade with Transylvania. Pop. 10,970.

Kinburn', a Russian fort at the confluence of the Bug and Dnieper, which was captured by Suwarrow from the Turks, 28th June 1788, and again from the Russians by the French and English fleets, 17th October 1855.

Kincar'dineshire, or **The Mearns**, a county on the E. coast of Scotland, of triangular form, bounded N. and W. by Aberdeen, S. by Forfar, and E. by the North Sea. Area 388 sq. miles; pop. (1871) 34,630. It has a rocky coast line of 30 miles, and extends inland 22 miles. On the coast between Bervie and Stonehaven, the two principal towns, are cliffs of 150–300 feet. The E. portion of the Grampians (with Mount Battock, at the W. extremity of K., 2505 feet) occupies the greater part of the county, and terminates in the promontory of Girdle Ness at the mouth of the Dee. To the S. lies the E. part of Strathmore (q. v.), called the 'How o' the Mearns,' a fertile and well-tilled valley of 50,000 acres, and there is also good land in the Dee valley and on the coast. About half of the surface, chiefly consisting of a rich loam, is under cultivation. The prevailing rocks are gneiss and conglomerate on the coast, and granite in the N. In 1876 45,255 acres were under corn, 22,433 in green crops, 46,142 under various grasses, and 6126 in permanent pasture; there were 4748 horses, 28,504 cattle, 32,176 sheep, and 2523 pigs. The cod, ling, haddock, skate, and turbot fisheries are brisk, but the manufactures, confined to coarse linens, are unimportant. K. sends one member to Parliament. Stone circles, cairns, and memorial stones abound. Roman coins and arms, as well as traces of Roman camps, have been found, and there are several ruined towers of the feudal period, the chief being Dunnottar Castle (q. v.).

Kinemat'ics (Gr. *kinēma*, 'a motion') is the science of pure motion. It combines the fundamental conceptions of algebra and geometry, and differs from Kinetics (q. v.) in leaving out of account the nature of the bodies used and the forces producing or called into action by the motion. The description of a surface by the motion of a line, and of a curve by the motion of a point, are familiar instances of kinematical conceptions. The most interesting cases of the K. of a point are considered under

such headings as Curvature, Cycloid, Epicycloid, Fluxions, Harmonic Motion, &c., and need not here be particularly adverted to. The great importance of K. lies not, however, in its purely geometrical applications, but in its bearing upon physical phenomena. It forms, indeed, the simplest introduction to mathematical physics, and has recently been applied with singular success to the more practical departments of science, such as the theory of machines and engineering generally. The motion of a rigid body or of any relatively fixed system of points is completely determined if the motion of any three points not in the same straight line be so. If any plane figure suffer displacement in its plane, the displacement may be accomplished by a rotation round a fixed point in the plane, which is determined by the initial and final positions of any arbitrary line in the figure. A succession of displacements may then be represented by a succession of rotations round a series of points, each of which corresponds to one displacement. By joining these points a polygon is obtained, which is definitely fixed for the given motion. Now, it can be shown that there can be drawn *in* the figure a second polygon which has its sides equal, each to each, to those of the fixed polygon, and which by rolling upon this fixed polygon gives the complete motion to the figure. By supposing the successive displacements small enough, the sides of these polygons may be diminished indefinitely, and the polygons become ultimately for a continuous finite displacement continuous curves. Hence any displacement of a rigid solid in directions wholly perpendicular to a fixed line may be produced by the rolling of one cylinder fixed in the solid upon another fixed in space—the axes of the cylinders being parallel to the fixed line. The point about which the figure at any instant is rotating is called the *instantaneous centre* of rotation. (See ROTATION.) The application of these and other purely kinematical theorems to the theory of machines has been given in an admirable treatise on *Theoretische Kinematik* (1874–5) by Professor Reuleaux of Berlin, translated by Professor Kennedy of University College, London (1876). See also Professor Kennedy's *Kinematical Models*, one of the science lectures delivered at the South Kensington Loan Exhibition in 1876. Another very important class of kinematical problems will be considered under the article STRAIN. K., with many of its applications to the theory of curves and surfaces, forms the first preliminary chapter of Thomson and Tait's *Natural Philosophy*.

Kinet'ics is the branch of Dynamics (q. v.) which investigates the motions of a material system resulting from the action of given forces, or discovers the combination of forces necessary to produce a given motion. The simplest problems are those which relate to the motion of a single particle under the action of a single force, and for problems of this nature Newton's first and second laws of motion (see MOTION, LAWS OF) are necessary and sufficient. The introduction of conditions of restraint, such as that the motion takes place in a resisting medium or along a definite path, results only in increasing the difficulties of the mathematical analysis. When, however, the motion of two or more particles in physical connection is to be investigated, a further principle is necessary, which is fully supplied by Newton's third law. In the scholium to this law Newton reckons the forces of resistance against acceleration as reactions equal and opposite to the actions which produce the acceleration. In other words, all the forces acting upon a system form with the reactions against acceleration an equilibrating set of forces; and this is the explicit statement of the principle enunciated by D'Alembert in 1742, and still known by his name. Its symbolic representation enables us to write down at once the equations of motion for any system for which the equations of equilibrium have been investigated. This principle Lagrange made the basis of his *Mécanique Analytique* (1788), a work which contains theorems of extraordinary beauty and generality, and is to be ranked along with Newton's *Principia* (1687) and Laplace's *Mécanique Céleste* (1798–1825). To Laplace we owe the first use in the theory of attraction of that function which is now known as the *Potential* (q. v.); while Lagrange developed in his remarkable system of generalised co-ordinates a general method for the solution of any dynamic problem. The whole investigation turns upon the mathematical treatment of a certain quadratic function of the rates at which the generalised co-ordinates vary. This function is now recognised as the kinetic energy (see ENERGY) of the system, and is the characteristic element in Maupertius' principle of least action (see ACTION, PRINCIPLE OF LEAST), the importance of which in dynamical science was first fully appreciated by Lagrange. The principle of *Varying Action*, an extension of the above by Sir W. R. Hamilton of Dublin, is by far the most valuable development since the time of the French physicists. This principle led, in the hands of its inventor, to a general dynamic theory, by which the whole motion of any conservative system is determined by means of a single function known as Hamilton's *Characteristic Function*. It is the so-called action, and is a function of the co-ordinates and of a constant which is the sum of the kinetic and potential energies of the system. There are several special departments of K. which have not here been touched upon, and will be mentioned merely for reference, such are hydrokinetics and electrokinetics, which are discussed under HYDRODYNAMICS and ELECTRICITY. See Thomson and Tait's *Natural Philosophy;* Tait and Steele's *Dynamics of a Particle;* Clerk Maxwell's *Electricity and Magnetism;* and the numerous elementary text-books upon mechanics and dynamics.

King, the chief of a nation, first in rank and power, holding a permanent life office, and, at least in the modern conception, personally irresponsible for his actions. He may be either hereditary or elective, his power absolute or limited; while the office itself may be open to both sexes, or confined to males alone, and religious consecration may or may not be essential to its due investiture. Still the germ of all kingship lies involved in the word *king*, which is identical with the Sansk. *janaka*, 'father,' both springing from the same root as the Eng. *kin*, the Gr. *genos*, and the Lat. *gigno*. From the head of a household the title passed to the head of a clan, a tribe, a nation, the power of its holders always increasing proportionately to the decrease in their number. The further we go back in the history of a people, the greater we find to have been the number of petty kingdoms, the smallest of which was formed, probably, by the absorption of states, similar in nature to, but smaller than itself. In this process of natural selection, two leading principles were at work —those of election and hereditary succession. By the one the people had a voice in the appointing of their leader; by the other he must come of a chosen and divine stock, he must be able to claim founder's kin with Zeus or Woden. Thus only would he be the noblest of a noble line. At first the K. was the chieftain of his people, not the holder of a territorial dignity. We meet early with a K. of the English, an Emperor of the Romans, a Duke of the Normans, but such titles as K. of England or France are comparatively modern; they belong to a later age when kingship had passed from chieftainship of a people to lordship of the soil. Only as lands, originally held in trust for the nation, came to be looked on as the K.'s personal estate, did men begin to ask why those lands should not pass, like any other territorial possession, by a fixed law of succession, and Primogeniture (q. v.) became the rule of their transmission. Again, the conceptions of an Emperor (q. v.) were blended with those of a K., and the modern theory grew up by which the Crown is regarded as the fountain of justice, the original grantor of all landed property, the source of the national assembly itself. In England, however, isolated from Roman influences, the primitive institution remained least altered. The eldest son of a deceased sovereign obtained a preference, but no more. We often speak of Harold, Stephen, and John as usurpers, but if they were such, then Ælfred, Eadward the Confessor, and, in more recent times, William III. and his successors were usurpers likewise. And as the English nation retained its elective rights, so too it retained its power of deposition. Thrice before and twice since the Conquest has a K. been deprived of his kingly office, whilst in three instances, though not formally deposed, he has been removed from all authority. Elsewhere, on the Continent, hereditary descent triumphed over election, and the more firmly established it became, the greater were the convulsions and alterings of old landmarks when from any cause it was once broken through. Hence, nowhere plainer than in England can modern kingship be traced to its primeval source. Here its stream may have widened and changed much of its early character, but it remains essentially the same waters, hemmed in by the same banks—Victoria is the descendant of Cerdic and Cymric, as her Parliament is the continuation of the West Saxon Witenagemôt. See Freeman's *Comparative Politics* (Lond. 1873), and vol. i. of his *Norman Conquest* (Oxf. 1870).

King'bird (*Tyrannus intrepidus*), or **Tyrant Flycatcher**, a species of *Insessorial* birds belonging to the section *Dentirostres*, and to the family *Muscicapidæ* or Flycatchers. The K. arrives in the United States in April, and leaves on its southward journey at the close of autumn. It derives its popular name from its tyrannical and active habits. The plumage is ashen-grey above; the head black, and provided with an erectile crest of feathers of an orange hue at their bases. The tail is black, tipped with white; the under parts, of a greyish-white hue. The average length is 8 inches.

King-chu, a walled city of China, province of Hu-pe, on the left bank of the Yang-tsi-Kiang. It lies 150 miles W. of Hankow, and is of some military importance. Pop. 500,000.

King Crab (*Limulus*), or **Molucca Crab**, the popular name of a peculiar genus of *Crustaceans*, forming the type of a special order, that of the *Xiphosura* ('sword-tailed'), whilst the curious extinct forms included in the order *Eurypterida*—such as the *Pterygotus*—are nearly related to the living K. C. In these crustaceans the head and chest form a large convex buckler of horse-shoe shape, bearing unstalked, compound eyes on its upper surface. The mouth has a small labrum or upper lip, and six pairs of appendages in the form of legs provided with nipping-claws, the bases of these legs being spinous, and serving as jaws. The first pair of appendages represents the *antennæ* or feelers. The abdominal segments—six in number—bear the gills and reproductive organs, covered by an *operculum*, on their under surface; and the *telson* or last joint of the body is prolonged to form a long spinous tail, from which the name *Xiphosura* has been derived. This tail is used by these crabs as a lever in enabling them to alter their position in the water. The *Limulus polyphemus* is the common species. The K. Crabs occur in the Indian and Japanese Seas, and are also found on the N. American coasts. Their eggs are considered delicacies by the Malays, who use the spinous tails to form spear-heads.

King'fisher, the name given to various *Insessorial* birds belonging to the section *Fissirostres* (q. v.). The genus *Alcedo*, to which the common K. (*A. ispida*) belongs, is distinguished by a long bill, the nostrils being of oblique form, and covered by a plumed scale. The second and third quills are the longest. The tail is short, and the hinder toe stout and broad. This bird is of common occurrence in Britain, and has varying hues of dark green and glossy blue on the upper parts, the under parts being chestnut, and the throat and breast white. The average length is 7 inches. The K. is usually of solitary habits, and may be known by its quick rapid flight on the banks of rivers, in which its characteristic food is found. It is extremely deft in catching fish, and will sit motionless for long periods watching the water from the branch of a tree. Small fishes are swallowed at once, prey of larger bulk being dashed against stones so as to soften it prior to its being swallowed. The nest is made in the banks of rivers, and is usually found in a deserted rabbit or rat hole. The eggs number from six to eight, and are of a pinkish colour. Within the nest the rejected scales and bones of fishes may be found. The tiny K. (*Alcyone pusilla*) inhabits N. Australia and New Guinea, and resembles the common K. in habits. Its colour is blue. The azure K. (*A. azurea*) inhabits New S. Wales. Of other species, one of the best-known is the belted K. (*Ceryle Alcyon*) of N. America, which has a head-crest of feathers, and is blue on the upper parts, a belt of blue crossing the chest. Its length is about 12 inches. The tridactylous K. (*Ceyx tridactyla*) inhabits Java and the E. Archipelago generally; a well-known Australian form being the *Halcyon Sancta*. The great African K. (*Ceryle maxima*) is found in W. Africa, and attains a length of 15 inches. Its colour is an ashen grey mottled with brown. By the ancients the K. was credited with marvellous powers of stilling the tempestuous sea, and of bringing forth its young upon a floating nest. Hence has arisen the metaphor 'halcyon-days,' &c. See HALCYON DAYS.



American Kingfisher.

King George's Sound, an inlet on the S. coast of Western Australia, containing a good roadstead and two sheltered harbours. The entrance is in 35° 6′ S. lat., 118° E. long. The only present importance of K. G. S. is as a coaling station for the mail steamers running between Ceylon and Melbourne.

King'lake, Alexander William, the historian of the Crimean War, was born in 1811, and educated at Eton and Cambridge. He practised at the Chancery bar from 1837 to 1856, and was member for Bridgewater from 1857 to 1868. His first work, *Eöthen*, a graceful and popular account of Eastern travel, appeared in 1844. He published the first two volumes of his *Invasion of the Crimea* in 1863, the fifth, which deals with the battle of Inkerman, in 1875. A cabinet edition, in 6 vols., is in course of publication; the fifth vol. appeared in June 1877. Both in literature and Parliament he has been a bitter opponent of French imperialism.

King's Bench. See QUEEN'S BENCH.

King's Book. By 36 Henry III. c. 3, it is enacted that commissioners shall be appointed in every diocese to certify the value of every ecclesiastical benefice and preferment, and according to this valuation the first-fruits and tenths were in future to be collected and paid. This *valor ecclesiasticus* is what is called the K. B. A transcript of it is given in Ecton's *Thesaurus* and Bacon's *Liber Regis*. But the whole of this document has been printed by the commissioners appointed to examine into the state of the public records, and copies distributed to many public institutions.

Kings, Books of, which are reckoned as one book in the MSS. of the Hebrew Scriptures, the division into two having been introduced from the LXX. and Vulgate in the 16th c., are a continuation of the narrative of the Books of Samuel (q. v.). They contain the annals of the Israelites from the accession of Solomon (B. C. 1016) to the destruction of Jerusalem by Nebuchadnezzar (587). See JEWS. Regarding the author of the Books of Kings, tradition—in the Talmud, Rabbis, and Christian Fathers—points to Jeremiah, and the prophetico-didactic character of the books favours the opinion, besides the similarity of 2 Kings xxiv. 18, xxv. 30 to Jeremiah lii. Some find a difficulty, however, in the age of Jeremiah, who began to prophesy in the 13th year of Josiah, from which time till the carrying away of Jehoiachin was sixty-six years, and think it more probable that the author was Baruch, who edited the Book of Jeremiah (q. v.).

King's College, Cambridge, was founded in 1441 by Henry VI. as an appendage to his earlier foundation of Eton College (q. v.), and reconstituted in 1443 on a much larger scale. Under the new statutes of 1861, it consists of a provost, at least forty-six fellows, and at least forty-eight scholars. The fellowships are open to all members of the college who have taken their B.A., and whose standing after such degree does not exceed three years. Of the scholarships, twenty-four of £80 value, with rooms, commons, and tuition free, are appropriated to the scholars of Eton; whilst the others, of £80, with free tuition, are open. The college gives away eight exhibitions and fourteen prizes, and presents to thirty-eight livings. In 1876 it had thirty-six undergraduates. Its chapel, the glory of Cambridge, was commenced in 1446 and completed in 1532, and is in the Late Perpendicular style. Its internal dimensions are—length, 209 feet; breadth, 45½; height, 76. The fan tracery of its unsupported stone roof, the fifteen ancient stained-glass windows, and the richness of the carvings, render this one of the finest pieces of architecture in England. The remaining buildings are mostly of a later date.

King's Counsel or **Queen's Counsel** is a rank given to certain barristers in England and Ireland, and to certain advocates in Scotland. The office is honorary, but it gives a right of precedence in all the law courts.

King's County, an inland county in the province of Leinster, Ireland, lies between Kildare on the E. and Roscommon and Galway on the W., and is separated from the latter by the Shannon. Area, 772 sq. miles; pop. (1871) 75,900. It is bordered on the S. by the Slieve-Bloom Mountains, watered by the Brosna and the head streams of the Boyne and Barrow, occupied in great part by the Bog of Allen (q. v.), and traversed by

the Grand Canal and the Dublin and Galway Railway. Exclusively an agricultural county it has a good loamy soil in many parts, and is distributed (1871) as follows:—130,583 acres under tillage; 222,680 in pasture; 8129 in plantation; 1733 under rivers and lakes; and 130,860 in waste, bog, mountain, &c. There is better farming here than in many other parts of the country, and the holdings are on an average of about 39 acres. Grazing is carried on extensively along the valley of the Shannon, and sheep-farming in the uplands in the N. bordering on W. Meath. The county sends two members to Parliament, and its chief town is Tullamore. There are many Danish raths, ruined castles, and ecclesiastical remains, such as the Abbey of Clonmacnoise (Irish Gael. *Clain-mic-Nois*, 'the retreat of the sons of the noble,' or more probably, 'the meadow of the son of Nos'), of date 548. The great tribe of the O'Connors were the former possessors of the country, which was assigned to English settlers and made shirelands in 1557 under the names of King's and Queen's County in honour of Philip and Mary.

King's Evil. See SCROFULA.

King's or **Queen's Evidence.** A criminal allowed to become a witness against an accomplice is so called. In England the admission is held to infer a promise of recommendation to mercy. In Scotland, by the mere act of calling an accomplice as a witness, the prosecutor forfeits his title to proceed against him for the crime in question.

Kingsley, Charles, was born at Holne Vicarage, Devonshire, 12th June 1819, entered Magdalen College, Cambridge, 1840, was appointed curate of Eversley, Hampshire, 1842, and rector, 1844, and married at the same time a daughter of Mr. Grenfell, M.P. His first publication was *Village Sermons*. In 1848 appeared the *Saint's Tragedy*, of which Bunsen remarked that it proved the author capable of continuing Shakespeare's great series of historic dramas. Though wanting in definiteness, it is a powerful delineation in the person of Elizabeth of Hungary of the natural struggle of the pure affection against the repressions and mortifications inculcated by a medieval priesthood. *Alton Locke* was published in 1849, and is perhaps his most powerful work. It earned him the title of the 'Chartist parson,' and contains vigorous descriptions of London life among the working classes, with sociological views suited to the author's sympathies. *Yeast* followed in 1851, and developed the same problems in reference to the agricultural labourers. It abounds with passages of the most intense and indignant realism. *Hypatia* in 1853 and *Westward Ho!* in 1858 are historical novels, the former handling with much brilliance and some inaccuracy the advance of early Christianity in the face of paganism, the latter, with fiery emphasis and intense realisation of the circumstances, painting the opening of the New World to the Elizabethan voyagers. In 1859 K. was appointed Professor of Modern History at Cambridge, Canon of Chester (1869), and Canon of Westminster (1873). He died at Eversley, January 23, 1875. After 1858 his natural force began to abate, but throughout the whole of his works there may be found an admirable wholesomeness of tone, an incisive honesty of expression, and an ardent, chivalric, yet practical enthusiasm. Among the best known of his other works are *Sermons on National Subjects, Phaethon, Alexandria and her Schools, Glaucus, The Heroes, Two Years Ago, The Water-Babies, Hereward, Madam How and Lady Why; At Last: a Christmas in the West Indies.* K. was a poet as well as a novelist and social reformer. Some of his lyrics are among the truest and tenderest written in modern times. *O Mary, go and call the Cattle Home; Three Fishers went Sailing out into the West*, &c., will long be remembered and sung. See *Charles Kingsley; His Letters and Memories of His Life*, edited by his wife (Lond. 1876).—**Henry K.,** brother of the above, born at Holne Vicarage, Devon, in 1830, was educated at Worcester College, Oxford, and lived in Australia from 1853 to 1858. He earned great popularity as a novelist, his chief works being *Geoffrey Hamlyn* (1859), *Ravenshoe* (1861), *Austin Elliot* (1863), *The Hillyars and Burtons* (1865), *Old Margaret* (1871), and *Number Seventeen* (1875). From 1869 to 1871 he edited the Edinburgh *Daily Review*. K. died May 24, 1876.

King's Lynn, or **Lynn Regis,** a port of England, in the county of Norfolk, on the right bank of the Great Ouse, 4 miles above its entrance into the Wash, and 90 N.N.E. of London by rail. It has several good churches, the W. Norfolk Hospital, and a grammar school. There is a considerable export of agricultural produce, and the chief imports are coal, timber, wine, spirits, tobacco, hemp, and oilcake. In 1875 there entered and cleared the port 1587 vessels, of 207,821 tons. Pop. (1871) 17,266. The town returns two members to Parliament.

Kings-of-Arms, the chief officers of the Heralds' College (q. v.), are three in number—Garter, Norroy, and Clarenceux. Of these Garter (instituted 1417) is head, while Norroy and Clarenceux are provincial kings of the country N. and S. of the Trent respectively. A fourth king-of-arms—Bath or Gloucester—attached (1725) to the Order of the Bath (q. v.), and whose jurisdiction extends to the Principality of Wales, has no place in the Heraldic Chapter. Scotland and Ireland have each their king-of-arms—Lyon (q. v.) in the former, and Ulster (q. v.) in the latter country.

King'ston, the capital and chief commercial town of Jamaica, lies on a splendid landlocked harbour in the S.W. of the island, 12 miles S.W. of Spanish Town by rail, and in a plain at the base of the Blue Mountains. It is supplied with good drinking water by a magnificent aqueduct, has no important buildings, but is surrounded by rich sugar-plantations and numerous villas and gardens. The harbour is enclosed on the S. by a tongue of land, and is defended by several strong forts. In 1870 the value of the exports, mainly rum, sugar, tobacco, and dye-woods, was £1,263,162, and of the imports £1,320,030. In spite of the land and sea breezes the climate is very hot, and there is much yellow fever. Pop. 35,000. K. was founded after Port Royal had been destroyed by the great earthquake of 1692, and named in honour of William III. It was in great part destroyed by fire in 1782, and again in 1843. A bishopric was established here in 1856.

Kingston, a town of Canada, in the province of Ontario, on the lower extremity of the lake of that name, 95 miles S.W. of Ottawa, and 172 W.S.W. of Montreal by rail, is next to Quebec the most strongly fortified place in the Dominion. In 1870 it had seventeen churches of various denominations (including a Catholic and an Anglican cathedral), three banks, three newspapers, and numerous benevolent and educational institutions. There are fine wharves, well adapted for the large grain-shipping trade, and extensive ship-yards, besides foundries, machine and piano factories, breweries, tanneries, &c. With Queen's University (founded in 1841) was incorporated (1866) the Royal College of Physicians and Surgeons, the former with eight, the latter with twelve professors. K. occupies the site of the old French fort of Frontenac (1673–1758), the present city having been founded in 1784 and incorporated in 1838. Pop. (1871) 12,407, who return two members—one to the House of Commons and one to the Provincial Parliament.

Kingston-upon-Thames, a market-town of England, in the county of Surrey, 12 miles S.W. of London by rail, stands on the right bank of the Thames, which is here spanned by a five-arched stone bridge and an iron railway viaduct. Besides the fine cruciform parish church, there are six district churches, a grammar-school, town-hall, &c. Malting is the leading industry. The parish includes several important suburbs, consisting mainly of villas, which have sprung up of late years. From antiquities discovered near the town, it has been identified with the Roman *Tamesa;* the first English name *Moreford* was changed to *Cyningestun*, from its being the coronation-place of the early English kings, the stone on which the monarch sat during the ceremony now standing near the Assize Court. Pop. of municipal borough (1871) 15,263.

Kingstown, a seaport of Ireland, on Dublin Bay, 6 miles S.E. of Dublin by rail, is a place of growing importance, being the station for the Liverpool and Holyhead mails. Its harbour, constructed in 1816 at a cost of upwards of £700,000, has an area of 251 acres, and is protected by two piers, 3500 and 4950 feet in length. K. is also a fashionable watering-place, and has fine hotels, baths, villas, and racecourse, &c. The older name, *Dunleary* (Irish Gael. *Laeghaire's Dun*, 'the hill of Laeghaire,' king of Ireland in the time of St. Patrick), was changed to K. in honour of a visit of George IV. in 1821, at which time it was a mere fishing village and collier haven. Pop. (1871) 16,378.

Kingstown, the capital of the British island of St. Vincent, West Indies, on an inlet which forms a good harbour. It is well built and fortified, and has fine botanical gardens. Pop. 5000.

King's Yellow, a pigment formed of a mixture of the sesqui-oxide and the golden yellow sesqui-sulphide of arsenic. See ORPIMENT.

King-te-Ching, a town in the province of Kiang-Si, China, on the Tchang-Kiang, 56 miles from its entrance into Lake Pojang. It is the chief seat of the porcelain industry in the empire, and has a pop. of 200,000.

King'wood, a scarce and beautiful Brazilian wood believed to be derived from a species of *Dalbergia* (*Triptolemæa*).

Kink'el, Johann Gottfried, born 11th August 1815 at Oberkassel in Rhenish Prussia, became (1838) a pastor at Bonn and 'Docent' in Church History, but after his marriage (1843), chiefly studied the history of art, of which he was made professor in 1846, having published (1845) *Die Altchristliche Kunst*, the first part of a great work never completed. K. was an active socialist in 1848, but was seized (June 1849), and sentenced to perpetual imprisonment, from which he escaped November 1850. For some years he taught in England German and the history of art, of which last he became professor at Zürich in 1866. A collection of *Gedichte* by K. has passed through nine editions (1843–73), and a longer poem, *Otto der Schütz*, reached its 34th in 1875.

Kin, Next of. See NEXT OF KIN.

Kinnaird's' Head, a high promontory near Fraserburgh, on the N.E. coast of Aberdeen, 20 miles E. of Banff, with a light-house 120 feet high.

Ki'no, the name of various astringent gums. The Indian K. is derived from *Pterocarpus marsupium*, and the African from *P. erinaceus*, both large trees belonging to *Leguminosæ*. It is extracted by making incisions in the bark from which the juice exudes, and hardening into a brittle mass by exposure to the air, is easily broken into little angular shining fragments of a bright ruby colour, in which state it comes to market. Several species of the Australian genus *Eucalyptus*, also yield a red resinous juice which consolidates into a substance resembling K., and the dhak (*Butea frondosa*) supplies largely Bengal K., used by the natives for tanning leather. The K. of Materia Medica is the Indian import obtained from *P. marsupium*, and is employed in diarrhœa, dysentery, &c., much as *catechu*. It contains about 75 per cent. of tannic acid.

Kinross'-shire, after Clackmannan the smallest county of Scotland, bounded on the N. and W. by Perthshire, S. and E. by Fife, is 12 miles from N. to S., and 13 from E. to W. Area, 78 sq. miles; pop. (1871) 7198. K. is mainly an undulating tract of low hills surrounding Loch Leven (q. v.), and drained by it. The Ochils skirt the N., and the Cleish Hills the S., while the Lomond Hills occupy the E. The soil is in general gravelly, but becomes richer N. and W. of the lake, and the chief formation is Old Red Sandstone, with coal measures in the S. In 1876, 7630 acres were under corn, 4021 in green crops, 11,208 under various grasses, and 8518 in permanent pasture; while horses numbered 1011, cattle 6133, sheep 23,155, and pigs 597. K. unites with Clackmannan in sending a member to Parliament. Kinross, the county town, 14 miles by rail from Dunfermline, had (1871) 1926, and Milnathort, 2 miles by rail to the N.E., 1312 inhabitants, chiefly occupied in the manufacture of tartan shawls.

Kinsale' (Irish Gael. *Ceannsaile*, 'head of the brine'), a seaport of Ireland, in the county of Cork, on the left bank of the estuary of the Bandon, which forms K. Harbour, and 14 miles S.S.W. of Cork by rail. The sheltered harbour affords anchorage for 300 vessels, but its foreign commerce has been wholly absorbed by Cork, while the fishing-craft, which in 1850 numbered 798, had in 1875 fallen to barely half that number. K. is, however, a much-frequented bathing-place, and has a town-hall, barracks, assembly-rooms, &c. It returns one member to Parliament. Pop. (1871) 5530; of parliamentary borough (including part of Ringcuran) 7050. K. is an ancient place, having given title to the De Courcy family since 1181. It was burnt in 1594, seized by the Spaniards in 1601, and was the place where James II. landed from France in 1689.

Kintyre'. See CANTIRE.

Kiosk', an eastern garden pavilion, open on all sides, and surmounted by a dome supported on pillars; also, a latticed chamber, projecting from the upper story of a building, common in Turkish and Persian palaces.

Kip'tshak, or **Deshti-K.** (*i.e.*, 'Steppe of K.'), the name given by Eastern writers in the Middle Ages to the wide district watered by the lower Ural, Volga, Don, and Dnieper, and inhabited by rude nomads, chiefly of Turkish stock, but better known as the name of the western quarter of the empire of Genghis Khan, which fell to his eldest son Jujy, and which stretched from the interior of European Russia and the Caucasus eastwards to Dzungaria, and from Siberia southwards to the Caspian, the Ural, and the Sir. Jujy died early, but his successor Batu conquered all the rest of Russia, and made his way to Silesia. The K. empire or territory of the 'Golden Horde' (from Mongol *ordo*, 'a tent'), was broken up in the 15th c. into the khanates of Kasan, Astrakhan, and Krim, which passed into Russia respectively in 1552, 1554, 1783.

Kir'by, Rev. William, was born at Witnesham, Suffolk, 19th September 1759, educated at Caius College, Cambridge, and took holy orders in 1782. From his mother he received the first initiative towards zoological study. In 1788 K. became a member of the Linnæan Society, which was newly started, contributed (1793) *A Description of Three New Species of Hirudo*, and other papers during the next few years. *A Monograph Concerning English Bees* appeared (1802); *The Introduction to Entomology*, written along with Spence (1826); *Habits and Instincts of Animals* (1830), a Bridgewater treatise. K. was honorary president of the Entomological Society, Fellow of the Royal and Geographical Societies, and corresponding member of many foreign societies. He died 14th July 1850. K. was a good observer, but his contributions to science were made chiefly from the picturesque and anecdotical point of view. See Freeman's *Life of the Rev. W. K.* (Lond. 1852).

Kirch'heim ('Kirkhome'), a town in the Danube district of the kingdom of Würtemberg, on the Neckar, 15 miles S.E. of Stuttgart, with which it is connected by railway, has the largest wool-market in S. Germany, and manufactures woollens, linens, and machinery. The ancestral castle of the Dukes of Teck is 6 miles distant. Pop. (1875) 6197.

Kirghis', a nomadic people of Turkish race who occupy a vast region of Central Asia known as the K. steppes, stretching from the Caspian to the Altai Mountains, and from the Sea of Aral to the rivers Tobol and Irtish. The K. are akin in language and race to the Uzbeks, and are divided into the two great branches of the K.-Kazaks or Kaizaks, and the Kara-K. ('Black K.'). The Kara-K., called Buruk by the Chinese, and Dikokamanniye by the Russians, dwell partly in Dzungaria and Turkestan, and partly in the E. portion of the Altai Mountains. They form the two distinct tribes of the *On* and the *Sol*, which again are split into many minor divisions, and which are not held together by the slightest bond of union. The K.-Kazaks, about 450,000 in number, are for the most part subject to Russia, and are divided into the three hordes—the Great Hordes (*Ulú-djús*), dwelling on the S. of the lake of Balkash, toward the lake of Issik-kúl; the Middle Horde (*Orta-djús*), between Balkash and Omsk in Siberia, and the Little Horde (*Kütchük-djús*), scattered as far W. as Tashkend and the river Chúi. The K. are wandering herdsmen or shepherds, and live in *yourts* and *kibitkas*, or felt tents; they are excellent breeders of cattle, and their food is mostly prepared from milk. The various tribes, especially those of the Kazaks, are much given to robbing and fighting with each other. The men are usually below middle size, but are strong and hardy, and have high cheek-bones, and eyes deep-set, and slightly oblique. The women, who do most of the work, are frequently handsome. An intoxicating beverage is made from sour mare's milk. Mohammedanism is the nominal religion, but there are no priests or mosques, and the faith only shows itself in a few rites and ceremonies. In the beginning of the present century the K. were deservedly known as 'the slave-hunters of the steppes,' as they regularly attacked caravans and sold their captives in the markets of Khiva and Bokhara. See Zaleskij's *La Vie des Steppes-Kirghises, Descriptions, Récits, et Contes* (Paris, 1865); Atkinson's *Travels*, &c. (Lond. 1860); Herr Wagner's *Reisen in den Steppen* (Leips. 1864), and Hellwald's *Russen in Central-Asien* (Eng. transl. Lond. 1874).

Kirkcald'y, a town of Scotland, in Fifeshire, on the N. shore

of the Firth of Forth, and a station on the North British Railway. With its suburbs, it is about three miles in length, and is hence known as the 'Lang Toun.' Its chief manufactures are linen, spun flax, and jute, wax-cloth, iron-wares, and pottery. The harbour, which is commodious, was entered in 1875 by 1175 vessels of 78,392 tons, and cleared by 2611, of 242,402 tons. The exports are linen and yarns, coals, &c., and the imports, flax, grain, and timber. Together with Dysart, Kinghorn, and Burntisland, K. sends one member to Parliament. Pop. (1871) 12,422. K. belonged to the abbots of Dunfermline from 1334 to 1450, and shortly after the latter date was made a royal burgh, having its charter ratified by Charles I. in 1644. Adam Smith was born here.

Kirkcu'dbrightshire, or The Stewartry of Kirkcudbright, a county in the S. of Scotland, bounded N. and N.W. by Ayrshire; S.W. by Wigtownshire and Wigtown Bay; S. and S.E. by the Solway; and E. and N.E. by Dumfriesshire. Area, 954 sq. miles; pop. (1871) 41,859. K. stretches 44 miles from E. to W., and from N. to S. 40 miles. The surface is in general hilly and even mountainous, especially in the N.W. and N., where Merrick rises to 2764 feet, the Rhinns of Kells to 2688 feet, Cairnsmuir of Deugh to 2612 feet, and Blacklarg to 1950 feet. In the S.W. Cairnsmuir of Fleet reaches 2331 feet, and in the S.E. Criffel 1800 feet. The principal rivers are the Cree, between K. and Wigtownshire, the Ken (with its affluent the Dee), widening into Loch Ken, on its way to the Solway at Kirkcudbright, the Urr, and the Nith, separating the S.E. of K. from Dumfriesshire. There are numerous small lakes. Most of the rocks belong to the Lower Silurian; but many of the mountains are granite. One-fourth of the surface is arable, but the upland districts afford good pasturage. In 1876, 32,618 acres were under corn, 17,610 in green crops, 47,444 under various grasses, and 75,062 in permanent pasture. Horses numbered 5366; cattle 41,229; sheep 369,334; pigs 7444. K. is traversed from Dumfries to Newton-Stewart by the Caledonian Railway. The towns are Kirkcudbright, the county town, on the Dee estuary, with a pop. of (1871) 2464, Maxwelltown, a portion of Dumfries, with (1871) 4198, and Castle-Douglas, with (1871) 2210 inhabitants. The county sends one member to Parliament.

Kirk'dale Cave, a remarkable cavern in the Oolitic limestone in the vale of Pickering, Yorkshire. It was discovered in 1821, is about 250 feet long, and contains the remains of extinct species of mammals, which were first described by Buckland in his *Reliquæ Diluvianæ*. Amongst them are the bones of elephants, hippopotamuses, rhinoceroses, cave-bears, hyænas, tigers, horses, &c.

Kirk'ham, a market-town in Lancashire, England, 2 miles N. of the Ribble estuary and 24 miles N.W. of Manchester, makes cottons, sailcloth, and sacking. Pop. (1871) 3593.

Kirkintill'och (a corruption of the Celtic *Caerpentulach*, 'the fort at the end of the ridge'), a market-town in Dumbartonshire, Scotland, 6 miles by rail N.E. of Glasgow on the Forth and Clyde Canal, with calico-works, mines of ironstone and coal, and stone quarries.

Kirk Kiliss'ia, or **Saran'ta-Ekkles'iés** ('forty churches'), a town of Turkey, in the vilayet of Edirné, 32 miles E. of Adrianople. It carries on an active trade in wine, corn, cheese, and butter, and is famed for its sweetmeats prepared from grapes and walnuts. Pop. 14,000.

Kirk-Road means in Scotland a path used by the inhabitants of rural districts for going to church. Such use, if ancient, prevents the proprietor of the land through which the K.-R. runs from shutting it against the public.

Kirk-Session is an ecclesiastical court in Scotland composed of the ministers and elders of a parish. It can suspend any one from the privileges of the church, to which it can also restore him. The K.-S. sometimes exacts fines from persons convicted of breach of church discipline, by threat of church censure or other spiritual punishment; but they have no legal power to impose a fine. An appeal from its decision lies to the Presbytery, thence to the superior ecclesiastical courts of Scotland, the provincial synod and General Assembly.

Kirk'wall, the largest town in the Orkneys (q. v.), lies on the N. shore of Pomona or Mainland, 35 miles N.E. of Thurso, and 24 from Duncansby Head. Its trade is increasing. In 1871, 1316 vessels of 95,706 tons entered the port; cleared, 1212, of 88,080 tons. The cathedral of St. Magnus, said to have been founded by Jarl Hakon in 1138, is a cruciform building in the Norman and early English styles, 226 feet long and 56 feet wide. Kirkevaag (Kirkjuvagr, 'Kirk Bay'), as K. was called in the middle ages, when the Orkneys were under Norway, was the residence of the jarls of Orkney. Ruins still exist of their palace, and of the bishop's residence. Pop. (1871) 2265.

Kirsch'wasser ('cherry water'), a liqueur prepared in Germany, Holland, and Denmark, from the juice of cherries mixed in equal proportion with strong spirit and sweetened with sugar. The liqueur is often flavoured with essential oil of bitter almonds and other aromatics; but in some cases the ripe cherries are ground up with their stones, the kernels of which communicate to the juice the same flavour as bitter almonds. See MARASCHINO.

Kischenev', the capital of the government of Bessarabia, Russia, on the malarious Byk, an affluent of the Dniester, 95 miles N.W. of Odessa by rail. It lies in a hilly and finely wooded district, and has fourteen churches, a government library, many fountains, a theatre, and a large trade in wheat, linseed, tallow, cattle, tobacco, &c. Its wine is famous. Pop. (1870) 102,427, extremely mixed, and in great part consisting of Jews. K. was little more than a village when it passed to Russia in 1812. It was the rendezvous of the Russian army, and the place where the declaration of war against Turkey was proclaimed, April 1877.

Kisfalu'dy, Sandor, a Magyar poet, was born at Sümegh in Hungary, 22d September 1772, studied at Raab and Presburg, entered the Austrian army, and saw some active service, after which he retired to an estate in 1801, and devoted himself to the cultivation of poetry. *Ketergæ Szerelem, Roldog Szerelem,* two volumes of lyrical poetry, first established his reputation, which was afterwards sustained in *Regeké—á Magyar Elöidöböl* ('Tales of the Old Hungarian Times'), and perpetuated in certain historical dramas, *e.g., János Hunyadi,* and *Ladislaus the Cumanian,* still represented upon the stage of his native country. K. died at Sümegh, 30th October 1844. His works were published in 8 vols. 1833-38.—**Karoly K.,** brother of the preceding, was born March 19, 1790, and died at Pesth November 21, 1830. He is the founder of the national drama, and an admirable writer of comedy. His best pieces may be studied in a German translation by Gaal (*Theater der Magyaren,* Bonn, 1820). K.'s collected works were published in 10 vols. in 1831. The chief Hungarian literary society has been named after the brothers K.

Kishengurh' (Krishnagarh, 'fort of Krishna'), the chief town of the native state of the same name in Rajputana, India, 21 miles N.E. of Nusserabad. It is a walled town, strongly situated on a range of granite hills.—The *state* of **K.** has an area of 724 sq. miles; pop. 105,000; revenue, £30,000. In consideration of losses in transit dues sustained owing to the opening of the Rajputana Railway, the British pay annually £2000. The ruling family branched off from that of Jodhpore in 1594.

Kishm, an island in the Persian Gulf, near the entrance, separated from the coast of Laristan by Clarence Strait, 3 to 8 miles broad. It is 55 miles long, and from 9 to 32 miles broad, is sterile and broken by sandstone hills, except in the N., where a black loam yields corn, vegetables, and fruit (especially dates) in large quantities. Jackals and antelopes abound, and in the S. of the island are extensive salt caves. K. formerly had seventy small towns and villages, and a pop. of 20,000, but owing to the depredations of pirates, the towns have now dwindled to three—K., Laft, and Basidohe—and the pop. to about 5000, mostly Arabs.

Kishnugg'ur (Krishna-nagar) the chief town of the district of Nuddea, Bengal, British India, on the left bank of the navigable river Jellinghi, 64 miles N. of Calcutta: pop. (1872) 26,750. It is famous for the manufacture of muslin, and of human figures moulded in clay. There is a Government college here with English professors, teaching up to the standard of the B.A. examination. It is attended by 150 pupils, and costs about £3000 a year. The Rajah of K. ranks as one of the leading Hindus and purest Brahmins in Bengal.

Kisljar', a fortified town of Russia, in the government of Stavropol, Cis-Caucasia, 45 miles from the mouth of the Terek,

weaves cotton and silk, and has a brisk trade in fish, wine, and brandy. Pop. (1870) 10,000.

Kiss, August, a Prussian sculptor, born 11th October 1802, at Paprotan, near Pless in Upper Silesia, was a pupil of Rauch and afterwards of Tieck. He had already modelled a number of designs for churches and other public buildings after the designs of Schinkel, when in 1839 he exhibited the model of his famous Amazon group. This was received with enthusiasm; the 40,000 thalers necessary for its completion was subscribed, and the work placed on the stairs of the Museum in Berlin, 22d June 1843. K. sent a model of it to the English Exhibition of 1851, which excited great attention and was bought by America. His other chief works are an equestrian statue of Friedrich the Great at Breslau, statues of Friedrich Wilhelm III. at Potsdam and at Königsberg, of St. Georg in the Schlosshof at Berlin, and of St. Michael at Babelsberg. K. died 24th March 1865.

Kiss'ingen, the most frequented bathing-place in Bavaria, lies picturesquely in the valley of the Franconian Saale, 30 miles N.N.E. of Würzburg by rail, and is surrounded by wooded mountains. Its three springs are the Rakoczy, of which 300,000 bottles are exported annually; the Pandur, a powerful salt-water impregnated with salt, used both for baths and drinking; and the Narbrunnen, resembling the selters water. The healing properties of the waters were known in the 16th c., when the place came under the protection of the Prince and Bishops of Wurzburg. At the beginning of the present century K. was a mere valley, and it is now visited annually by 10,000 persons, and has a resident pop. (1875) of 3176. The Prussians here defeated the Bavarians, 10th July 1866.

Kist'na, an important river in S. India, which properly receives this name after the junction of the Tungabudra and Bhima with the Krishna (*sic*), a short distance below the town of Kurnool. These three rivers drain the S. Mahratta country and the Deccan. The K. rises in the W. Ghauts, N.E. of Bombay, only 40 miles from the Arabian Sea, and after a S.E. course of 800 miles falls into the Bay of Bengal by three mouths S. of Masulipatam. The area of its basin is 94,500 sq. miles. In its upper course, and on the banks of its tributaries, many minor irrigation works have been constructed; and the great scheme, formed by an anicut or weir at the head of the delta, is intended to supply 430,000 acres. The whole K. valley, however, has been the scene of the greatest suffering during the famine of 1877. The stream is useless for navigation.—**K.** *district*, which has been formed out of the old districts of Masulipatam and Guntoor, at the mouth of the K. River, has an area of 8036 sq. miles; pop. (1872) 1,452,374. The land is swampy and exposed to cyclones; the staple crop is rice. The chief town is Masulipatam.

Kit, a general term for all regimental necessaries except arms, uniform, and accoutrements. All approved recruits receive a free K., the articles of which they are bound to replace if injured or lost. Before 1855 soldiers had to pay for their K. from the high bounty then given.

Kit, a small pocket violin.

Kitch'en-Garden is the garden ground appointed for the cultivation of culinary vegetables, fruit-shrubs, and fruit-trees. It should be so placed with regard to the kitchen departments of a house as to admit of intercommunication without bringing the operators or operations into view of the family. Size is regulated by the family wants, and a rectangular form is recommended, the area being enclosed by walls, with, if necessary, plantations forming an outer belt to break the force of high winds. The most desirable surface is one that is level, open, and airy. A forcing department, a frame ground, and a reserve ground, are accompaniments to every complete K.-G. The more delicate fruit-trees are always placed and trained against the walls, and the hardier descriptions and fruit-shrubs are planted in the open garden—as standards, dwarfs, or espaliers. The herbaceous vegetables are of two kinds; (1) perennials which remain several years in the ground, such as asparagus, rhubarb, horseradish, strawberries; (2) the more numerous crop of annuals or biennials, many of which only occupy the soil a part of the year. The important object to be attended to in arranging the system of crops is to procure the greatest quantity and the best quality of the desired kinds of produce at the least possible expense of labour, time, and manure. See HORTICULTURE.

Kite (*Milvus*), a well-known genus of *Raptorial* birds, the common species of which—*Milvus regalis*—may be readily distinguished by the long, forked, or divided tail. The K. was formerly much more common than at the present time, the advance of civilisation and the culture of land having caused this bird to become comparatively rare. In the genus *Milvus*, the bill is straight at its base, and curved towards its tip. The wings are long, their third and fourth quills being longest. The tarsi are short and scaly. The common K. attains a length of 20 inches, the general colour being reddish-brown. The food consists of mice, rabbits, hares, and the smaller birds, whilst this bird is also known to be an expert fisher. The eggs, numbering two or three, are white, tinted with brown; and the nest is generally built in high trees. The Arabian K. (*M. Ægyptus*) closely resembles its European neighbour. The swallow-tailed K. (*Elanoides furcatus*) inhabits America, but has been occasionally found in Britain. It is nearly allied to the falcons, and is coloured white and black. Another American species is the *Ictinia Mississippiensis*, or Mississippi K.; whilst the Govinda K. (*Milvus Govinda*) is common in India.



Kite.

Kit-Kat Club, an association founded about 1688, which took its name from its meeting at Christopher or Kit Kat's, a pastry-cook in King Street, Westminster. From a purely convivial meeting it came in the reign of Anne to be associated with Whig principles and the upholding of the Protestant succession, its forty-three members at that period including Marlborough, Walpole, Addison, Steele, Garth, &c. Kneller painted the portraits of his brother members in three-quarters length—whence the title *kit-kat* applied to that species of portrait—and engravings of his paintings, with memoirs of the club, were published in 1821. See the *Quarterly Review*, vol. xxvi.

Kitt'iwake Gull (*Larus tridactylus*), a species of *Laridæ* or Gull (q. v.) named from the sound of its cry, is common round the British coasts. It is white on the head and neck, and silvery grey on the back, the wings being variegated with black and white. The average length is 16 inches. The hinder toe is represented by a mere horny tubercle—hence the specific name *tridactylus* or 'three-toed.' The eggs number three, and are of a brownish olive colour. The K. G. is found in the Mediterranean and Caspian Seas, but is a typical northern bird.

Kitt'o, John, D.D., a Biblical writer, the son of a jobbing mason, was born at Plymouth, December 4, 1804. Having become deaf at the age of twelve, his youth was spent in great misery in a workhouse. Mr. Groves, a dentist of Exeter, took him as assistant in 1824, and subsequently sent him to a missionary college. After a residence as a missionary at Malta he spent four years (1829–33) with Mr. Groves in Eastern travel. From his return till his death, 25th November 1854, he worked incessantly (usually fourteen hours a day) at Biblical Literature. Many of his works are standard authorities. Among the best are the *Pictorial Bible* (1838; new ed. 1855); the *Cyclopædia of Biblical Literature* (1850; 3d ed. by Dr. W. L. Alexander, 3 vols., Edin. 1870), and *Daily Bible Illustrations* (1849–53). See *Memoirs* by J. E. Ryland, with *Critical Estimate* by Professor Eadie (1856).

Kiwi-Kiwi. See APTERYX.

Kiz'il-Irmak' ('red river'), the ancient *Halys*, a river of Turkey in Asia, rises on the Kösse Dagh, 97 miles W. by N. of Ersingan, flows first S.W., then N.W., and finally N.E. to the Black Sea, 40 miles E. of Sinope. It has a length of 450 miles.

Kizil-Kum' (Turk. 'red sand'), the desert of Turkestan, between the Sír-Daria and Amu-Daria, is a plain of reddish-brown sand which is here and there heaped up in hills by storms. It is over 40 miles broad, and its only vegetation is one kind of grass, and a scanty bush that sometimes reaches a height of 10 feet. The margin, called Ak-Kamish, is good grazing land, on which the Kirghiz feed their herds.

Kjölen (Norse, 'The Keel'), the watershed stretching between Sweden and Norway from the Finmark to Röraas, with numerous peaks 6000 feet high.

Klag'enfurt (*Claudii Forum*), the capital of Carinthia, Austria, 160 miles S.W. of Vienna by rail, on the Glau, and 2 miles E. of the lovely Wörther See, with which it is connected by a canal. The town is nearly square, and promenades occupy the site of the fortifications, destroyed by the French in 1809. The chief buildings are the parish church, with a tower 288 feet high, the archiepiscopal palace, and the 14th c. Ständehaus ('house of the estates'). There are two gymnasia, a theological college, a seminary, school of engineering, and a deaf and dumb asylum. K. has the largest white-lead manufactory in Austria, besides leather, cloth, and tobacco industries. Pop. (1869) 12,285.

Klap'ka, Gyorgy (George), a Hungarian general, was born April 7, 1820, at Temesvar, entered the army and became (1842) sub-lieutenant in a Hungarian regiment of guards, rose (1847) to the rank of lieutenant-colonel, and (1848) on the outbreak of the Hungarian revolution acted as general in the struggle against Austria. During the provisional government K. became Minister of War; but the most brilliant point in his career was the heroic defence of Komorn (1849) after Vilagos had capitulated, a defence which was varied by the famous sortie of August 3, in which he cut in twain the Austrian lines, and which he only ceased to sustain upon honourable terms being granted him by General Haynau. In 1850 were published the *Memoirs* of K. and (1851) *The National War in Hungary and Transylvania*. K. unsuccessfully attempted to stir up a revolution in Hungary in 1866, undertook the reorganisation of the Turkish army in 1873, and in 1877 sided with the Turks in their struggle with Russia.

Klap'roth, Heinrich Julius, the son of a celebrated German chemist, was born October 11, 1783, at Berlin, taught himself Chinese before he was sixteen, studied at Halle (1800–2), started the *Asiatisches Magasin* at Dresden, and attracted the attention of scholars. In 1804 K. went to St. Petersburg, where he laboured in behalf of the Academy of Sciences at Oriental language and literature. He travelled as far as the Chinese frontier (1806), and on his return was nominated extraordinary academician, granted a pension, and admitted into the ranks of the Russian nobility. K. then explored the Caucasian range, but being prohibited from publishing the results of his travels, he left Russia in 1812, having been previously deprived of his honours. At the Isle of Elba he offered his services to Napoleon, and for some time lived upon his pen at Paris, until Humboldt in 1816 procured him the professorship of Asiatic languages and literature at the University of Berlin. K. died at Paris, August 20, 1835. His extraordinary sagacity, penetration, and erudition make him one of the greatest linguists of this century. He wrote with the same clearness and facility in French as in German, and has left important works in both tongues. *Reise in den Kaukasus und Georgien in den Jahren* 1807–8; *Archiv für die Asiatische Literatur, Geschichte und Sprach-Kunde* (1810); *Abhandlung über die Sprache und Schrift der Uiguren* (1820); *Asia Polyglotta* (1823-29), are among his German contributions. *Tableaux Historiques de l'Asie depuis la Monarchie de Cyrus jusqu'à nos Jours* (1824); *Mémoires relatifs à l'Asie* (1827–28); *Magasin Asiatique* (1827); *Histoire du Kachmir* (1825); *Lettre à M. Champollion le Jeune*, are some of his contributions in French. See Landresse, *Notice Historique et Littéraire sur K.*; Fischer, *Denkschrift auf K.*; Merlin, *Catalogue de la Bibliothèque de M. K.* (Par. 1839).

Klatt'au (Czech, *Klatovy*), a town of Bohemia, on the Bradlenka, 25 miles S. of Pilsen, carries on a cloth-weaving industry. Pop. (1869) 7734.

Klaus'enburg (Magyar, *Kolosvár*, 'the enclosed fortress'), a town of Transylvania, on the Szamos, 106 miles E.S.E. of Grosswardein by rail, consists of a walled inner town, surrounded by five suburbs. The cathedral, built by Sigismund (1414), was restored by Matthias Corvinus, and there are three gymnasia, a university (founded 1872), a Hungarian theatre, &c. The chief manufactures are tobacco, cloth, paper, and faience pottery, and in the neighbourhood are important rock-salt works. Pop. (1869) 26,382. K. is the *Claudiopolis* of the Romans.

Klaus'thal, a town of Hanover, in the Ober-Harz, 25 miles N.E. of Göttingen, and 1792 feet above the level of the sea. In the vicinity are several silver, lead, zinc, copper, and iron mines (the Georg Wilhelm mine is 2135 feet deep), giving employment to most of the inhabitants. K. is the seat of the Government mining administration, and its Berg-schule contains a large collection of models and minerals. Most of the houses are of wood, and the surrounding country is bleak and sterile. Along with Zellerfeld, from which it is separated by the Zellbach, K. has a pop. (1875) of 8548.

Kle'ber, Jean Baptiste, French republican general, was born at Strassburg, 6th March 1753, entered a military school at Munich, and while there attracted the attention of Kaunitz, who appointed him to a lieutenancy in his own regiment. Finding promotion in the Austrian army too slow for penniless soldiers, K. soon resigned his commission, and lived for a time in obscurity as inspector of public buildings at Belfort in Elsass. But in 1792 he was again induced to take arms, this time as a private, and in the French army. Soon he became adjutant-major. At the defence of Mainz his bravery gained him the rank of adjutant-commander, and ultimately of brigade-general. Twice defeating the Vendeans, once at Mans, and once at Savenay in 1795, he was placed at the head of three divisions of the army of the North, and again proved victorious at Fleurus, Marchiennes, Mons, Louvain, and Maestricht. Jealous intrigue then compelled him to retire from active service, and he quietly passed the leisure thus gained in writing his memoirs. Erelong, however, he hastened at the call of Bonaparte to Egypt, accompanying his chief on the Syrian expedition, capturing El-Arish, and gaining the brilliant victory of Mount Tabor. At the battle of Aboukir he also distinguished himself. Left by Bonaparte in command of the army in Egypt, K. at the convention of El-Arish consented to evacuate the country with his troops. Admiral Keith was unable to fulfil certain promises made to the French by Sir Sidney Smith; and K., indignant at what he accounted a breach of honour, called upon his men to fight once more. The Turks were routed with great slaughter at Heliopolis, and the French were in hopes of again conquering Egypt. But K. fell by the hand of a Turkish assassin, on the 14th of June 1800. See Ernouf's *La Vie de K.* (Par. 1867).

Klenze, Leo von, a German architect, born 29th February 1784, in the principality of Hildesheim in Hanover, after an education in Paris and Italy, became in 1808 architect to Jerome Bonaparte, King of Westphalia, and in 1815 entered the service of Maximilian I. of Bavaria, for whom and his successor Ludwig I. he built in Munich the Glyptothek (1816–30), Odeon, Kriegsministerium, Duke Max's Palace, the Bazaar, Old Pinakothek (1826–36), Royal Palace, Ruhmeshalle (1853), Walhalla (1830–42), and Propylæa (1862). During a visit to Greece in 1834, K. devised the plans for the rebuilding of Athens, and in 1839 he was invited to St. Petersburg to superintend the construction of St. Isaac's Church and the Czar's Palace. K. died at Munich, 27th January 1864.

Kleptoman'ia (Gr. *kleptō*, 'I steal,' and *mania*, 'insanity'), is an irresistible impulse to steal, connected with, or dependent upon, disease of the cerebro-spinal system. Kleptomaniacs must not be confounded with notorious habit-and-repute thieves; for K. may affect individuals who are not covetous, and whose circumstances are such that there is no obvious motive for theft. Many insane people appropriate the property of others under the impression that everything they see belongs to them, while others do so out of mere stupidity, and some simply from the desire to possess, knowing, at the same time, that the articles do not belong to them; but such cases are not examples of pure K., for the morbid impulse to steal is associated with other cerebro-mental lesions. There are many instances on record of K., in which there was no other apparent mental disorder; but in most instances there will probably be found distinct symptoms of cerebro-spinal disease, or a hereditary predisposition thereto. Gall mentions that the first king of Sweden was always stealing trifles, so that K. is not invariably associated with a miserly, avaricious disposition, nor with a strong desire to possess where there are no means of purchasing. Sometimes articles, thus appropriated, are entirely worthless, and are never turned to any account; and in some instances, when they are of value, they are freely given to others. Generally there is some attempt

water containing in it certain organic and inorganic substances. The organic substances are chiefly urea and uric acid; the inorganic, chlorides of sodium and lime, sulphates of potass and soda, and phosphates of lime and magnesia. The organic substances are separated from the blood by the action of the cells lining the convoluted tubes by a process of secretion. The water and inorganic salts are separated from the blood by a process of filtration, this process occurring within the Malpighian corpuscle. Anything which alters the amount of pressure within the *afferent* or *efferent* vessels, will alter the amount of water and inorganic salts separated. Normally, the *efferent* vessels have a smaller calibre than the *afferent*, and hence there will be a greater pressure in the afferent than in the efferent. Again, the pressure normally is greater within the blood-vessels than in the Malpighian body. If, by any means, the pressures in the afferent and efferent vessels and the Malpighian body be equalised, the process of filtration will be stopped. The separation of the water and salts is influenced by physical conditions. The separation of the urea and uric acid is a vital process, dependent upon the functional activity of the epithelial cells lining the tubules.

Diseases of the K.—The kidneys are subject to various affections, the most important of which is that known as *Bright's Disease* (q. v.), characterised by intense congestion, with exudation and hæmorrhage into the tubes, and desquamation of the epithelium. Inflammation of the K. or Nephritis is also of frequent occurrence, and one or more of the tissues may be affected, as the nerves, the vessels, the parenchyma, or the interstitial connective-tissue. In addition, the cortical substance, the pyramidal, the pelvis of the kidney, or all parts together may be affected, and the affection may be partial or diffused. The parenchymatous tissue is generally implicated, in the first instance, and afterwards, the interstitial tissue, which sometimes undergoes fatty or amyloid degeneration. The diagnosis of these affections is difficult during life, and can be effected only by chemical tests and microscopic examinations of the urine. Most of these affections may terminate in suppuration, which may also depend upon morbid conditions of the blood, external violence, retention of urine, or calculi in the kidney or ureters. The most frequent symptoms of D. of the K. are more or less pain in the region of these glands, shooting along the ureters; a sensation of numbness down the thigh; pain in and retraction of the testicle; frequent desire to void urine, and more or less febrile symptoms. D. of the K. are all of a very serious nature, more especially those of an acute form; but even the chronic forms greatly impair health, and ultimately cause premature death. Suppuration is the most rapidly destructive of all the lesions, and is generally considered to be a fatal disease. Neuralgia of the kidneys is not of very frequent occurrence, and the affection, so termed, usually depends upon the passage of a concretion through the ureter, one of the most painful of all diseases. The pain comes on in paroxysms, with intervening periods of comparative ease, and is usually accompanied by vomiting, profuse perspiration, and a small and feeble pulse. *Suppression of Urine*, or *Ischuria*, although generally a mere symptom of other diseases, is in some cases an independent or idiopathic affection, there being either a complete cessation of the secreting action of the kidney, or such a diminution as to indicate morbid action. If no urine be separated from the blood, the urea retained acts as a poison on the nervous system, causing coma or intense stupefaction, which invariably terminates in death, unless the action of the kidneys be restored. For further information on D. of the K., see BRIGHT'S DISEASE, ADDISON'S DISEASE, DIABETES, CALCULUS, NEPHRITIS, and URAEMIA.

Kidney Bean. The common K. B., French bean, or haricot, is *Phaseolus vulgaris*, largely cultivated for human food both in tropical and temperate regions. Its native country is supposed to be India, from whence it may have come to Europe through the conquests of Alexander the Great. It varies from a low, almost bushy sub-erect plant, to one with stems that twine 6 to 10 feet. As far back as English trustworthy garden records go, it has been grown in that island for the pods, which in the young green state are the most delicate legume in cultivation. They also make an excellent pickle. On the Continent of Europe the ripe seed, called haricots, is largely used, and when properly selected and cooked they are strongly recommended as an article of food, from their digestive and antibilious qualities. The scarlet runner (*P. multiflorus*) is grown for the same purpose as the K. B., and is remarkably prolific. The pretty ripe beans, however, are unwholesome, or even in some degree poisonous, and the root contains a narcotic poison. It is a native of Central America, whence it is stated to have been introduced into Europe in 1633. The genus *Phaseolus*—distinguished by the keel of its flowers being prolonged into a very long beak, which forms a complete or nearly complete spiral—numbers in all about sixty species, mostly tropical, but many besides the above are widely cultivated, such as *P. Mungo*, with nearly cylindrical pods, in India and Africa; *P. lunatus*, in all hot climates; *P. perennis*, in America; *P. rostratus*, cosmopolitan within the tropics.

Kidney Vetch, the name given to the genus *Anthyllis*, belonging to the tribe *Loteæ* of the natural order *Leguminosæ*, from the former reputation of the commonest species, *A. vulneraria*, in kidney complaints. The genus numbers about twenty species, distributed through Europe, Asia, and N. Africa, and the above named is not very rare in Britain in dry pastures, &c. It is a good sheep fodder.

Kie'kie, the native name for *Freycinetia Banksii*, belonging to the *Pandanræ* (screw palms), a lofty climber growing in the northern island of New Zealand. The bracts and young spikes make a very sweet preserve; the narrow leaves, 2 feet long, are used for basket-making.

Kiel, a seaport in the province of Slesvig-Holstein, Prussia, on an excellent harbour at the head of Kieler Hafen, 55 miles N. of Hamburg, has an important trade, manufactures of tobacco, sugar, oil, soap, woollen goods, and machinery, and a university (founded in 1665), with a library of 140,000 vols. Since 1864 its harbour has become an important station for Prussian war-ships. In 1875 there entered the port 3977 vessels, of 332,883 tons, and cleared 4000, of 322,729 tons. K., founded in the 11th c., entered the Hanseatic League in the 14th c. On the division of the duchies it fell to Gottorp, becoming in 1713 the seat of the duke and of the Government, but by the deed of exchange in 1773 was joined to the Danish part of Holstein. On the 14th January 1814, Denmark concluded peace here with England, and also with Sweden, which then lost Norway.

Kiel'ce, a government of the former Russian province, known as the kingdom of Poland, bounded W. by Piotrkov, N. and E. by Kadom, and S. by Galicia. Area, 3897 sq. miles; pop. (1870) 518,730. K. is one of the fairest and most fruitful parts of Poland; more than half the surface is cultivated, and one fourth is forest. The chief industries are iron-smelting, tanning, and the preparation of brandy, beer, and flour.—**K.**, the chief town, 100 miles S.S.W. of Warsaw, and surrounded by high mountains, is a bishop's see, and has some copper-mines, great corn-markets, and considerable trade in iron, flour, and wood. Pop. (1870) 11,000.

Kie'pert, Heinrich, a geographical scholar and chartographer, was born at Berlin, 31st July 1818, and studied (1836–40) at the university of that city, where he showed the peculiar bent of his mind in designing and lithographing many maps of ancient Greece and Italy for the use of his fellow-students. In 1841 he was sent by Ritter, along with Schænborn and Lœw, on a scientific expedition in Asia Minor, and in 1845 was appointed Director of the Geographical Institute at Weimar. He was called to the Statistical Bureau of Berlin in 1865. His chief works are an *Atlas von Hellas* (new ed. 1871), *Neuer Hand-atlas über alle Theile der Erde* (2d ed. 1867, 40 sheets), *Bibel-atlas* (2d ed. 1854), *Atlas Antiquus* (5th ed. 1869), and *Erdkarte* (1863, 38 sheets. These are all more remarkable for their fulness, freshness, and accuracy, than for their beauty of engraving.

Kiev, or **Kief** (*Kijev*, Polish *Kijov*), one of the four governments of the Ukraine, Russia, is surrounded by the governments Minsk, Tshernigov, Poltava, Kherson, Podolia, and Volhynia. Area, 19,687 sq. miles; pop. (1870) 2,144,276. K. is a fruitful, undulating plain, bounded on the E. by the river Dnieper, which receives from it Pripet, Teterev, Irpin, Ros, and Tjasmin. Corn-growing, cattle-rearing, and beet-sugar manufacture are the chief industries. One quarter of the surface is forest.—**K.**, the chief town, on the Dnieper, 267 miles N. of Odessa, has numerous churches (including two cathedrals, one of which, St. Sophia, is the earliest monument of Russian ecclesiastical architecture), great barracks, an arsenal, an exchange, a theatre, and a university (St. Vladimir, founded in 1833), and carries on important manufactures, chiefly of leather, crockery, chemical

from the outer luberosity of the femur to the upper part of the head of the fibula; and a *short external lateral* ligament situated behind the last, not having a constant arrangement. Besides these ligaments the joint is closed in by fascia derived from the muscles in the neighbourhood of the joint, and by lateral slips from the *patellar* ligament.

Placed between the semilunar cartilages and the tibia and femur there are processes of the *synovial membrane* of the joint. It lines the internal surfaces of the ligaments of the joint, and is prolonged upwards in front of the femur for a distance of three inches. Between this synovial membrane and the portion of the anterior ligament below the patella there is a collection of fat which forms a padding to fill up certain gaps which are produced in movements of flexion and extension. In some animals this synovial membrane consists of two or three parts, and an indication of this separation remains in man in the form of a fold of synovial membrane which passes from this cushion of fat to the intercondyloid notch of the femur. To this fold the name *ligamentum mucosum* has been given.

When the knee is flexed all the ligaments of the joint are relaxed except the *patellar* and *posterior crucial* ligaments. In extension the *posterior* and *lateral* and the *anterior crucial* ligaments are stretched. In semiflexion a considerable amount of rotation can be produced. The crucial ligaments are the chief agents in preventing too much flexion and extension. The cartilages help to adapt the shape of the tibia to the different surfaces of the femur with which it is in contact in certain positions. They lessen the shock given to the leg in jumping and other movements. The *patellar* changes its position with regard to the femur and tibia in the movements of flexion and extension, distributes any pressure which may be made upon the joint in front over a large and even surface, and enables extension of the leg upon the thigh to take place more rapidly by acting as a fulcrum.

Knell'er, Sir Godfrey, a famous portrait-painter, was born at Lübeck, a free town of N. Germany, in 1648. He studied under Rembrandt, and after living in various German towns, settled in England in 1674. In 1688 he succeeded Sir Peter Lely as court-painter, and retained that office under James II., William III., and Anne. He was knighted by William in 1692, and made a baronet by George I. in 1715. He died October 27, 1723. K.'s most notable works are the 'Beauties of Hampton Court,' and the portraits of the Kit-Kat Club; but many royal and other distinguished personages sat to him for their portraits. K. was a wit as well as an artist, but his vanity was egregious. He is said to have given Pope £500 to write an extravagant epitaph on his tombstone in Westminster Abbey.

Knight, Charles, publisher and author, son of a bookseller, was born at Windsor, 15th March 1791. He edited several publications at Windsor, the *Etonian*, *Plain Englishman*, &c. In 1823 he started *Knight's Quarterly Magazine*, and continued it on removing to London in 1824. He became connected with the Society for the Diffusion of Useful Knowledge in 1827, for which he published among other works the *Penny Magazine* (1832–45); the *British Almanac* and its *Companion*, published annually since 1828, and the *Penny Cyclopædia* (1833–56) of which the *English Encyclopædia* (1854–61) is an improved development. Mr. Knight won a high place as a Shakespearian commentator by his *Pictorial Shakespeare and Biography of Shakespeare* (1839–41); and has edited or written a multitude of tracts and papers, *Half Hours with the Best Authors* (1848); *Knowledge is Power*, on the vexed question of capital and labour (1855); *Half Hours with the Best Letter Writers* (1866–68), &c. His *Popular History of England* (1856–62) is his most elaborate and able work. He published an autobiography, *Passages of a Working Life during Half a Century* (1863–65). In 1860 he was appointed publisher of the *London Gazette*, a sinecure of £1200 a year, not too great a reward for a life of unwearied labour for the development of pure and instructive literature. He died, March 9, 1873.

Knight'hood. The right to confer K. was not originally a prerogative of royalty, nor was the order a part of the municipal constitution of any state. It was partly a military and partly a religious institution existing throughout Christendom, and the order might be conferred by any one who was himself a knight, whether in his own or in a foreign country. Accordingly a foreign knight is a knight in England by our law, though a foreign duke is only an esquire. See CHIVALRY.

Knights Bann'erets were created on the field of battle by the king under the royal banner. The custom is now in desuetude, and the order obsolete.

Knights' Fee, in England, was so much inheritance as was sufficient to maintain a knight with sufficient revenue.

Knights of the Shire are the members returned to Parliament from the counties of England. Anciently they were required to be knights girt with the sword.

Knights Templars. See TEMPLARS.

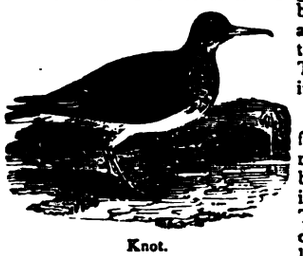
Knipp'erdolling. See ANABAPTISTS.

Knitt'ing (from Old Eng. *cnytan;* Low Ger. *knutten*, 'to make a knot'). The art of producing articles of hosiery, &c., with one continuous thread. In net-making, which has been practised from a remote period, a kind of K. is performed, the thread or twine being knotted into meshes with a needle. Plain K. is commonly pursued in making stockings by hand, and consists in forming with yarn or thread by the aid of K.-needles successive rows of loops, the loops in each row being drawn through those immediately preceding. Stocking K. is believed to have been invented in the 16th c., but in what country is uncertain. Fancy K. in cotton and coloured wools is followed by ladies in the production of many useful and ornamental household articles. Shawls, mits, &c., of great beauty and fineness are knitted by the natives of Shetland from the fine soft wool of the Shetland sheep. The greater part of the hosiery of the Midland district of England is made on the Stocking-frame (q. v.), but K.-machines will eventually supplant it. One of American origin, called the 'crane knitter,' is becoming popular in Great Britain; with it, a pair of men's woollen socks can be made in twenty-five minutes. The self-acting power K.-machine, invented by A. Paget, will be found described in *Transactions of Mechanical Engineers Institute* for 1870.

Knives (Old Eng. *cnifas;* Ger. *kneife*), a well-known general name for a variety of cutting-instruments of diverse forms and uses. K. are usually made of steel or iron, unless for special use, as cutting fruit, paper, &c., when silver, ivory, or other material may be employed. In remote antiquity cutting instruments were made of flint chips; subsequently copper and bronze were used. Table-K. and forks were unknown to the nations of antiquity. Among the Greeks and Romans only one knife, which was often richly ornamented, lay at table, and it was used by a carver to cut the meat into small pieces, which were lifted with the fingers. In *Athenæus* it is stated that the Gauls tore meat with their teeth, occasionally assisting themselves with a knife which each one carried in a sheath by his side. The Old English carried about with them a *met-sæx*, or food-knife, and it is recorded that King Æthelstan left his knife on the altar of Beverley as a pledge for his redemption of a vow of benefaction. Chaucer refers to the common practice of his day in the line—'A Scheffeld thwitel bar he in his hose,' and at the same time bears testimony that Sheffield, still the foremost centre of the cutlery manufacture, was then famous for its K. The custom of carrying meat-K. about the person, is still perpetuated by wearers of the Highland costume, in which the dirk, with its small knife and fork in one sheath, is a prominent and admired feature. According to Stow, Richard Mathews, on Fleet-Bridge, was the first Englishman who made '*fine* K. and knife-hafts,' and in 1563 he obtained a prohibition against all K. of foreign manufacture. Clasp or spring-K. of Sheffield make were common in the second half of the 17th c.; they came originally from Flanders. The flaying-knife is the emblem of St. Bartholomew, and in the *History of Croyland Abbey* it is stated that the monks there distributed little K. to all and sundry on St. Bartholomew's Day in commemoration of the saint's horrible death. The operations in the manufacture of a steel table-knife are similar to those described under CUTLERY for a razor and fork.

Knot, a name given to a species of wading or grallatorial birds—the *Tringa Canutus* of the naturalist. This bird occurs in flocks in many parts of the British coasts, and feeds on the sea-grass (*Zostera marina*). It migrates southwards on the approach of

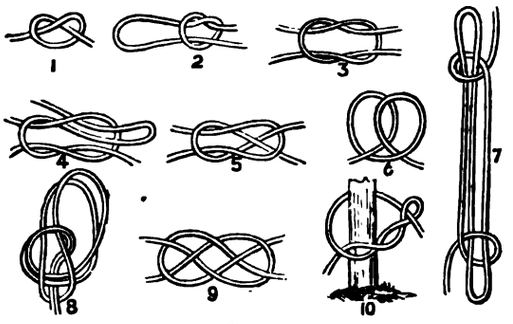
winter, and does not breed in England. The eggs appear to number five. The colour is a bright chestnut, variegated with brown and black, the plumage assuming an ashen grey tint after the breeding season. The average length is 10 inches.



Knot.

Knot, the nautical name for a geographical mile. The name arises from the method by which a ship's rate of sailing is ordinarily estimated. The log-line (see LOG) is divided into equal lengths by knots, and each length is $\frac{1}{120}$th of a geographical mile, so that the number of knots on the line which run out in half a minute gives at once the rate per hour at which the vessel is going.

Knot, a mode of joining or fastening ropes. There are numerous kinds of knots having different capabilities, and on shipboard and in industrial pursuits they are of constant service. A few of the more common and useful knots are here shown.



Knots.

(1) Thumb or overhand K. tied at the end of a rope to prevent it slipping; (2) running K. used to bind or draw anything close; (3) reef or sailor's K., (4) draw K., and (5) common bend or weaver's K., are very useful for joining two ropes securely; the draw K. has also the advantage of being easily undone; (6) clove hitch binds firmly, and will support a weight on a smooth vertical pole; (7) sheepshank, for shortening a rope without unloosing the ends; (8) double bowline hitch, serviceable for slinging a cask; the single bowline hitch takes a tight grip of a post or other rope to haul on; (9) Carrick bend, a strong interweaving of two doubled ropes; (10) timber hitch for hauling on to move a weight. The knots used by mariners are described in Dana's *Seaman's Manual*. See also *Book of Knots* (Lond. Hardwicke & Bogue).

Knot-Grass, or **Knot-Wort**. See POLYGONUM.

Knout, the Russian scourge, consists of leather thongs braided with wire. It was formerly used in punishing all kinds of criminals, but is now only inflicted on incendiaries, assassins, and such like. Some 120 lashes are considered equivalent to a sentence of death.

Knowles', James Sheridan, an English dramatist, was born at Cork, Ireland, May 12, 1784, studied at London under his father, and composed while yet a boy the *Welsh Harper*. He early became acquainted with Lamb, Coleridge, and Hazlitt, was seized with histrionic ambition, tried his fortune at Dublin and failed (1806), tried again at Waterford (1807) in a company of Edmund Kean's, where he published his *Fugitive Pieces*. In 1815 his *Caius Gracchus* was played at Belfast; in 1820 *Virginius* appeared; in 1825 *William Tell;* in 1832 the *Hunchback;* in 1836 *Love Chase;* two of which from their adaptability to the modern stage will probably keep their ground for some time. K. wrote more than a dozen plays besides, none of them, except that they have an imitative flavour of the Elizabethan dramatists and an accurate knowledge of stage effect, rising beyond mediocrity. *The Idol Demolished by its own Priest* is a controversial treatise written by him after he had forsworn the stage and turned Baptist. K. died at Torquay, Devonshire, December 1862. A collection of his 'Dramatic Works' was published at London in 1863.

Knox, John, descended from a Renfrewshire family of some consequence (the Knoxes of Ranfurly), was born in 1505 at Gifford, East Lothian, educated at the grammar school, Haddington, and at St. Salvador College, St. Andrews (1524), where, along with George Buchanan, he studied under John Major. After diligent research among the schoolmen, and, as it is supposed upon doubtful evidence, having taken orders as a priest about 1530, K. devoted himself to the study of Jerome, Augustine, and others of the Christian fathers with the result that (about 1543) he embraced reformed doctrines and entered the family of Hugh Douglas of Longniddrie to act as tutor to a son of his and John Cockburn's of Ormiston. During 1546–47 K. preached to the Protestants who had gathered within the castle of St. Andrews until a French force, under Leo Strozzi, took it in August. K. was sent to the galleys in France for two years, from which he was released in 1549. 'He abode,' says Burton, 'in the S of England until the death of Edward VI., when he found refuge and congenial duty in Geneva. Thus, for some years after the capture of St. Andrews he and his cause disappear from the face of Scottish history.' In 1550 K. was preaching in Berwick and the adjoining country, and (April 4th) had to answer to the Bishop of Durham for heresies. At Berwick he paid his addresses to Marjory Bowes, to whom he was afterwards married. When in London in 1553, K. refused an English bishopric, and by his advice influenced to a considerable extent the Prayer Book of the Church of England. Next year K. was at Dieppe on his road to Geneva, where he became acquainted with Calvin, and about which time he wrote his *Admonition to the Professors of God's Faith in England*. At Frankfort he became pastor of a Protestant church, but on the arrival of Dr. Cox, who had been preceptor to Edward VI., a dispute which arose as to the use of a church service sent K. back to Geneva. His 'cause' reappeared in Scotland (1555), but K. remained in Geneva (1556–7–8), along with his wife and mother-in-law. During this period he assisted in making a new translation of the Bible into English, and published a dogmatic treatise, *The First Blast of the Trumpet against the Monstrous Regiment of Women*, in which he impugned the right of females to govern. 'On the 2d of May 1557,' according to his *History of the Reformation*, 'arrived John K. from France,' after which began the most important period of his life as Scotch Reformer. He preached at Perth, and the religious houses were wrecked, the same course being adopted by the 'rascal multitude' at Crail, Cupar, Linlithgow, Stirling, and Lindores. It was then determined by the 'Lords of the Congregation' to set up the Protestant worship throughout Scotland, but, held in check by the French troops under the Queen Regent, negotiations had to be opened with the English court. These were conducted with great zeal and success by K., and ended in an English army being sent to Scotland to aid the cause of the Reformation. On the 20th December 1560 K. sat in the first General Assembly of the Reformed Church of Scotland, having, during the previous autumn, assisted in the compilation of the *Protestant Confession of Faith* and the *First Book of Discipline*. In August 1561, Queen Mary arrived in Scotland, and had many interviews with K., whom she endeavoured to talk over. The Reformer never desisted from denouncing with unflinching directness before her Antichrist and Popish idolatry. A reaction against the Reformation took place, which made K. all the more inexorable. He condemned Mary's proposed marriage with Darnley, and broke off for a year and a half his friendship with Murray and Maitland because he thought they temporised. K. married, for the second time (March 1564), Margaret Stewart, a daughter of Lord Ochiltree. An inhibition was laid upon him (1565) for the personal offensiveness to the court of his preaching, and he took the opportunity of visiting England, charged from the Assembly with a letter to the English bishops asking lenity for the brethren who scrupled to use the sacerdotal dress. The murder of Rizzio took place March 9th, 1566, and K. justified it. The murder of Darnley followed, February 9th, 1567, and K. publicly maintained that the estates of the kingdom ought to bring Mary to a trial, and if she were found guilty, that she

ought to be put to death. K. was a prominent party to the coronation of James VI. (24th July), and he preached (December 15th) at the opening of the Parliament which ratified all the acts previously passed in favour of Protestantism. In 1570 Regent Murray was assassinated, and K., who regarded the deed as a grave national misfortune, preached his funeral sermon. Against Kirkcaldy of Grange, his former friend, K. thundered denunciations, and his situation in Edinburgh became dangerous when the Hamiltons, who refused to pledge their word for his safety, were received into the castle. Accordingly K. sought and found a safe retreat in St. Andrews, where, though his health was shattered owing to an attack of apoplexy (1570), he wrote a *Vindication of the Reformed Religion*. 'Thirsting to depart' though he was, K. returned to Edinburgh in August, wrote (1572) a letter of sorrowful farewell to the Assembly, and at the arrival of the news of the Massacre of St. Bartholomew, was still able to execrate in public 'that murtherer, the King of France.' K. died November 24, 1572, and left behind him two sons by his first wife, and three daughters by his second. It was said over his grave by the Earl of Morton that 'he neither feared nor flattered any flesh.' K.'s claims to historical consideration are many. The Scotch Reformation was largely due, in the different aspects it assumed, to his personality. Like Calvin and Luther, he not only reformed religion, but improved the language of his country. His *History of the Reformation of Religion within the Realm of Scotland* is written with strength, vigour, and simplicity. K.'s character has been variously estimated. That he was arrogant and egotistic is certain, but 'his impersonation of self, his "I, John Knox,"' says Mr. J. H. Burton, 'and his assumption of authority come from a source deeper than idle parade.' Never was man more disinterestedly earnest, never did a life shape itself more consistently in accordance with its ethical and religious theory. 'This man of God,' his secretary Bannatyne wrote in his diary when K. died, 'the light of Scotland, the comfort of the kirk within the same, the mirror of godliness, and patron and example to all the true ministers in purity of life, soundness in doctrine, and in boldness of reproving of wickedness.' See Burton's *History of Scotland*, vols. iii., iv., v.; M'Crie's *Life of Knox; Scots Worthies*, by J. Howie.

Knowlto'nia, a S. African genus of *Ranunculaceæ*, having very rigid ternate or bi-ternate leaves, umbellate green flowers and juicy fruits. The bruised leaves produce blisters. It was named by Salisbury after Thomas Knowlton, a useful gardener and botanist of the last century.

Knox'ville, a city of Tennessee, U.S., at the head of the navigation on the Tennessee River, and on the new railway from Charleston to Cincinnati. It is the third city in the state in point of size, and lies in one of the most fertile and beautiful regions of the U.S.; has 17 churches, a marble court-house, erected at a cost of $400,000, the E. Tennessee University, the State Agricultural College, with an endowment of $500,000, a free library, an opera, &c. The manufactures are iron, paper, railroad-cars, carriages, &c. Pop. (1870) 8682.

Knuts'ford (Knut's Ford?), a market-town of England, in Cheshire, on the Bollin, 23 miles E.N.E. of Cheshire by rail. It has several quaint old half-timber, gable-fronted buildings, and a racecourse. Pop. (1871) 3597.

Ko'ala, or **Kangaroo Bear** (*Phascolarctos cinereus*), a genus of *Marsupial* mammals, occupying a position somewhat intermediate between the kangaroos and phalangers. The K. is the native 'sloth' and 'bear' of the Australian colonists. It attains a length of 2 feet. The body is stout, and covered with a fur of a bluish-grey colour. The tail is absent. All the feet have strong curved claws, adapting the animal for climbing trees, while the great toe can be opposed to the other toes, and the fore-feet become handlike in function from the division of its fingers into two opposable sets. The food consists of vegetable matters.

Kobeljáki, a town in the government of Poltáva, Russia, on the Vorskla, 140 miles by rail S.W. of Kharkov. Pop. (1870) 12,989.

Koblenz'. See COBLENZ.

Kob'olds. See GIANTS AND DWARFS.

Koch, Karl Heinrich Emmanuel, a German naturalist, was born at Weimar in 1809. He studied at Würzburg and Jena, and in 1836 undertook a scientific journey through southern Russia, the results of which were published in his *Reise durch Russland nach dem Kaukasischen Isthmus* (2 vols. 1842–43). On his return he became Professor of Botany at Jena, but in 1843 again set out and explored the neighbouring lands of Turkey, Armenia, and the basin of the Caspian. From materials then collected, he has published several works, of which the chief are *Wanderungen im Orient* (3 vols. 1846–47), *Beiträge zu einer Flora des Orients* (1848–54), *Die Kaukasische Militärstrasse* (1851), besides an excellent map of the Caucasian Isthmus, published at Berlin in 1851.

Kock, Charles Paul de, the posthumous son of a Dutch banker, was born at Passy-lès-Paris, May 21, 1794. As a boy K. was dreamy and timid, and numbers of romances were put into his hands by his mother for his amusement. On his fifteenth year he became a banker's clerk, and in that situation wrote his first novel. Besides novels he wrote vaudevilles, comedies, and melodramas in incredible profusion. The profligacy of his writings has often been commented on by English writers. By French critics, though the fluent vulgarity of his style is condemned, he is accepted as a truthful painter of the manners of the bourgeoisie, and an accurate investigator in *affaires du cœur*. The best of his theatrical pieces were published in Paris (2 vols. 1840), and his novels (1845, in 56 vols.). Among his characteristic novels may be mentioned *Mon Voisin Raymond, Sœur Anne, Le Barbier de Paris, Un Jeune Homme Charmant, Mœurs Parisiennes. Le Troubadour Portugais, M. Mouton, Une Nuit au Château*, represent perhaps about his best specimens of melodrama, vaudeville, and opera-comique. K. died at Paris, 28th August 1871. There are three collections of his works, that of 1834–35, in 30 vols.; of 1841–43, in 26 vols.; of 1844–45, in 56 vols.

Kohat', the chief town of the district of the same name in the Punjaub, India, 37 miles from Peshawur; pop. (1868) 6064. The cantonment, which lies to the E., containing 3000 men of all arms, is much overcrowded. To the N. is a strong mud fort, which cost £31,000. K. is an important frontier station, to overawe the wild tribes of the neighbouring hills.—The *district* of K., which is bounded on the E. by the Indus, contains an area of 2839 sq. miles; pop. (1868) 145,419. The staple crops are wheat, millet, Indian corn, and barley. Alum, sulphur, and coal are found, and salt is mined to the amount of 14,000 tons a year, yielding to Government a revenue of £8500. Sword-blades and rifle barrels of great excellence are manufactured entirely by hand. The K. pass, 9 miles in length, which separates K. from Peshawur, was long in the possession of the Afreedees—warlike mountaineers, who came to terms with the British in the beginning of 1877.

Kohl, Johann Georg, a German traveller, was born at Bremen, April 28, 1808, and studied law at the universities of Göttingen, Heidelberg, and Munich; and after acting for some years as private tutor in the families of the baron of Manteuffel and Count Meden, settled in 1838 at Dresden. Since then he has travelled over almost the whole of Europe, besides spending four years (1854–58) in America, and has published numerous works descriptive and scientific. Among these are *Der Verkehr der Menschen in seiner Abhängigkeit zu der Erdoberfläche* (1841); *Skizzen aus Natur und Volkerleben* (1851); *Aus meinen Hütten* (1852); *Geschichte der Entdeckung Americas* (1862); *Nordwestle-Deutsche Skizzen* (1864); *Am Wege. Blicke in Gemüth und Welt* (1866); *Geschichte der Erforschung des Golfstroms* (1868).

Kohl-Rabi ('Kale Turnip'), the German name for a dwarf variety of the cabbage (*Brassica oleracea*, var. *gongylodes*) with stem swollen so as to resemble a turnip above ground, but of a delicate green colour. This abnormal growth is used like turnip or potato as a vegetable to meat, or is dressed whole, and eaten with sauce. It is more appreciated, and more cultivated in Central and N. Europe than in Britain.

Ko'kra Wood is a very hard wood obtained from *Sapa Roxburghii*, a tree with simple laurel-like leaves, now placed in the Spurge family, but having a curious affinity to the genus *Alnus* (alder) of *Amentiferæ*. It is used in India for various purposes, and imported into Europe chiefly for manufacturers of musical instruments, such as flutes.

Kol'aba, the chief town of the district of the same name, Bombay, British India, and also of an island on the Conean coast, due S. of Bombay. K. town is a military convalescent station. K. island was formerly the headquarters of the Angria family of Mahratta pirates, but the dynasty failed in 1841. The *district* of K. has an area of 1482 sq. miles; pop. (1872) 350,405.

Kolapore', the chief town of the native state of the same name, India, in connection with the Bombay Government, 185 miles S.E. from Bombay. Pop. (1872) 39,621. The *state* of K., which lies within the Deccan, has an area of 3184 sq. miles; pop. (1872) 802,691; revenue, including that of its dependencies, £304,000. The products are rice, millet, sugar-cane, and coarse cotton; the manufactures are pottery and hardware. The ruling dynasty is Mahratta, and traces its descent from a younger branch of the family of the great Sivajee. The present (1877) Rajah is a minor, and the state is administered by the Political Agent. Public works, education, and sanitary improvements are receiving special attention. Since 1822, internal mismanagement has frequently required the intervention of the English; the last treaty dates from 1864. There are eleven recognised feudatory chiefs. The Bombay Sepoys mutinied here in 1857.

Kolar', the chief town of the district of the same name, in the state of Mysore, India, 43 miles E.N.E. from Bangalore, and 10 miles N. of the Madras Railway. Pop. (1871) 9924. Silk and blankets are manufactured, and turkeys are reared in great numbers. Here is the tomb of Hyder Ali's father. The *district* of K., in the extreme E. of Mysore, has an area of 2577 sq. miles; pop. (1871) 618,954. The crops are *ragee*, rice, gram, oilseeds, betel leaf, tamarind and turmeric. The exports are silk and sugar. It contains the rock fort of Nundidrug.

Kol'berg, a fortified seaport of Prussia, in Pommern, on the river Persanté, near its entrance into the Baltic, 143 miles N.E. of Berlin, with which it is connected by rail. It has an old cathedral, a handsome town-house, important salmon and lamprey fisheries, salt-works, and 37 vessels of 6586 tons. Standing among low swamps it can easily be surrounded by water. Pop. (1875) 13,550, of whom 1687 are soldiers. K. has sustained several protracted sieges. Before the town lies the fortified work called the *Maikuhle*.

Kolgujev', a rocky and swampy island of 1350 sq. miles, lying N.E. of Tsheskaja Bay, 124 miles from Kanin Noss, inhabited by a few Samoieds, but visited annually by Russian fowlers and fishers.

Kollar', Janos, a Slavic poet, born 29th July 1793 at Mossocz in the N. of Hungary, after an education at Kremnitz and Neusohl, studied theology at the universities of Presburg and Jena. Appointed pastor of the Slavic evangelical church at Pesth (1819), he held that post until the outbreak of the revolution of 1848, when he was called to Vienna as confidential agent of the government. The year following he was made Professor of Archæology in the University of Vienna, where he died January 29, 1852. K.'s first and finest production, *Básné* ('Poems,' 1821), became famous in its second edition, under the new title *Slávy Dcera* ('Daughter of Glory.' 1824), and marks an epoch in Czech literature. It consists of 622 sonnets, of which Panslavism is the connecting sentiment. His later writings were mainly on linguistic subjects. Kober published a selection from his writings entitled *Spisy* (4 vols. Prag, 1862–63).

Köll'iker, Rudolf Albrecht, a German physiologist, was born at Zurich, July 6, 1817. Since 1847 he has been Professor of Physiology at Würzburg. His chief works are his *Mikroskopische Anatomie* (2 vols. 1850–54), the materials of which he had published as memoirs during his earlier career; his *Handbuch der Gewebelehre* (1852, 4th ed. 1863); the *Entwickelungsgeschichte des Menschen* (1861); and the *Icones Histologicæ* (1864).

Kollin', a town of Bohemia, Austria, on the left bank of the Elbe, 35 miles E. of Prag, with a pop. of 7727. It is the scene of a victory gained by the Austrians under Marshal Daun over Friedrich the Great, 18th June 1757.

Köln (Fr. *Cologne*, Lat. *Colonia*), a fortified city of Prussia and capital of the Rhineland province, on the left bank of the Rhine, 24 miles S.E. of Düsseldorf by rail. A fortress of the first rank and one of the chief commercial centres of Germany, it is semicircular in shape, girt by a ring of twenty-two forts, and has narrow, gloomy streets. A bridge of boats and an iron bridge 1352 feet long, connect it with Deutz on the right bank of the river. The great architectural feature of K. is the cathedral, which was founded in 1248, and is one of the most magnificent specimens of Gothic in Europe. A cruciform structure, it is 510 feet long and 231 broad, and the central tower rising over the transept is 357 feet high. The choir, completed in 1322, and flanked by seven chapels, exhibits in its lowest parts the simple, dignified forms of early Gothic, while from the massive pillars of the substructure rises a florid system of splendid arches and flying buttresses. The work of building which had lingered was abandoned in the 16th c., and the edifice was converted into a hay magazine by the French in 1795. In the beginning of the 19th c. it was rescued from destruction; first Friedrich Wilhelm III. and then the German people contributed funds for its restoration, the cost of which is estimated at £700,000; Zwirner was appointed architect, and, excepting the towers, the building was completed in 1863. Other notable churches are those of St. Peter, containing a picture of the crucifixion of St. Peter, painted and presented by Rubens; St. Ursula, where are preserved the bones of the 11,000 virgins, who, according to the legend, were massacred here by the Huns on their refusal to break the vow of chastity; St. Marie im Capitol, the oldest church in K., built in the 11th c.; church of the Minorites, of the 13th c., with the tomb of Duns Scotus; and that of St. Gereon (1219–1227) dedicated to the 408 martyrs of the Theban legion and their captains Gereon and Gregory (afterwards the patron saints of K.), who are traditionally recorded to have perished here during the persecutions of Diocletian in 286. The Gürzenich, so named from its founder, was originally a 'Merchants' Hall,' and was built 1441–74; it is now used as a music hall, and is the finest secular building in K., being adorned with pinnacles and six slender watch-towers. (See Raschdorff, *Das Kaufhaus Gürzenich in K.* Berl. 1864, with twenty-one plates.) K. has also an archbishop's palace, a town-house of the 13th c., a museum (1855–61), an observatory, a public library, a botanic and zoological garden, an arsenal, a seminary for the education of priests, several gymnasia and a theatre. Outside the walls are beautiful gardens and promenades. K. was famed for its cloth industries as early as the 13th c., and had warehouses at Bergen and Bruges. It is now noted for its manufacture of eau-de-cologne, of which some 1,500,000 bottles are exported yearly. The factories of the perfume are twenty-four in number, and of these the Klosterfrau Maria Clementine Martin, produced 26,400 gallons (value £48,855) in 1871. The other industrial products of K. are silks, woollens, laces, cotton yarns, velvets, clocks, and metal wares. There is good dock accommodation and an extensive river-trade in wine, grain, oil, &c. K. is a great railway centre. Pop. (1875) 135,371 (including Deutz with a pop. of 14,513), of whom 16,746 are Protestants, 2685 Jews, and 5240 soldiers. K. was originally called *Ubiorum Oppidum*, but when a Roman colony was planted here by Julia Agrippina in A.D. 50, the name was changed to *Colonia Agrippina*. Remains of the Roman period—sculptures, mosaics, tombstones, &c., are continually being discovered. K. subsequently became a free city of the empire, and one of the richest of the Hanse towns, and was the seat of a university from 1388 to 1798. Its bishop was raised into an archbishop in the 8th c., and for several centuries the holders of the see took their place as princes and electors of the empire. The archbishopric was secularised in 1801, and the city with its territory was ceded to Prussia in 1814. See Ennen and Eckertz, *Quellen zur Geschichte der Stadt K.* (vol. i. 1860), and Ennen, *Geschichte der Stadt K.* (3 vols. 1862–68).

Kolom'na, one of the oldest towns of Russia, in the Government of Moscow, on the Moskva and Kolomenka, 63 miles S.E. of Moscow by rail. It has twelve churches, two convents, an old kremlin, manufactures of silks, cottons, leather, &c., and some cotton-printing, and tallow-melting. Pop. (1870) 20,000.

Kolome'a, or properly **Kolomyja**, an old town of Austria, in Galicia, at the foot of the Carpathians. It is noted for its pottery, and had formerly an important trade. Pop. (1869) 17,679, of whom nearly half are Jews.

Koltsof, Alexis Vasiljevitch, a popular Russian lyrist, born in Voronezh, 14th October 1809. His father, a cattle-

dealer, gave him only the merest rudiments of education; but a few books bought at fairs awoke his imagination, and in his wandering life as a herdsman it was roused to an enthusiasm for the steppe that reflects itself in all his songs. After imitating for a time the verse of such poets as Derzawin and Pushkin, K. went in 1831 to Moscow on business, and there found friends who inserted some of his poems in the journals. A visit to St. Petersburg in 1838 introduced him to Pushkin, Joukovsky, and a wide circle of appreciative friends. He longed more and more to be rid of trade, and was just about to settle in St. Petersburg for a literary life, when he sickened and died, 31st October 1842. In 1846 appeared a complete edition of his poems, with a biography by Bjelinsky. They are marked by deep poetic feeling, force of conception, and a charming naïveté of expression.

Kolŭvan', a town of Asiatic Russia, in the government of Tomsk, on the left bank of the Obi, 100 miles S.W. of Tomsk, and at the base of an offset of the Altai Mountains, in which there are large jasper quarries. Pop. 3000.

Kolyma', the most easterly of the great rivers of Siberia, rises in the Stanovoi Mountains, flows N., receiving the Omolon and the Anyui, and enters the Arctic Ocean by the K. Bay, after a course of nearly 1000 miles. At its mouth lies the little town of Nishnii Kolymisk.

Komorn' (Hungar. *Komárom*), a town in the comitat of K., Hungary, lies on the E. extremity of the Greater Schütt, an island at the junction of the Danube and Waag, 87 miles E.S.E. of Vienna, with which it is connected by railway. Its fortifications, founded by Matthias Corvinus, and restored since 1805, extending 7 miles along the rivers' banks, are among the strongest in Europe, and can shelter as many as 50,000 men. During the Hungarian War under Klapka (q. v.), the insurgents here resisted the Austrian forces from October 1848 to September 1849. K. has considerable trade in wine, grain, wood, and fish.

Kond, or **Khand**, an aboriginal hill tribe of India, chiefly found in Orissa, where they number 77,000, and also in the N.E. of Madras. They are supposed to be of Dravidian origin, akin to the Gonds. Until the last few years they were notorious for human sacrifice, which they used to carry out in the most systematic and horrible manner. This practice demanded a military force for its suppression in 1847, when more than 1500 victims were rescued. It is said that all inclination to it has now died out. See Dr. W. W. Hunter's *Orissa*, and Colonel Dalton's *Descriptive Ethnology of Bengal* (Calcutta 1872).

Kong Mountains, a range in the W. of Africa, forming the N. boundary of Ashanti and Dahomey, and extending W. from the Niger, in a line almost parallel to the coast (from which it is distant some 200 miles), as far as the tableland of Senegambia. The greatest known summits are not over 2500 feet.—**K.** is also the name of the capital of a district to the N.W. of Ashanti, which has some cotton industries, and a trade in gold dust, and is the converging point of several caravan routes.

Ko'nieh, a town of Asia Minor, capital of the vilayet of the same name, 129 miles W.S.W. of Newschehr, is a decayed place, though its numerous mosques and other public buildings still give it an imposing aspect. There is a bazaar for the sale of English cottons, Nürnberg wares, &c., but of native industries there are none. Pop. estimated at from 22,500 to 30,000. K. is the ancient *Iconium*, the capital of Lycaonia, which was a populous city, inhabited by Greeks and Jews, at the time of the visit of Paul and Barnabas. It was the scene of a synod (235), fell under the Arabs (708), became the residence of the Seljuk sultans (1097), and was captured by Friedrich Barbarossa (18th May 1190). On December 20, 1832, it witnessed the defeat of the Turks under Redshid Pasha by Ibrahim Pasha, the Egyptian viceroy

Kön'ig, Friedrich, the inventor of the steam-press, was born at Eisleben, April 17, 1775, and first began business as a printer and bookseller. In 1807 he went to London, and with the aid of Thomas Bensley and others was enabled in 1810 to patent his first steam-machine, which printed by two flat plates. In 1811 he patented his cylinder press, and after various improvements, which he patented, he returned to Germany in 1817, where in the succeeding year he established, along with Andreas Friedrich Bauer, a firm for making steam printing-presses at Oberzell near Würzburg in Bavaria. K. died January 17, 1833.

Kön'iggrätz, a fortified town of Bohemia, on the left bank of the Elbe, at the mouth of the Adler, 64 miles E.N.E. of Prag by rail. It is the seat of a bishop and has a cathedral and some cloth industries. Pop. (1869) 5061. The Austro-Saxons, under Benedek, suffered a severe defeat here at the hands of the Prussians under Moltke, 2d July 1866.

Kön'iginhof, an industrial town of Bohemia on the Elbe, 18 miles N. of Königgrätz by rail. It has manufactures of linen, leather, hats, &c., and some sugar refining. Pop. (1869) 5370.

Kön'igsberg, the capital of the province of E. Prussia, and a fortress of the first rank, on undulating ground at the confluence of the Old and New Pregel, and 4½ miles from the entrance of the united stream into the Frisches Haff, 78 miles E.N.E. of Danzig. It is the seat of a university (old building founded in 1544, new one completed in 1862) and has a royal palace of date 1532–54, enclosing a large quadrangle, and having a lofty Gothic tower, a schlosskirche adjoining the palace, where Friedrich I. was crowned in 1701 and Wilhelm in 1861; a museum with a collection of 300 chiefly modern pictures, a Gothic cathedral, begun in 1835, situated on an island in the Pregel, and containing the tomb of Kant, an observatory, royal library, botanical garden, several public gardens, and a theatre. The Pregel is crossed by seven bridges, and on the N. sides of the town are two extensive sheets of water. K. is connected by rail with its port of Pillau, at the mouth of the Frisches Haff. A new quay on the river at K., with rails, was being constructed in 1876. There are large manufactures of machinery, chemicals, beer, soap, leather, tobacco, paper-hangings, &c. K. has an immense trade in grain, drawing its supply chiefly from Russia (export in 1875, 8,262,161 cwts., value £3,485,916). Its other exports are timber, wool, iron, and iron wares, and petroleum (1875, 110,588 barrels). In 1875 there entered the port of Pillau 2424 vessels of 541,080 tons, and cleared 2316 of 1,250,773 tons. K. is connected by rail with the S. of Russia. In 1875 there was imported 3,022,000 cwts. of coal and coke, and 217,000 barrels of herrings. Pop. (1875) 122,636. K. was originally a castle (1255) of the Teutonic order, and was named after King Ottokar of Bohemia. After the fall of Marienburg (1457) K. became the residence of the Grand Master of the Order, and subsequently (1525-1618) that of the Dukes of Prussia. The Elector Friedrich III. of Brandenburg here assumed the title of King of Prussia in 1701, and after the disasters of 1806 Friedrich Wilhelm III. retired hither with his court, including Baron v. Stein, W. v. Humboldt, York, &c. K. is also noted as the birthplace of Kant, and the scene of his life-work. Hamann, Herder, and others are also associated with the city.—**K.** is also the name of a town in the Neumark, Brandenburg, on the Röke, with some tanning and distilling. Pop. (1875) 6353.

Kön'igswart, a town of Bohemia, in the valley of the Beraum, a tributary of the Elbe, 79 miles W.S.W. of Prag. It is the seat of a castle built by Metternich in 1618, and in the vicinity are iron and tin mines, and mineral springs. Pop. (1869) 7494.

Konotop, a town in the Russian government of Tschernigov, Russia, 440 miles S.W. of Moscow by rail, has several factories. Pop. (1870) 9946.

Kon'rad is the name of several German poets of the middle ages. (1) **K.**, probably Castellan to Heinrich the Lion (1139–95), who translated the *Song of Roland* into German verse (mod. ed. W. Grimm, Augsb. 1838). (2) **K. Fleck**, a native of Swabia, born about 1220, author of the exquisite *Flore und Blanscheflur* (ed. by Sommer, 1846; mod. version by Wehrle, 1856). (3) **K. Von Würzburg**, represents at its best the last epoch of romantic poetry as it flourished under the fostering hand of the Hohenstaufen. Little is known as to the details of his life beyond the meagre facts that having dwelt for long at Würzburg, he died at Basel, 31st August 1287. He was one of the most prolific of the Minnesänger, and though prolix at times, is marked by the spontaneity, freshness, and *naïveté* of his order. His chief works are the legends, *Heil. Alexius* (Massmann,

1843); *Silvester* (Grimm, 1841); *Das Herze* (Roth, 1846); *Engelhart und Engeltrut* (Haupt, 1844); *Kaiser Otto* (Hahn, 1838); *Die Goldene Schmiede* (Grimm, 1840); *Lieder* (Pfeiffer, 1870), &c.

Konrad I., the nephew of Emperor Arnulf and Count of Franconia, was elected King of the Germans, October 9, 911. K. carried on wars with his vassals, the Dukes of Saxony and Bavaria, in order to establish the royal authority. He was mortally wounded in an engagement with the latter, and before his death he asked his brother to hand over the crown to the eminently competent Heinrich of Saxony. The chief internal change during his reign was the making of duchies for the first time into hereditary fiefs. K. died December 23, 918.—**K. II.**, son of Heinrich, Duke of Franconia, was elected at Mainz, September 8, 1024, King of the Germans. He was speedily engaged in war with his cousin, the Duke of Carinthia, part of his policy being to lessen the power of the territorial aristocracy. Then he crossed the Alps (1026), was crowned King of Italy at Milan, and (1027) Emperor at Rome. Upon the death of Rudolf of Burgundy (1032), K. succeeded to that duchy, though he had to contest with Eudes of Champagne for five years before obtaining absolute possession. At different points he carried on war with the Bohemians, Poles, Slavs, and Hungarians. In 1037 K. revisited Italy, and issued his Edict, making all fiefs hereditary. He died at Utrecht, June 4, 1039, and leaves the reputation of having been one of the most sagacious and brave German kings. K. was the first of the Franconian line of emperors.—**K. IV.**, the last of the Hohenstaufen dynasty, was born, April 1228, at Andria, received the title of Duke of Swabia and Elsass, and was crowned King of the Romans in 1237. K.'s reign was marked by a struggle with Heinrich of Thuringia, who, at the advice of Innocent IV., assumed the title of royalty at Hochheim. He became Emperor upon the death of Friedrich II. (1250), but was excommunicated by the Pope, against whom he fought with success. He died of a fever at La Vallo, May 21, 1254.—**Konradin of Swabia**, son of the preceding and Elizabeth of Bavaria, was born in 1252. In his infancy K. was stripped of the crown of Germany, Naples, Sicily, and Jerusalem, through the influence of Innocent IV., who, notwithstanding the opposition of Manfred, K.'s uncle, enlisted the services of Charles of Anjou by promising him royal honours. Manfred was conquered in the plains of Graondella, and (1268) K. being defeated at Scurcola, was taken prisoner, conducted to Naples, and executed in November of the same year. A fragment of poetry among a collection of the Minnesänger is attributed to the unfortunate youth, who suffered the severest penalties for his father's excommunication.

Koo'doo (*Strepsiceros Koodoo*), a species of Antelope (q. v.), attaining a height of 4 feet at the shoulder. Its distinctive feature is the curious spiral conformation of the horns, which attain a length of 3 feet, and are provided with a keel. So regular in their conformation are these structures, that a straight pole may be passed down and through the spirals, without interruption. The K. is hunted for the sake of the skin and flesh, a strong durable leather being made from the former. The colour is a reddish grey, marked on the sides with several prominent white streaks. The female is hornless. The K. is usually found in bands of four or five.

Koom'rah, the name given to a species of *Equidæ* somewhat intermediate in form between the horse and ass, found in N. Africa, where it inhabits woody districts. Very little is known regarding its exact nature or habits. The colour is a very dark bay. The tail is slightly tufted, but the general bearing of the animal suggests an alliance with the horse.

Ko'pek (*kopeika*), a Russian copper coin, one-hundredth part of a Rouble (q. v.).

Ko'ran (Arab. 'the reading,' or 'that which ought to be read,' from *kara*, 'to read'), is the collection of revelations which Mohammed (q. v.) professed to receive from time to time either directly from God or through the angel Gabriel; the name being applied to the whole book and also to any particular chapter or section. It was composed in the dialect of the Koreish, the most noble of all the Arab tribes, with some slight mixture of other dialects. It is the standard of the Arabic language, and is universally acknowledged to be written with the utmost elegance and purity; it claims, indeed, to be inimitable by human pen, and therefore to be a standing miracle, greater than that of raising the dead. To this miracle Mohammed himself chiefly appealed for the confirmation of his mission, publicly challenging all the scholars of Arabia to produce a single chapter that could be compared with it. That Mohammed was the author of the K. is undisputed, although it is probable that, as was said by some of his countrymen at the time (*cf.* K. 16, 25), he got assistance from others. The account given of the matter by himself was that the divine original was written from everlasting on a vast table beside the throne of God, and that a copy from this was sent down to the lowest heaven, from which Gabriel revealed it to Mohammed in fragments as circumstances required, showing the whole copy, a volume bound in silk and ornamented with gold and gems, to the prophet once a year. The revelations were taken down from the lips of the prophet by his secretaries, and published to his followers, the original copies being thrown promiscuously into a chest. The work of editing these various fragments was entrusted by his successor Abu Bekr to Zeid ibn Thabet, one of his secretaries, who collected them from the palm leaves and skins on which they had been written, and from the mouths of such as had gotten them by heart. In the thirteenth year of the Hegira, owing to the numerous variations of the copies used in the different provinces, the Calif Othman ordered a large number of copies to be transcribed from that of Abu Bekr, and to be put in circulation in place of the old ones, which were burned.

'The general design of the K. seems to be this: to unite the professors of the three different religions then followed in the populous country of Arabia, who, for the most part, lived promiscuously, and wandered without guides, the far greater number being idolaters, and the rest Jews and Christians mostly of erroneous and heterodox belief, in the knowledge and worship of one eternal, invisible God, by whose power all things were made, and those which are not may be, the supreme governor, judge, and absolute Lord of the creation; established under the sanction of certain laws, and the outward signs of certain ceremonies, partly of ancient and partly of novel institutions, and enforced by setting before them rewards and punishments, both temporal and eternal: and to bring them all to the obedience of Mohammed, as the prophet and ambassador of God, who after the repeated admonitions, promises, and threats of former ages, was at last to establish and propagate God's religion on earth by force of arms, and to be acknowledged chief pontiff in spiritual matters as well as supreme prince in temporal' (Golius, quoted by Sale). The great doctrine of the K., then, is the unity of God, to re-establish which truth Mohammed declared to be the chief end of his mission, as it had been the mission of Moses and Jesus, the great prophets before Mohammed, but after whom no great prophet need be expected. Accordingly the greater part of the K. is filled with examples of punishment inflicted by God on those who rejected and abused his messengers, many of them taken from the Old and New Testaments, and the Jewish and Christian apocryphal books. Another part is occupied with laws and admonitions to various virtues, especially reverencing and worshipping the only true God, and resignation to his will. The rest consists of passages relating to particular emergencies.

The K. is not only the Bible of Mohammedans, but also their code of law and jurisprudence, and Book of Common Prayer. It contains explicitly or implicitly all knowledge. The various discrepancies and contradictions in it are explained by the doctrine of abrogation: that God commanded several things in the K. which were for good reasons afterwards revoked. Of the present text 225 verses have been abrogated in this way. See MOHAMMEDANISM.

Kordofan' ('the white land'), a province in the Egyptian territories of the Sudan, formerly an independent state, but conquered by an Egyptian force in 1821. Its area is about 12,000 sq. miles, and its pop. is estimated at 500,000. The chief town is El Obeid (q. v.). See NUBIA and SUDAN.

Kör'ner, Karl Theodor, a German poet, born at Dresden, 23d September 1791, studied for two years at the school of mines at Freiburg, and went in 1810 to Leipsic, but owing to imprudence was forced to leave the university. At Vienna he brought upon the stage some comedies of high value; his serious dramas were less striking, but their pathos, most marked in *Zriny* and *Rosamunde*, captivated the young. On the breaking

out of the War of Freedom, K. entered the army, after his *Leier und Schwert* ('Lyre and Sword') had shown that his special field lay in the patriotic lyric. Weber's melodies made his fresh, bold songs all the more popular. On the 26th August 1813 K. fell in an action between Schwerin and Gadebusch, where there is a monument to his memory. His *Sämmtliche Werke* were published by Streckfuss (1 vol. Berl. 1834, 1863; 4 vols. Berl. 1838, 1863), and by Wolff (with letters, &c., 4 vols. Berl. 1858). Biographies of K. have been written by Erhard (1821) and Hadermann (1848).

Kosciusz'ko, Tadeusz, a Polish patriot, was born of noble parents in the government of Minsk, 12th February 1746. Educated at Warsaw, he entered the army and obtained the rank of captain. In the American War he distinguished himself by the side of La Fayette, and on his return to Poland became major-general. When Catherine II. declared war he served under Poniatowski; but the base intrigues of Stanislas rendered all patriotic movement useless, and he retired in disgust to Germany. In 1794 K. returned to Poland, assumed the dictatorship, marched upon the Russians and defeated them at Raclawice. By a series of skilful movements he kept the ill-disciplined armies of the enemy at bay; but on the appointment of Suwaroff to the Russian command Poland's hopes fell. Overpowered by numbers, K. sustained an irretrievable defeat on the 10th of October 1794 at Macsiewice. Falling from his horse, covered with wounds, he cried, 'Finis Poloniae!' Within a month Poland was completely subdued. K. was kept in confinement at St. Petersburg during Catherine's reign, but regained liberty on Paul's accession, and passed into France. He died of fever 15th October 1817. There are biographies of K. by Falkenstein (Leips. 1825, 2d ed. 1834); and Chodzko (Par. 1837).

Kös'lin (Slav. 'the goat town'), a town in the province of Pommern, Prussia, 75 miles N.E. of Stettin by rail, and 5 miles from the Baltic, with a great sheep-market, and manufactures of paper. Pop. (1875) 14,816.

Kos'lov, a town in the Russian government of Tambov, on the river Voronezh, 42 miles W. by N. of the town of Tambov by rail, with a large trade in corn and tallow. Pop. (1870) 25,522.

Kossuth, Lajos (Louis), chief actor in the Hungarian Revolution of 1848, was born at Monok, in the county of Zemplin, April 27, 1806. Educated for the profession of his father, a lawyer, but too early a republican to hope for legal preferment, he quitted his studies, and entered on his political career as a representative at the diet of Presburg, in 1832. Here his only attempt at oratory covered him with mortification, and he determined to gain influence by establishing a journal. This journal, first circulated in MS., afterwards in lithograph, did not long escape government suppression; and its editor was condemned to four years' imprisonment. In 1840 the result of the elections compelled the release of all political prisoners, and K. was again at liberty, more a republican than ever. The *Pesth Journal*, which he then established, with a circulation of sixty copies, in two months numbered six thousand subscribers. After nearly four years of journalistic work, K. devoted his energies to the formation of national societies, several of which did most important reformation work. In 1847, K., in his prime, was by an overwhelming majority returned to parliament as member for Pesth. At once making a bold stroke for freedom, he demanded the formation of a Hungarian ministry. The demand was granted. Hitherto K. had sought the political reform, rather than the independence of his country; but Austria's deceptions urged his party to extremes. K. forced the Emperor to ratify decrees giving equality of civil rights to all classes, and franchise to every citizen possessing £10 of income, or £40 in heritable property, to every university graduate, and to every workman employing an apprentice. The Vienna cabinet was not slow to revenge itself. Imperial decrees were passed practically nullifying any independence Hungary had gained; the Croats were instigated to desertion, and open rupture quickly ensued. Still K., in his new journal, *K.'s Gazette*, maintained the attitude of a dutiful subject. Only when Austria openly espoused the cause of the Croats did he, in despair, appeal to the nation with these words, 'I demand two hundred thousand men, and forty-two millions of florins.' They were granted. Volunteers flocked to the standard, and a severe battle was fought with Jellachich. Marching on Vienna, K. sustained a defeat at Schwechat, and retired. Still patriots volunteered. The diet removed from Pesth to Debreczin, formally declared the country in danger, and appointed K. Governor of Hungary. Austria, aided by Russia, spread destruction pitilessly, and in 1849 K., convinced that the cause was lost, resigned his post, escaping to Turkey, and thence to England. Seldom has the British nation accorded to any foreigner a welcome warmer than that which K. received. His eloquence won for Hungary the most intense sympathy. K. was but coldly heard, however, in America, whence he returned to England in 1852. His *Select Speeches*, delivered in this country during the Russian war, have been edited by F. W. Newman. On the outbreak of the Italian revolt, K. addressed the soldiers of his country, but failed to effect any movement. In 1867 he was elected deputy for Waitzen, but declined the office. He has latterly resided at Turin, devoting much of his time to science. In 1877 K. broke the silence of years to advocate an anti-Russian policy on the part of Hungary and England.

Kos'troma, a central government of Russia, is watered by the navigable Volga, with its tributaries. Area 32,701 sq. miles; pop. (1870) 1,101,099. The forests, which belong mainly to the peasants, and cover three-fourths of the surface, are the chief source of wealth, shipbuilding, tar-making, and the manufacture of mats of linden bark being important industries. Linen, paper, and Russia leather are also largely manufactured. In all there are 411 factories, with 8132 workmen. Among the inhabitants are 4000 Cheremissians, and 300 Karakalpaks.—**K.**, the capital of the government, 191 miles N.E. of Moscow, on the rivers Volga and K., which are frozen for six months of the year. It has a fine cathedral, forty churches, leather and linen industries, a thriving trade, and celebrated shipbuilding yards. It was founded in 1152, and suffered much from Tartar and Polish invasions. Pop. (1870) 27,178.

Ko'tah, the chief town of a native state of the same name in Rajputana, India, on the right bank of the river Chumbul, 195 miles S.W. from Agra. It is a well-built place, with some trade. In 1857 the British resident, with his two sons, was murdered by the native troops of the K. contingent.—The *state* of K. has an area of about 5000 sq. miles; pop. about 450,000; net income, £200,000. Much of the country is well watered; the hilly tracts are carefully preserved for large game. The dynasty, whose title is Maharao, dates from 1620. In 1874 it was found necessary for the British to assume the direct administration of affairs, which is conducted through an able Mohammedan minister. K. is the headquarters of the Harowti Political Agency.

Kö'then (Ger. 'the place of huts'), an old and well-built town in the duchy of Anhalt, S. Germany, 12½ miles W.S.W. of Dessau. It has a handsome railway station, and is at the junction of lines from Magdeburg, Bernburg, Halle, and Dessau. The old castle has a valuable zoological museum. Pop. (1875) 14,408.

Kotri, a town in the district of Kurrachi, Scinde, British India, on the right bank of the Indus, opposite Hydrabad, and 105 miles N.E. by rail from Kurrachee; pop. (1872) 7949. K. occupies, at present, an important position, as the terminus of the Scinde railway, where goods and passengers are transhipped into the Indus steamers. It happens to be situated on a permanent bank of the river. There is a floating-dock here, and a steam ferry to Gidu Bundar, the port of Hydrabad.

Kott'bus, a town of Prussia, in the province of Brandenburg, on the Spree, 70 miles S.E. of Berlin, at the junction of lines of railway from Berlin, Halle, Leipsic, Breslau, and Posen. It has an old royal castle, and large manufactories of cloths, woollens, and linens. Pop. (1875) 22,650.

Kots'ebue, August Friedrich Ferdinand, a German poet and playwright, was born at Weimar, May 3, 1761, and after a varied career in Russia and Germany, was assassinated at Mannheim, March 23, 1819, by K. Sand, on account of his hostility to liberalism. His works are numerous, and marked by skilful stage-effects. The chief are *Menschenhass und Reue* (1789), known on the English boards as *The Stranger*; *Die Indianer in England* (1789); *Die Verwandtschaften* (1798); *Das Epigramm*, and *Die beiden Klingsberg* (1801); *Das Intermezzo* (1809); *Die Verkleidungen* (1818), &c. There is a collected edition (1840–42) in 40 vols.; a select edition (1868) in 10 vols. See Döring's *Biographie Von K.* (1840).

Kou'miss, or **Ku'miss**, an alcoholic beverage made by the Tartars and Kalmucks from mare's milk, which is caused to undergo vinous fermentation. A spirit, called *rack* or *racki*, possessing a most disagreeable taste, is distilled from it. K. is supposed to possess therapeutic virtues, and its manufacture in England has recently been entered on.

Kouss'o. See CUSSO.

Kov'no, a government of Russia, made up (1843) of the N. districts of the former government of Vilna, is bounded N. by Courland and S. by Vilna, Suvalki, and E. Preussen. Area 15,775 sq. miles; pop. (1870) 1,156,041. K. is undulating and wooded, with numerous streams, which run S. to the Niemen, or N. to the Baltic and the Gulf of Riga. The chief industries are agriculture and wood-cutting; the principal crop is rye, while flax and hops are also largely cultivated. K., the chief town, at the confluence of the Vilia and Niemen, 415 miles S.W. of St. Petersburg by rail, has considerable trade, and is noted for its mead (*Lippitz*). Pop. (1870) 33,050.

Krajo'va, the chief town of Little Wallachia, near the E. bank of the Schyl, 120 miles W. of Bucharest, with which it is connected by rail. It is very irregularly built, has a large public park, and is inhabited by many wealthy bojars. Pop. 22,767.

Krasnoiarsk' (Slav. 'the beautiful city'), 1. A town of Russia, in the government of Astrakhan, on the Achtuba mouth of the Volga, and 23 miles N.E. of Astrakhan, has important fisheries, and is noted for its fruit. Pop. (1870) 8246.—2. **K.**, capital of the government of Yeneseisk, in E. Siberia, in a fruitful district on the river Yenesei. Gold washing is carried on, and there is a museum for Siberian antiquities. Pop. (1870) 9997.

Krazin'aki, Count Valerian, born about 1780, is chiefly known by the use to which he turned a wide knowledge of Slavonic language and literature during the period succeeding the rebellion of the Poles in 1830, when he resided in England. *The Rise, Progress, and Decline of the Reformation in Poland* (2 vols. Lond. 1839–40); and *Montenegro and the Slavonians in Turkey* (1853) are among the most instructive of a host of miscellaneous works published by him in this country. K. died in Edinburgh, 22d December 1855.

Kre'atine. See CREATINE.

Kre'feld, a town of Rhenish Prussia, 5 miles from the E. bank of the Rhine, and 12 N.W. of Dusseldorf by rail. It is the chief German seat of the silk and velvet industries—the manufactures vying with those of Lyons, and amounting in value yearly to over three millions sterling. Other products are machinery, chemicals, and cottons. Pop. (1875) 62,905, of whom 13,000 are Protestants (1000 Anabaptists), whose ancestors, settled here under the protection of the Princes of Orange (1600–1702). K. with the county of Meurs fell by inheritance to the crown of Prussia in 1702. The French under the Prince of Bourbon-Condé were here defeated by Ferdinand of Brunswick in 1758.

Kremenchug', a town of Russia, in the government of Poltava, on the Dnieper, 58 miles S.W. of Poltava by rail, has seven churches, numerous charitable institutions, tallow and rope factories, manufactures of liqueurs, &c., and is the trade-centre of the government. Pop. with the suburb Krinkow (1870) 30,472.

Kremenetz' (Slav. 'a fortress'), a town of Russia, in the government of Volhynia, on the Ikva, 115 miles W. of Jitomir, in a ravine surrounded with high mountains. It has an observatory and a botanic garden; and on a high hill near is the famous monastery of Pocheyof. Pop. (1870) 10,449.

Krem'nitz (Slav. 'a fortress,' Magy. *Körmöcz Bánya*), a town of Hungary, between the Gran and Neutra, 80 miles N. of Pesth, with which it is connected by rail. Its gold and silver mines are among the richest in Europe, and it has five churches, a castle, and a famous mint that issues yearly over 130,000 ducats and 2,000,000 silver florins. There are also vitriol and paper industries. Pop. (1869) 8442, who are mostly of Saxon origin, and still speak a corrupted Saxon dialect.

Krems, a town of Austria, 37 miles W.N.W. of Vienna, by rail at the confluence of the K. with the Danube, is a walled place with fine churches and numerous educational institutions. Market gardening is an active industry, and there is a thriving trade in flax, soap, wine, &c. A rich alum bed was discovered here in 1760. Pop. (1869) 8155.

Kremsier, a town of Austria, in the markgrafdom of Mähren, on the river March, 40 miles E. by N. of Brünn. The Archbishop Olmütz has here a beautiful summer residence, with fine art collections and a large library. During the Vienna rising the Austrian diet met at K. from 22d November 1848 to 7th March 1849. (Pop. 1869) 9910.

Kre'osote. See CREOSOTE.

Kreuz'er, a German coin, equal to $\frac{1}{60}$ gulden, or $\frac{1}{2}$d. in S. Germany, but in Austria called *neu-K.*, and equal to $\frac{1}{100}$ gulden, or $\frac{3}{5}$d. The K. was first coined in the Tyrol in the 13th c., and was marked with a cross (*kreuz*).

Kreuz'nach, a town of Rhenish Prussia, on the Nahe, where it joins the Rhine, 40 miles S.S.E. of Koblenz by rail. It is chiefly celebrated for its medicinal salt springs, which of late years have attracted many visitors. There are some manufactures of brandy, champagne, chocolate, and tobacco. A quaint stone bridge, on which are built several houses, unites the *Altstadt*, the *Neustadt*, and *Bade-Insel*. Pop. (1875) 13,787.

Kril'of, Alexis Andrejevich, a Russian poet and fabulist, born at Moscow, February 14, 1768, obtained in 1812 a post in the imperial library at St. Petersburg, and in 1830 a seat in the cabinet. He stood in high favour with the Czars Alexander I. and Nicholas, who loaded the closing years of his life with wealth and honour. K. died at Vassily-Ostrov, on the 21st November 1844. When a young man, K. wrote prose comedies; but his fame rests on his fables (published in 1808, 1811, and 1816), which are truly national poems, full of native thought and humour, and wholly free from the imitation of French models universally found in earlier Russian literature. They are familiarly known by all classes of society in Russia, and have been translated into German by Torney (Mitau, 1842). See W. R. S. Ralston's *K. and his Fables* (1871).

Krimmitschau', a town of Prussia, in the province of Saxony, 40 miles S. of Leipsic by rail. It has manufactures of woollens, cottons, needles, and buttons. Pop. (1875) 17,649.

Kris, or **Creese**, the name for a dagger with wavy blade and carved wood hilt carried by the Javanese, and worn throughout the Malayan Archipelago generally. It is with this weapon that fanatical Bugis or Malays run *amok*, that is, under some sudden impulse, rush wildly through a village, wounding every person in their path.

Krish'na ('the black or blue one'), the eighth *avatar* or incarnation of Vishnu, and the most popular god of the Hindu cosmogony. In the Mahabharata he appears as a prince, whose valour greatly contributed to the successful issue of the war. In the Ramayana he becomes a god, and the 18th Purana or Bhagavata is devoted to the description of his life. The legends all centre round the upper valley of the Jumna, in the neighbourhood of Muttra and Brindabun, where K. sported with the milkmaids. His love scenes with Radha are beautifully described in the Gita Govinda of the poet Jayadeva (see translation by Arnold, Lond. 1876). In many respects, K. recalls the Apollo of the Greeks, and some episodes in his early life are even thought to be borrowed from the New Testament.

Kro'nenberg, a town of Rhenish Prussia, on the Wipper, has manufactures of silks, and iron and steel wares. Pop. (1875) 8165.

Kron'stadt (Germ. 'crown city'), a strongly-fortified and regularly built seaport town of Russia, on the island of Kotlin, in the Gulf of Finland, 20 miles W. of St. Petersburg. It is the chief commercial seaport of Russia, the seat of the admiralty, and main station of the Russian Baltic fleet. The fortifications of K., founded in 1710 by Peter the Great (who took the island from Sweden in 1703), have been gradually strengthened with ramparts of massive granite, defended with many batteries of large cannon. In 1854–55 Sir Charles Napier blockaded K. without effect. It has three large harbours: the inner for merchant ships, the outer for ships of war, and a third for shipbuilding and repairs. K. is the port of St. Petersburg. In 1874 it was entered by 1773 sailing vessels and 1084 steamers, of which 945 (including 510 steamers) were English. On an

island near lies the fort of Kronslot ('crown castle'). Pop. (1870) 47,166.

Kronstadt, or **Krünen** (Magy. *Brassó*), a town of Austria, in Transylvania, 70 miles E. of Hermannstadt, is the terminus of the principal railway, and the chief centre of the trade and manufactures of Transylvania. It consists of a lower quarter, surrounded with walls, and three suburbs, and has an old fortified castle, a fine Gothic church, and a town-house with a high tower. K. has several paper-mills, and extensive manufactures of linens, woollens, and cottons. Pop. (1869) 27,766, of whom three-fifths are Germans.

Kross'en, a town of Prussia, province of Brandenburg, at the confluence of the Bober and Oder, 32 miles S.E. of Frankfurt, has two churches, an ancient *schloss*, and manufactures of cloth and leather. Pop. (1875) 6789.

Krü'dener, Barbara Juliane von, grand-daughter of the Russian Field-Marshal Münnich, born 21st November 1764 at Riga, married in her sixteenth year Baron von K., whom she accompanied to Venice and Copenhagen as Russian ambassador, but was divorced, and returned to Riga in 1791. To this time belongs her well-known sentimental novel, *Valérie ou Lettres de Gustave de Sinar à Erneste de G.* (2 vols. Paris, 1804, new ed. 1855), in which she sketches the romance of her own life. Becoming penitent she joined the Herrnhuters, and travelled through great part of Europe, drawing crowds of unfortunates of all classes to her preaching of repentance, visiting the distressed in prisons, and fearlessly rebuking kings and princes. In *Le Camp des Vertus* (Paris, 1815) she published her views on the Second Advent. The Czar Alexander I. was deeply influenced by her. Though honoured by some as a heroine and a prophetess, she was by many regarded as mad, and was driven from one country after another, till her death at Karasu-Basar in the Crimea, 25th December 1824. See Brescius and Seiler, *Beiträge zu einer Charakteristik der Frau von K.* (Berl. 1818); Eynard, *Vie de Madame de K.* (2 vols. Paris, 1849); and *Frau von K., eine Zeitgemälde* (1868).

Kru'mau, a town of Bohemia, on the Moldau, 15 miles S.W. of Budweis. It has an immense castle, built on a rock and enclosing five courtyards. There are large breweries and a famous beer-vault is cut in the solid rock. Pop. (1869) 6600.

Krumm'acher, Friedrich Adolf, a religious writer of Germany, born July 13, 1768, at Tecklenburg in Westphalia, died a preacher at Bremen, 4th April 1845. He is widely known as a writer of moral parables (*Parabeln*, 1805, 8th ed. 1850; *Apologen und Paramythien*, 1810) much imitated in his own time. See Möller, *F. A. K. und seine Freunde* (Bonn, 1849). —**Friedrich Wilhelm K.**, son of the above, born at Duisburg in Rhenish Prussia, January 28, 1796, an eloquent preacher and earnest opponent of rationalism, was from 1853 to his death (December 10, 1868) Court Chaplain at Potsdam. His *Elias der Thisbiter* (3 vols. 5th ed. Elberfeld, 1860), *Elisa* (2 vols. 2d ed. *ib.* 1845), and *Salomo und Sulamith* (7th ed. *ib.* 1855) have been translated into English.

Krumm'horn, a very old wind instrument of wood; also an organ stop, called in England (by corruption) *cremona*.

Krupp, Friedrich, a celebrated German metal-founder, was born at Essen, in Rhenish Prussia, April 11, 1812. There, in 1827, his father established a foundry, which under the proprietorship of the son has grown to one of the most extensive manufactories in the world. (See ESSEN.) In 1851 he exhibited in London at the Great Exhibition a block of steel, weighing 45 hundredweights, and cast after a method invented by him. The steel manufactured by this process is called Krupp's steel, and can now be cast in 100-ton blocks. His great fame, however, rests upon his steel guns, which were used so successfully by the Prussians at the siege of Paris during the late war (1870–71). Recently he has cast an 80-ton breech-loading gun in steel, which is nearly 30 feet long, and will throw a projectile ½ of a ton in weight, and has designed besides a 124-ton gun, to be made upon the same plan, whose projectile will weigh 1 ton.

Kru'senstern, Adam John Chevalier von, a Russian voyager, born 8th November 1770 at Haggud in Esthonia, served (1793–1799) in the English navy, and after his return to Russia, commanded (1803–6) a Russian expedition to the N. Pacific in the interests of science and trade, described by himself in *Reise um die Welt* (3 vols. 1810–12; Eng. trans. by Hoppner, 1813). Other works of his are *Atlas de l'Ocean Pacifique* (2 vols. St. Petersb. 1824–27), and *Beiträge zur Hydrographie der grösseren Oceane* (Leips. 1819). K. became a vice-admiral in 1829, and an admiral in 1841, and died August 24, 1846.

Kshatt'riya, or **Chetri**, the second or warrior caste of the primitive Hindu system. How they became extinct is uncertain. They are said to have been exterminated by an angry god, Parasuram. Among those who claim to be their modern representatives are the Rajputs (q. v.) and the Khetris, the great trading caste of the N.W., who are now to be found all over the peninsula, and even visit Central Asia in pursuit of commercial profit. The chiefs of the aboriginal hill tribes also generally claim to belong to the K. caste.

Ku'ba, a town of Asiatic Russia, in the government of Baku, 47 miles S.S.E. of Derbend, was the seat of a khan, but was abandoned by the Russians on their annexation of 1816, on account of its unhealthiness, and **New K.** founded in its stead, 18 miles to the westward. The latter is well built, and strongly fortified, and carries on a lively trade with Persia and Astrakhan. Pop. 9405.

Kuban', a river of Russia, rises in the Caucasus, at the N.W. base of Mount Elbruz, flows N., and then W. receives the Labu, passes the forts Nikolaja, Protschimo-Okop, and Jekaterinodar, and enters Lake Kesiltash, near the Strait of Kertch on the Black Sea, after a course of over 450 miles.

Kûb'lai Khan, a great Mongol conqueror, grandson of Genghis Khan (q. v.), flourished in the 13th c. He expelled the Manchu Tartars from China, subdued the native Sing dynasty, and by 1280 was ruler of the most extensive empire on the face of the earth. It reached from the Arctic Ocean to the Straits of Malacca, and from Asia Minor to the Sea of Okhotsk. Every Mongol prince acknowledged his paramount authority; the Grand Dukes of Russia paid him tribute, and scholars came to his court from India, Persia, and Europe. K. died at Pekin in 1294.

Kuch, or **Cooch Behar**, the chief town of a native state of the same name in Bengal, India, situated between two channels of the river Torsha, a tributary of the Brahmaputra, 348 miles by road N. from Calcutta; pop. (1872) 7132.—The *state* of **K. B.**, which is surrounded by British territory, has an area of 1292 sq. miles; pop. (1872) 532,565; revenue, £116,000, of which some part is derived from estates within British districts. The staple crop is rice; the exports, jute, tobacco, and oilseeds. By a treaty dated 1773, the state pays a tribute of £6770, which was then estimated to be half the revenue. The present rajah is a minor, and the state has been under British management since 1864, by which it has greatly advanced in prosperity. It is the home of the tribe of Koch, or Rajbansi, who are probably of Indo-Chinese origin, and number one and a half millions throughout Bengal.

Kue'nen, Abraham, a famous Dutch theologian, was born at Haarlem, 16th September 1828, and, after attending the gymnasium there, was enrolled a student of theology at Leiden, 4th September 1846. On the 21st of June 1851 he was made a doctor of theology, after having defended as his thesis a *Specimen theologicum, continens Geneseos Libri Capita triginta quatuor priora ex Arabica Pentateuchi Samaritani Versione nunc primum edita cum Prolegomenis* (Leiden, E. J. Brill). After passing the ecclesiastical examinations (which give access to the office of a preacher in the Reformed Church), he was appointed on the 1st October 1851 *Adjutor Interpretis Legati Warneriani*, and as such charged under Professor F. W. J. Juynboll, *Interpres Legati Warneriani*, with the care of the Oriental MSS. of the University Library of Leiden. On the 30th December 1852 he was appointed Professor Extraordinary of Theology in Leiden. At his entrance on this office (12th March 1853) he delivered a discourse, *De accurato Antiquitatis Hebraicæ Studio Theologo Christiano magnopere commendando* (Leiden, P. Engels.). On the 1st October 1855 he was appointed Ordinary Professor. In the academical year 1861–62 he was Rector of the University of Leiden, and on laying down office (8th February 1862) he delivered a discourse, *De Religione Christiana, per continuas Theologiæ Commutationes sibi constanti et incolumi* (Leiden, Van Doesburgh). Before entering on the office of

professor, K. was made Doctor of Literature *honoris causa* by the senate of the University of Leiden (2d February 1853). K.'s writings are *Liber Geneseos secundum Arabicam Pentateuchi Samaritani Versionem* (Leid. E. J. Brill, 1851); *Libri Exodi et Leviticí secundum Arab. Pent. Versionem* (*Ibid.* 1854); in the *Bijbelsch Woordenboek voor het Christelijk Gezin* (Biblical Dictionary for the Christian Family), published in three vols. (Amst. P. N. van Kampen, 1852–59), the articles *Jerusalem*, *Samaritanen* (Samaritans), and a number of others on the books of the Old Testament; in the *Godgeleerde Bydragen* (Theological Contributions), published at Amsterdam, for 1855–66, a number of dissertations, and sometimes extensive reviews of books, and among other things, a number of essays under the common title, *Het O. Testament in het N. Testament* (The Old Testament in the New Testament); in the periodical, *De Bijbelvriend, Nieuw end Oud, ter verklaring van den Inhoud en den Geest des Bijbels* (The Bible-friend, New and Old, for the explanation of the contents and the spirit of the Bible (Nymegen, H. C. A. Thieme, 1860–1872), a number of essays and articles, among which there is a series of sixteen *Schetsen uit de Geschiedenis van Israël* (Sketches from the History of Israel); *Historisch-kritisch Onderzoek naar het Onstaan en de Verzameling van de Boeken des Oudèn Verbonds* (Historico-critical Inquiry into the Origin and Collection of the Books of the Old Covenant) (3 vols. Leid. 1861–65); [French transl. of part 1, by A. Pierson, with an introduction by M. Renan (Par. M. Lévy, frères, 1866); Eng. transl. of chaps. i. and ii., *Pentateuch and Joshua*, by Bp. Colenso (Longmans, Lond. 1865.)] In the *Theologische Tijdschrift* (Theological Journal; Amst. and Leid. Loman and Van Doesburgh; later, Leid. Van Doesburgh) for 1867 and following years, K. wrote a great number of essays, articles, shorter and larger reviews and notices, among other things, a series of ten *Critische Bydragen tot de Geschiedenis van den Israëlietischen Godsdienst* (Critical Contributions to the History of the Religion of the Israelites); *De Godsdienst van Israël tot den Ondergang van den Joodschen Staat* (The Religion of Israel to the Fall of the Jewish State, 2 vols. Haarl. 1868–70); *De vijf Boeken van Moses, eine Voorlezing* (The Five Books of Moses, a lecture, Leid. 1872); *De Profeten en de Profetie onder Israel: Historisch-dogmatische Studie* (The Prophets and Prophecy in Israel, an historical and dogmatic inquiry, 2 vols. Leid. 1875). There are English translations of the three last-mentioned works. Smaller brochures—published separately, or in collections of sermons—are not mentioned here. In the *Theological Review*, No. liv. (July 1876) appeared *Yahveh and the 'other Gods,'* and in the reports and communications of the Royal Academy of Sciences (Section of Literature), *De Samenstelling van het Sanhedrim* (The Composition of the Sanhedrim) (1st ser. vol. x.); *De Stamboom van den Masoretischen Tekst der O. Testament* (The Pedigree of the Masoretic text of the Old Testament, 2d ser. vol. iii.), translated into French by A. Carrière (Paris, E. Leroux, 1875); *De Mannen der Groote Synagoge* (The Men of the Great Synagogue, 2d ser. vol. vi.).

Whatever may be thought of the results at which he has arrived, it cannot be denied that K. is eminent alike as a critic of the Old Testament and as an historian of its religion. He exercises a growing influence both here and on the Continent, particularly on the younger and fresher students of the Hebrew Scriptures. As a critic he has developed, qualified, and applied the positions of Graf, maintains the priority of the Jahvistic fragments in the Pentateuch, and finds the origin of the Levitical legislation in and after the Babylonian captivity. He holds that the prophecies of the 8th c. B.C. are authentic documents, written by contemporaries of the events described, and constitute the firm and luminous point from which the constructive, literary, and historical criticism of the Old Testament can best start. As an historian he denies the supernatural, regards the religion of Israel as a phenomenon to be explained like the other religions of the world by the operation of strictly natural causes, with a development that was alike in history, thought, prophecy, and legislation throughout organic. K. is a thinker of remarkable power, an historian of subtle insight and great constructive ability, an accurate and laborious scholar, and a writer of singular lucidity, terseness, and force.

Kuenlun' Mountains, a range of Central Asia, stretching from the Bolor-Tagh E. to the mountain-system of China, and forming the N. boundary of Thibet. The western part, which is all that is yet known, is generally called Karakorum, and towers to a height of 21,000 feet, sending down tremendous glaciers, and opening in wild romantic valleys.

Ku'fic Writing, a form of Arabic characters, somewhat older than the age of Mohammed, and used throughout Northern Arabia. It was modelled on the Old Syriac, and was named after the town of Kufa on the Euphrates, because that place, as the first seat of the Califs, outside Arabia, contained the most accomplished Arabic scribes. From Kufa the writing spread over the other lands of the Califate, but fell into disuse in the 10th c. It is found on coins and inscriptions. Stockholm has one of the best collections of Kufic coins in Europe. Among the writers who have paid special attention to this subject are Adler (*Museum Cuficum Borgianum*), the two Tychsens, Hallenberg, Castiglioni, Marsden, De Sacy, Frähn, and more recently Dorn, Stickel, De Sauley, Olshausen, and Sorel.

Kugler, Franz Theodor, a German author, born at Stettin, January 19, 1808, early devoted himself to artistic pursuits, trying in turn music, painting, and poetry. In 1831 he became Doctor of Philosophy, and in 1835 was nominated Professor to the Academy of Fine Arts, being appointed a member of the Berlin Academy in 1849. He died March 18, 1858. It is said of K. that, 'along with Waagen and Schnaase, he opened out a new path in artistic history, and originated a national art in Prussia.' Among his chief contributions are *Handbuch aer Geschichte der Malerei von Constantin bis auf die neuere Zeit.* (1837–47); *Handbuch der Kunstgeschichte* (1841–47); *Geschichte der Baukunst* (1856). His history of Friedrich the Great reached a 7th ed. in 1870.

Kuh'-horn ('Cow Horn') or **Alp-horn**, the long horn of the German mountainous regions, having usually five notes, and capable of producing melodious phrases.

Kuik'ajou, or **Potto** (*Cercoleptes caudivolvulus*), a peculiar species of carnivorous mammalia found in S. America, and attaining the size of a large cat. Its colour is light brown, variously marked with bands of a darker colour. The tongue is very long, is used in taking in honey, a partiality for which has procured for the K. the name of 'honey bear.' The tail is prehensile, and assists the animal to climb trees. The K. is readily domesticated, and appears to be of inoffensive habits.

Kuil'enburg, a walled town of Holland, in the province of Gelderland, on the S. bank of the Lek, 10 miles S. by E. of Utrecht by rail. It has several places of worship, including a Jansenist church and a synagogue, also a fine orphanage. There are manufactures of stoves, furniture, &c., and a steamboat trade with Rotterdam, chiefly in grain, butter, and tobacco. Pop. (1870) 6162.

Ku'ka, or **Ku'kana**, a town of Central Africa, the capital of Bornu, lies 10 miles W. of Lake Tchad, and consists of two distinct towns, Billa-Gedibe and Billa-Futebe, the former of which is the royal residence. There is a large weekly market of mats, horses, slaves, pearls, &c. Estimated pop. 8000.

Kulm (Czech. *Chlumec*, 'a hill;' cognate with the Lat. *culmen*), a village of Bohemia, Austria, 8 miles N.E. of Teplitz, is celebrated as the place where a French corps under Vandamme was surrounded by the allied Austro-Russian army, and, after a fierce resistance, forced to surrender with eighty pieces and 10,000 men, August 29–30, 1813.—**K.** (Pol. *Chelmno*) is also the name of a town in the province of West Prussia, near the Vistula, 25 miles N. by W. of Thorn. It has linen industries and a corn trade. Pop. (1875) 9615. K. was a Polish Hanse town from 1466 to 1772. The *Kulmisches Recht* was a collection of all the statutes of the Teutonic knights for the Kulmisch land.

Kuma'on, a large district in the N.W. Provinces, British India, which lies on the S. slopes of the Himalayas. Area, 6000 sq. miles; pop. (1872) 433,314. It reaches up to Thibet, and contains some of the highest peaks in the world, as well as the sacred sources of the Ganges. K. was annexed after the Nepâl war of 1815. The lower regions include the terai, or long fringe of malarious jungle which skirts the base of the mountains. The forests are now preserved, and the low land has been brought under an immigration scheme. Potatoes are largely grown, and in 1872 there were 1395 acres under tea

cultivation, yielding 285,700 lbs. Gold and lead are found, copper mines are also worked, and the iron is of sufficiently good quality to attract European capital. The chief towns are Almorah (pop. 6260), Mandi, and the sanatorium of Nyni Tal. J. P. Minaef, one of the professors in the University of St. Petersburg, who visited India for the purpose of collecting Oriental MSS., published *Indyeiskiya skazki i legendui*, &c. (Indian Tales and Legends collected in K. in 1875; St. Petersb. 1877).

Kumbuk', a large and handsome tree of the Myrobalan family (*Combretaceæ*) called *Pentaptera glabra*. It is a native of various parts of India, and the hard and durable wood is employed in shipbuilding. By calcining the bark and wood a kind of lime is obtained for chewing with the betel nut.

Kümm'el. See CARAWAY.

Kumquat of Japan, a shrub belonging to the orange family, namely, the *Citrus Japonica* of Thunberg. It bears a fruit about the size of a gooseberry, from which an excellent preserve is prepared. In Chusan the K. occupies extensive slopes of the hills, bearing abundance of its yellow fruit, which is collected for home use and for export.

Ku'nersdorf, a village of Brandenburg, 4½ miles N.E. of Frankfurt, is the scene of a disastrous defeat of Friedrich the Great by the Russian and Austrian allies, August 12, 1759.

Kungur', a town of Russia, in the government of Perm, on the Sylwa, 49 miles S.E. of Perm, has six churches, tanning and other industries, and in the neighbourhood a large anchor factory. Pop. (1870) 10,804.

Kunigun'de, St., whose life is written in the *Acta Sanctorum*, was the wife of Heinrich of Bavaria, who became emperor in 1014. As the story goes, K. being childless, her husband lent his ear to calumnies affecting her chastity, and permitted her to suffer a trial by ordeal. Having walked barefoot over ploughshares at a white heat unscathed, K. vindicated her virtue, and after Heinrich's death she took the veil, and founded the convent of Kaufungen, where she died March 3, 1040. In 1200 K. was canonised by Innocent III.

Kunnoj' (*Kanauj*; Sansk. *Kanyakubja*, 'round-shouldered girl'), a town in the district of Furruckabad, N.W. Provinces, British India, on the Kali stream, 52 miles N.W. of Cawnpore. Pop. (1872) 17,093. At present little more than 'an expanse of ruins, where the cultivated fields are composed of brick-dust and mortar.' K. was for many centuries the capital of Hindustan, being second in antiquity only to Oude, and it has given its name to the most honoured sept of Brahmins. The Hindu dynasty was overthrown by Mohammed of Ghur in 1194; but the city owes its ruin chiefly to a change in the course of the Ganges, which now flows 2 miles to the E. In 1540 K. was the scene of the decisive defeat of the Mogul Emperor Humayun by his Afghan rival, Shere Shah.

Kup'ferschiefer, the name given to a series of beds of dark shale, rich in copper ore, which occurs in the Harz and Hessen, and seems to be contemporaneous with the lower strata of the Magnesian Limestone of the Permian Period (q. v.).

Kupur'thulla (*Kapurthala*), the capital of a native state of the same name, in N.W. India, in political connection with the Punjaub Government, 8 miles from the left bank of the river Beeas, 75 miles S.E. from Lahore.—The *state* of K. lies half in the Punjaub, and half in Oude, the latter territory having been granted for services during the Mutiny of 1857. Area, 1650 sq. miles; pop. 470,000; revenue, £170,000, of which £13,100 is paid to the British as commutation for military service; army, 15 guns, 198 horse, and 1014 foot. The products are sugar-cane, cotton, wheat, maize, and tobacco. The present Rajah, descended from the warlike Sikh stock, was most liberal in support of education. He is now insane, and the state is under British administration. See Griffin's *Rajahs of the Punjaub* (Lahore, 1870).

Kur (Gr. *Kuros*, Lat. *Cyrus*), or **Mtkwari**, a river of Armenia, rises in the Soghan-lü Mountains to the S.W. of Kars, enters Caucasia, and after a winding south-easterly course of about 600 miles, only 70 of which are navigable, enters the Caspian by several mouths between Baku and Senkoran. Its principal tributaries are, on the right the Aras (q. v.), and on the left the Alasun.

Kurdistan' ('land of the Kurds'), the geographical expression for a loosely-defined region of south-western Asia, which is included in the Turkish vilayets of Van, Diarbekr, and Bagdad, and in the Persian province of Azerbijan. Its area is variously estimated at from 28,000 to 100,000 sq. miles (three-fourths of the whole being nominally subject to Turkey), and the pop. at from one to three millions. The Kurds (anc. *Carduchi*) are a nomadic Aryan race, much given to plundering, and little changed from what they were in the time of Xenophon. They are stout, dark-complexioned, and savage in appearance. A few have settled down to agriculture, and the cattle, goats, and horses of their rearing are widely famed. The Kurdish language, a sister of the Persian, is divided into two main dialects —the Kurmanchi and Zaza. A branch of the race occurs in the Persian province of Khorasan, whither it was transported by Shah Ismail to guard his eastern frontier. These number some 25,000, live mostly in tents, and are still notorious for their thievish propensities. See Rich's *Narrative of a Residence in K.* (2 vols. Lond. 1836), and Lerch's *Forschungen über die Kurden* (2 vols. St. Petersb. 1857–58).

Ku'ria Mu'ria Islands belong to Britain (since 1854), and are situated in a bay of the same name on the S.W. coast of Arabia. They are six in number, have a total area of 21 sq. miles, and are inhabited by some thirty fishermen. There is a slight export of inferior guano.

Ku'rile Islands, a chain of twenty-six Japanese islands in the N. Pacific Ocean, stretching from the island of Yesso, N.N.E., to Kamtchatka, across the entrance to the Sea of Okhotsk, a distance of 700 miles. Area estimated at 3000 sq. miles; pop. probably not over 300. They are irregular and mountainous, containing some ten active volcanoes, one of which is 12,000 feet high. They derive importance from their iron and copper mines, seal-fishery, and fur trapping. They are divided into the Great and Little Kuriles; the latter belonged to the Russians till they gave them up, in exchange for territory in Saghalien, to the Japanese by treaty of June 1875.

Ku'risches Haff, a lagoon on the N. coast of Prussia, separated from the Baltic by a narrow tongue of land called *K.-Nehrung*, and communicating with it by the Memel Deeps, some 1000 feet wide, and 12 feet deep. It is 60 miles long, and on an average 15 broad; its waters are fresh, and for the most part shallow.

Kur'nal (*Karnal*), the chief town of the district of the same name in the Punjaub, British India, on the Grand Trunk Road, 74 miles N. of Delhi. Pop. (1868) 27,022. It is a walled city of great antiquity, and has manufactures of country cloth and blankets. It is the site of a stud-farm, but the military cantonments were removed in 1841, on account of unhealthiness, supposed to have been engendered by the interference with drainage caused by the Western Jumna Canal. K. was the scene of a decisive battle (1739), when Nadir Shah, the Persian invader, defeated the Mogul emperor.—The *district* of K., which is bounded on the E. by the Jumna River and irrigated by the canal, has an area of 2351 sq. miles; pop. (1868) 610,927. The staple crops are wheat, millet, rice, cotton, and sugar-cane. The manufactures are sal-ammoniac, made out of the salt that effloresces from the soil, glass, and cotton goods. The towns are K., Paniput, and Kythul.

Kurnul', the chief town of the district of the same name in Madras, British India, on the right bank of the Tungabudra River, not far above its junction with the Kistna, 320 miles N.W. of Madras; pop. (1871) 25,579. The *district* of K., which is bounded N. by the Nizam's dominions, has an area of 7151 sq. miles; pop. (1871) 914,432. This tract was only acquired by the British in 1834, when the Nawab or Mohammedan chief was forcibly dethroned for treason. It is the scene of the operations of the Madras Irrigation Company, guaranteed by Government, which were commenced in 1864, and have not proved a success, despite a total expenditure of more than a million sterling. The district is at present (1877) the centre of suffering from famine.

Kurrach'i (*Karachi*), the capital city and the seaport of the province of Scinde, British India, at the extreme N. of the delta

of the Indus. Pop. (1872) 53,526, with an additional 3297 in the cantonments which lie N.E. of the city. K. occupies a most important position both for trade and for military purposes. The harbour is the best along the seaboard for 500 miles in either direction. It lies between Manora Head and the island of Kiamari. Up to 1874, £450,000 had been spent on its improvement, and is now dredged to a uniform depth of 20 feet. In 1871–72 it was visited by 1021 ships, with a tonnage of 129,508. The total value of sea-borne imports and exports is about four million sterling. The chief imports are cotton piece goods (£850,000), metals (£200,000), grain and sugar (£100,000 each), liquors (£90,000). The exports are raw cotton (£800,000), wool (£400,000), oil-seeds, dyes, and provisions (£150,000 each). These figures include the interportal trade with Bombay. There is besides a large inland trade with Beluchistan and Afghanistan. The railway at present (1877) only runs to Kotri, 105 miles up the Indus, but the connection with the Punjaub is being proceeded with. K. has no important manufactures. The town is well built, and cared for by the municipality. There are several churches, schools, and hospitals; a handsome public building, called the Frere Hall (in honour of Sir B. Frere, for eight years commissioner of Scinde), which cost £20,000; three steam cotton-presses, which can turn out daily 1000 pressed bales; and the head offices of the Indo-European Telegraph Company. The city is said to have had no existence prior to 1729. It was occupied by the British in 1839, four years previous to the conquest of the province by Sir Charles Napier.—K. *district*, which extends between the Hubb River and the Indus and across the delta of the latter river, has an area of 14,091 sq. miles; pop. (1872) 423,459. It is covered to a great extent with barren hills and sandy deserts, and is very thinly peopled. See *Gazetteer of Scinde* (Lond. 1874).

Kursk, a government in S. Russia, surrounded by the governments Orel, Voronezh, Kharkov, Poltava, and Tshernigov. Area, 17,937 sq. miles; pop. (1870) 1,866,859. It is an undulating plain, intersected by the rivers Sem, Psiol, and Vorskla, which belong to the river system of the Dnieper, and by the Donetz with its affluent the Oskol, belonging to that of the Don. Agriculture is the principal industry; hemp, flax, hops, and tobacco are much cultivated.—K., the capital, 285 miles S. by W. of Moscow, has twenty-two churches, and a great church seminary with 2000 students. Pop. (1870) 31,754.

Kusnesk', a town of Russia, in the government of Saratov, and on the Trussva, 300 miles W. of the Volga. It has large tanneries and an active trade in timber. Pop. (1870) 14,185.

Kusten'djie, a fortified seaport in Bulgaria, Turkey, on the Black Sea, at the E. end of Trajan's Wall. A railway, opened in 1860, connects it with Tchernavoda on the Danube. The estimated value of exports for 1872, in transit and otherwise, consisting of cereals, cattle, wool, cheese, &c., was £400,000; and of imports, chiefly manufactured goods, hardware, coal, &c., £220,000. The same year there entered and cleared 395 steamers and sailing ships, for the most part British, Turkish, Austrian, and French, with a total tonnage of 177,185 tons register. Pop. 1800.

Küs'tenland (*i.e.*, 'coast land'), a crown land of Austria, lying between Carniola and the Gulf of Venice. Area, 3084 sq. miles; pop. (1869) 600,525. It is part of the former kingdom of Illyria, and is sometimes called by that name. Including the peninsula of Istria (q. v.) it is traversed in a south-easterly direction by lateral ranges of the Julian Alps, which in Monte Maggiore attain a height of 4400 feet. The only considerable rivers are the Isonzo and Quieto, and the chief ports are Trieste (the capital), Capo d'Istria, Pirano, and Rovigno. The K. produces oil, wine, figs, and other fruits, and there is much cattle-breeding in the uplands. The country is crossed by a railway line connected with the systems of Austria and Italy.

Küs'trin, a fortified town in the Neumark district of the province of Brandenburg, Prussia, is 53 miles E. of Berlin by rail, at the confluence of the Warthe with the Oder. It has three suburbs and a royal castle. Pop. (1875) 11,202.

Kutai'eh (anc. *Cotiæum*), a town of Asia Minor, in the vilayet of Brusa, on the Pursak, a tributary of the Sakaria, 72 miles S.E. of Brusa. It carries on a considerable trade, is protected by a fortress, and has an estimated pop. of 60,000.

Kutais', a Russian government, bounded N. by the Caucasus, W. by the Black Sea, S. by Asiatic Turkey, and E. by Tiflis. It is mountainous, and is watered by the Rion and its tributaries. Area, 8000 sq. miles; pop. (1870) 591,590.—**K.**, the chief town of the above, lies on the right bank of the Rion near the Tiflis railway, and 60 miles W.N.W. of the port of Poti on the Black Sea. It occupies the site of the ancient *Cutatisium* or *Cytäa*, capital of Colchis, is fortified, and has a trade in grain, wine, cattle, &c. Pop. 8263.

Kutch, or **Cutch** (*Kach*) a native state of W. India, in political connection with the Bombay Government, occupying a peninsula which becomes an island at certain seasons of the year, bounded N. by the Runn of K. separating it from Scinde, W. by the Indian Ocean, S. by the Gulf of K. separating it from Kattywar, and on the E. by the native states of Gujerat. Area, excluding the Runn, 6500 sq. miles; pop. (1872) 487,305. The products are grain, cotton, and oilseeds; but K. is best known as a centre of active trade and a nursery of seamen. The greater part of the commerce of the E. coast of Africa is in the hands of Mohammedans and Hindus from British India, of whom many are emigrants from K. In 1871 the trade of K. direct with Zanzibar was valued at $281,660, chiefly cotton cloth. In 1872–73 the coasting trade of K. with Indian ports was thus returned:—Exports, £72,000, chiefly cocoa nuts, spices, wood, grain, and pulse; imports, £2100, chiefly salt. The ruling chief, whose title is Rao, is of the Jhareja clan of Rajputs, which dates back to the 15th c. The first treaty with the British was in 1809, and there have been several later agreements to suppress piracy, restore internal order, and check female infanticide. The present (1877) Rao, who is fifty-five years of age, has much improved the administration, and has co-operated to put down the Zanzibar slave-trade. Revenue, £130,000; tribute, £18,000. The capital is Bhuj, but the port of Mandvi is the most populous town.

Kutt'enberg (Czech. *Hora-Kutna*) is a town of Bohemia, Austria, 45 miles E. by S. of Prag by rail. A vein of silver here discovered in 1237, after being worked to a depth of 2000 feet, became exhausted at the close of the 16th c. There are still mines of copper and lead. K. manufactures cottons and beet-sugar, and has several Gothic churches, that of St. Barbara being much admired. Pop. (1869) 12,747.

Ku'tub Minar' (the 'pillar of Kutub-ud-din,' the first Mohammedan emperor of Delhi), the name of the celebrated column or tower at Delhi, which is unique in the world. It is now 238 feet high, but was once higher. The base, which is of red sandstone, is a polygon of twenty-four sides. The shaft is circular, and tapers gradually to the summit. There are five stories, each with a balcony; the two upper ones are of white marble. It can easily be ascended by a spiral staircase inside. It was struck by lightning in 1368, and again in 1803 it required to be thoroughly repaired by the British Government. After much controversy, it has been decided that it was built in honour of Mahommed of Ghur (1200–20), and that Hindu artificers were probably employed.

Ku'tusoff, Michael Laurionovich Golenitscheff, Prince of Smolensk, was born in 1745, studied at Strassburg, became an officer of artillery in his seventeenth year, and rose to the rank of lieutenant-colonel during the war of Polish Confederation. At Chouma (1774), and again at Otchakoff (1788) he was severely wounded; he contributed greatly to the victory of Matchin, acted as ambassador at Constantinople and Governor of Finland, commanded (1805) the first Russian *corps d'armée* against the French, and overcame Marshal Mortier at Dürenstein. K. was second in command at Austerlitz, and commander-in-chief (1811–12) in the Turkish and French wars. He died at Bunzlau in Silesia, May 10th, 1813.

Kyaboo'ca. See AMBOYNA WOOD.

Ky'anising, a process of preserving wood from Dry-rot invented by Mr. Kyan of New York. It consists in immersing the timber in a solution of corrosive sublimate, which unites with the albumen, and prevents the germination of fungi. K. has to a great extent been superseded by other methods, as

...e mercury we have a floating rod, which has at its ... end a cup which is concave in shape on its lower surface ... it accurately upon the surface of the mercury at its apex. A pencil of vulcanite is fixed so as to be at right angles to ... rod. Any increase or diminution in the blood-pressure ... vessel will be communicated to the mercury, and will cause ... corresponding rise and fall of the column, and this movement will in turn affect the floating rod and pen. When the pen in connection with this rod is brought in contact with a revolving cylinder, the surface of which is covered with paper, there is produced a mark in the form of a curve, showing the mean blood-pressure which has existed during the experiment. This instrument was introduced by Ludwig.

The gauge K consists of a C-shaped hollow spring, which communicates with the blood-vessel by means of tubing and a cannula. When at rest the spring is filled with spirits of wine, and the tubing with carbolated water. Any alteration in pressure in the blood-vessel will cause an alteration of the amount of pressure in the spring, and will result in a straightening or increased curving of the spring. To exaggerate this change of form, there is connected with the end of the spring a lever made of light wood, to the end of which a pen or point is attached. This point can then be brought into contact with the revolving cylinder as in the instrument A. This instrument was introduced by Fick, and the tracing obtained by it represents accurately the variations in blood pressure during a pulsation of the heart.

Kyrie Eleison (or "Lord have mercy") is a phrase which occurred in the ancient Greek liturgies, and has been frequently set to music. In particular it was incorporated in the Latin Mass, forming the introduction to the Gloria in ...

L.



the twelfth letter of the alphabet, corresponding both in position and in modified shape to the Greek *Lambda* and Hebrew *Lamed* ('ox-goad'). It is a liquid, with a peculiar soft sound, which is uniformly constant in all languages, except in the Welsh and Spanish, where L is doubled and pronounced with a lisp as a sort of aspirate, indifferently represented by H L, and F L. L interchanges with R, D, and N; 'apostle' becomes, in French, *apôtre;* 'St. Giles' is properly Saint Ægidius; Bologna or Boulogne, is the Latin Bononia. L sometimes disappears altogether, as *piano*, from *planus*=level; Firenze, the modern Italian name of Florence. When preceding another consonant, it sometimes becomes mute, as 'palm, could.' In English words of one syllable, the final L is doubled, as 'bell.' As a numeral L. stands for 50; as an abbreviation for *libra*, the Latin for 'pound' (hence £. for a pound sterling, and lb. for a pound avoirdupois), and also for Law, as LL.D. = Legum Doctor, or Doctor of Laws.

Laa'land. See LOLLAND.

Lab'arum, the standard of Constantine the Great, in which the Roman eagle was replaced by a golden crown, inclosing the monogram XP, while on the purple banner below the figure of Christ was substituted for that of the Emperor. Its adoption was due to Constantine's well-known vision of a cross in the heavens, which preceded his victory over Maxentius, and led him to embrace Christianity.

Labédoyère, Charles Angelique François Huchet, Comte de, a French general of an old Breton family, was born at Paris, April 17, 1786. At the age of twenty he joined the army, became aide-de-camp to Marshal Lannes, subsequently to Prince Eugene; was placed, in 1811, at the head of a battalion, and next year was made colonel by Napoleon. During the retreat from Moscow, and at Lützen, Bautzen, and Kolberg, his bravery won for him further distinction, and he soon became general of brigade. L. was one of the last of Napoleon's officers to leave the field of Waterloo. He subsequently supported the claims of Napoleon II., but after the capitulation of Paris, delaying too long his flight, was arrested, tried by court-martial, and shot on the plain of Grenelle, August 19, 1815.

La'bel, or **File**, in Heraldry, a three-pointed figure, used to distinguish the eldest son during the lifetime of the father.

Labia'tæ is a large natural order of dicotyledonous herbs and shrubs, numbering about 120 genera and 2500 species—abundant in warm and temperate regions, rare in Arctic and Alpine districts. Some sixty species are natives of Britain. The properties are stimulant, fragrant, aromatic. Many are used as culinary vegetables, more particularly for flavouring purposes—such as the mints, sage, thyme, and others; others yield volatile oils, which are used in medicine, perfumery, &c., as peppermint, lavender, rosemary, patchouli.

La'bium, the term applied to the lower lip in insects and other Arthropoda. The L. in insects is composed of a confluent pair of maxillæ or lesser jaws. The term is used in contradistinction to the *labrum* or upper lip, a segment developed apparently in the middle line of the body of Arthropoda.

Lablache', Luigi, a famous operatic singer of French origin, was born at Naples, December 6, 1794, studied under Gentile and Valente, and at the age of seventeen was engaged as *buffo Napoletano* at the San Carlino Theatre in Naples. Thence with ever increasing success he passed to Palermo, Milan, Turin, and Vienna, in the last of which cities he created quite a furore, and had a medal struck in his honour. L. made his *début* at Paris in 1830, and sang there every winter till 1852. He also visited England, Russia, and Germany, and was everywhere received with enthusiasm. He died at Naples, January 23, 1858. L. was a splendid artist, powerful, passionate, and majestic; he was also a man of exquisite taste, and amassed a precious collection of antiquities. See Castel Blaze, *Biographie de L.*, and Fétis, *Biogr. Univ. des Musiciens.*

Lab'oratories are establishments where scientific experiments are systematically carried on. The name has long been familiar in reference to chemistry, and till comparatively recently was solely used in this connection. Now, however, L. are recognised as essential to the complete study of every natural and physical science. The laboratory system has been especially developed in Germany, where every university has its chemical, physical, physiological, botanical, zoological, anatomical, L., in buildings totally distinct in many cases from the rest of the university. The example set by Germany is being assiduously followed by all civilised nations; and it is very much owing to this rapid development of opportunities for investigation and for training in the method of research, that science in all its branches has made such progress during the last quarter of a century.

Laborde', Alexandre Louis Joseph, Comte de, born at Paris, 15th September 1774, was the youngest son of an eminent financier (guillotined 18th April 1794). Entering the Austrian service, he served through five campaigns against the French Republic, but returned to France after the Peace of Campo Formio, and having won the confidence of Napoleon, attended him in 1808 on his Spanish, and in 1809 on his Austrian invasion. On the fall of the empire, L. retired for a while from politics and devoted himself to the cause of education, visiting England in 1815 to study the Lancaster system, but in 1823 he entered the Chamber of Deputies as a member of the extreme Left, signed the Protestation of 1830, and after the July Revolution received the prefecture of the Seine. He died at Paris, 24th October 1842. L. was the author of many valuable works on travel and antiquarian research, of which may be mentioned *Voyage en Espagne* (4 vols. Par. 1807–18); *Itinéraire de l'Espagne* (5 vols. Par. 1809–27; 3d ed. with additions by Humboldt and St. Vincent, 6 vols. 1827–28); and *Les Monuments de la France* (2 vols. Par. 1832–36).—His son, **Léon Emanuel, Comte de L.**, born at Paris, 15th June 1807, studied at Göttingen, travelled in the East, and was secretary to the French embassy at Rome (1829), London (1830), the Hague (1832), and Kassel (1834). Quitting diplomacy, he held the post of curator of modern sculpture in the Louvre (1848–51), and of director of the imperial archives from 1856 till his death, which took place at Paris, March 30, 1869. Like his father, he was a member of the Academy, and like him he published a multitude of works on travel, art, and archæology, as *Voyage de l'Arabie Pétrée* (Par. 1830–33); *Voyage en Orient* (Par. 1837–64); *Histoire de la Gravure* (Par. 1839); and *Archives de la France* (Par. 1866).

La'bour. See CAPITAL.

La Bourdonn'ais, Bertrand François Mahé de, one of the great Frenchmen in India in the 18th c., was born at St. Malo, February 11, 1699. Destined for the sea from his youth, he became a captain in the service of the French East India Company in 1723, and in 1725 took Mahé, on the Malabar coast, which was called after him. In 1746, as governor of the Isles of France and Bourbon, he led a fleet to Pondicherry and put the

British squadron to flight. In conjunction with Dupleix, he then attacked Madras, which surrendered; but he quarrelled with Dupleix about the terms of the capitulation, and forthwith sailed away. On his return to France he was thrown into the Bastille; though acquitted on his trial, he died of a broken heart, September 9, 1753. See Colonel Malleson's *French in India*.

La'bourers and Artificers. By 5 Eliz. c. 4, single men between twelve years of age and sixty, married men under thirty years of age, and all single women between twelve and forty years of age not having any means of livelihood, may be compelled by two justices to go out to serve in husbandry or in certain specific trades. Differences between masters and servants in husbandry and in handicrafts may be determined by a justice of the peace, who is to examine upon oath and make order for payment, provided the question does not involve a value above £10. Police magistrates of the metropolis have power to settle disputes between masters and bargemen, ballast men, coal porters, sailors, and other labourers for hire on the river Thames, docks, and wharves, provided the sum in dispute does not exceed £5. They have also authority within the metropolis district summarily to compel any one detaining the property of another to deliver it to the owner, if the value does not exceed £15.

Labrador', the name applied to an undefined part in the N.E. of the great Canadian peninsula, between Hudson's Bay and the Atlantic. L. proper, or the country stretching from Cape St. Louis, at the entrance to Belle Isle Strait to Cape Chudleigh in the N.W., is under the jurisdiction of Newfoundland. Area 70,000 sq. miles; pop. (1869) 2479, exclusive of the natives, who have of late years been greatly reduced by famine and disease. The interior has a sandy, rocky, and swampy surface, and the coast is precipitous, greatly indented, and fringed with islands. The coasts abound in valuable harped and hooded seals, and the sea is well-stocked with codfish and herring of the best quality. Near the settlements are cultivated some potatoes and vegetables. The climate is severe, the temperature in winter ranging lower than that of Greenland, and the scanty flora is limited to stunted birch, willow, juniper, and poplar trees. The inhabitants are mostly Esquimaux, and have been converted to Christianity by Moravian missionaries, whose chief stations are Nain (the first, founded in 1771), Okkak, Hebron, Zoar, and Rama. There are other Protestant and Roman Catholic missions, the latter among the scanty Indian tribes of the interior. In the brief summer the coast is visited by many vessels from Newfoundland, England, Jersey, and the United States. The revenues are in the care of a collector, whose headquarters are at Blanc Sablon. L. is governed by a summary court, the judge of which is both magistrate and coroner. See Hind's *Explorations of the Interior of the L. Peninsula* (1863). The part of the peninsula to the W. of L. proper, that drains into Hudson's Bay and Strait, was for two centuries the property of the Hudson's Bay Company (q. v.), and was sold to the Dominion of Canada in 1871. The tract of country to the S. of L. proper, and stretching along the St. Lawrence, also belonged formerly to the Company, and is now the *district* of L., in Saguenay county, Quebec. It is inhabited chiefly by French Canadians and Indians, who are mainly employed in the seal, fish, and fur industries. At Moisie there are considerable iron-works. The position of the Indians has been greatly improved by Roman Catholic missionaries. Pop. (1871) 3597, exclusive of Anticosti (q. v.), with its 102 inhabitants.

Lab'radorite, the typical member of the lime felspar group, is of common occurrence in greenstone, gabbro, hypersthene rock, and certain granites. It is usually dark grey or brown in colour, but is often relieved by a play of brilliant colours due to internal reflections. It is capable of taking a fine polish, and has consequently been employed in jewellery.

Lab'ridæ, a family of Teleostean fishes, represented by the genera *Labrus*, *Scarus*, &c. In this group the mouth has thick fleshy lips. One dorsal fin spiny in front is developed. The ventral fins are beneath the pectorals, *i.e.*, are *jugular* in position. Cycloid scales form the body-covering, and there are soft teeth on the pharyngeal bones. The typical genus *Labrus* includes the Ballan and other wrasse. The Ballan wrasses (*Labrus bergylta*) is common round the coasts of Britain; the three-spotted wrasse (*L. trimaculatus*) being another familiar species. The genus *Scarus* (q. v.) includes the Parrot fishes of tropical seas.

Lab'rum. See LABIUM.

La Bruyère. See BRUYÈRE.

Labuan' (Malay, 'an anchorage'), a British island in the Malay Archipelago, at the mouth of a bay on the N.W. coast of Borneo, from which it is separated by a channel 10 miles wide. Area 45 sq. miles; pop. (1871) 4898. It was ceded by the Sultan of Borneo in 1846, and a settlement called Victoria has been made at its S.E. extremity. There is a good harbour, an ample supply of water, and extensive coal mines, which are connected with the port by railway over 5 miles long. The exports are sago, camphor, birds' nests, and pearls. In 1874 the total value of exports was £99,105, and of imports £89,978. The public revenue (1874) was £7084. L. is a bishop's see. Its importance is mainly due to its central position with regard to Borneo, Annam, Cambodia, and the Philippines.

Labur'num, the *Cytisus Laburnum* of botanists, is a native of Switzerland and the adjoining mountain territory of France and Germany. It and the lilac are now the commonest trees in British suburban gardens, but the L., with its 'golden rain,' is seen to greatest advantage when planted in front of loftier trees in a park or extensive shrubbery. The dark heart-wood is hard and heavy, for which qualities it is in request for turning. The seeds are poisonous. The purple L. is a hybrid between the above-named species and *C. purpureus*. Scotch L. is the variety *Alpinus* of *C. laburnum*.

Lab'yrinth (derived by some from Labaris, the name of one of the numerous princes to whom the construction of the famous Egyptian L. was attributed, by others deemed akin to the Gr. *laura*, 'a passage') is the name applied by the ancients to vast structures, consisting of numerous intricate passages and halls, and situated wholly or partly under ground. The great Egyptian L. lay to the S. of Lake Mœris in Middle Egypt, at a short distance from the city of Crocodiles, since called Arsinoë. It is thus described by Herodotus—'The L. has twelve courts, all of them roofed, with gates exactly opposite one another, six looking to the N., and six to the S. A single wall surrounds the entire building. There are two different sorts of chambers throughout—half under ground, half above ground, the latter built upon the former; the whole number of these chambers is three thousand, fifteen hundred of each kind. The keepers could not be got to show the underground buildings; since they contain the sepulchres of the kings, who built the L., and also those of the sacred crocodiles. The upper chambers excel all other human productions; for the passages through the houses, and the varied windings of the paths across the courts, excited in me infinite admiration. The roof was throughout of stone, like the walls; and the walls were carved all over with figures; every courtway surrounded with a colonnade, which was built of white stones, exquisitely fitted together.' Accounts of this wonderful building are also given by Strabo and other ancient writers. It was identified by Dr. Lepsius in June 1843. A second L., on the model of the Egyptian, but only one hundredth part the size, is said to have been built by Dædalus, at the command of Minos, who shut up within it the monster Minotaurus. It is uniformly spoken of as situated near Cnossus, the royal city of Crete. It is now, however, generally believed never to have existed, and that its introduction into the works of later writers was suggested by the natural caverns, still to be seen in that neighbourhood. Similar structures were also erected in Lemnos and in Samos. The term L. was applied to an ornamental maze or wilderness in gardens, such as the Maze at Hampton Court. In anatomy, the L. is the part of the internal ear behind the tympanum; and in metallurgy, a series of troughs conveying water for washing pulverised ore in a stamping-mill.

Labyrinth'odon, the name given to a peculiar extinct genus of Amphibians for which a special order has been constructed, namely, that of the *Labyrinthodontia*. This group is defined by Huxley as including animals in which the 'body is of salamander form, with relatively weak limbs and a long tail. The dorsal vertebræ, when completely ossified, are biconcave, with double transverse processes. The ribs have distinct capitula and tubercula.' The points in which the L. differs most perceptibly from all living amphibians consist in the presence of three

hard, bony skin-plates in the thoracic region, occupying the place of the interclavicle and clavicle or collar-bone. Between these plates and the pelvis other skin-plates were developed, forming a kind of armour-plating on the abdominal surface. The skull has 'distinctly ossified epiotic bones,' and the cranial bones are sculptured, and 'exhibit peculiar smooth symmetrical grooves—the so-called "mucous canals."' Another point in which the L. appear as exceptional animals when compared with their nearest living allies, is the possession of teeth of a very complicated pattern. The parietes or outer walls of the teeth were deeply folded and plaited, 'so as to give rise to a complicated "labyrinthine" pattern in the transverse section of the tooth.' Living amphibians possess at the most teeth of very rudimentary nature. The head in the L. was further defended by bony armour-plates. These animals became first known to geological science by the discovery of their foot-prints in sandstones of the Triassic age. These footprints resembled the shape of the human hand, each having five toes, and hence the unknown animal which made these traces received the name of *Cheirotherium*, literally 'hand-beast.' Further research resulted in the discovery of the L. remains, and in the demonstration that the hand-like impressions were formed by these animals. The L. occur as fossils in rocks ranging from the Carboniferous to the Triassic system. Numerous genera (*Anthracosaurus*, *Raniceps*, *Dendrerpeton*, *Hylerpeton*, *Archegosaurus*, &c.) are known.

Lac is a resinous substance elaborated on the twigs of various trees by the puncture of the female insect of *Coccus lacca*. The plants on which the substance is chiefly obtained are the banyan (*Ficus Indica*), and the peepul (*F. religiosa*), besides *Butea frondosa* and one or two others; and the countries whence it comes are India, Burmah, Siam, and Pegu. The twigs on which the deposit is formed are completely encrusted with the resinous material sometimes to the thickness of a quarter of an inch. L. in reality consists partly of an exudation from the tree, arising from the incision of the female insect in depositing her eggs, and partly of a secretion from her own body, in which the eggs are deposited during their development. The bodies of the female insects themselves, which remain adherent to the resinous mass they elaborate, and generally the undeveloped eggs, form part of the L. as gathered. The twigs covered with L. are gathered twice a year, and in that state without any preparation they constitute the stick L. of commerce. This is subsequently crushed to small pieces, the wooden cores are removed, and the residue washed with a weak solution of carbonate of soda. The washing separates the colouring matter contained in the crude L., and the remaining resin then constitutes seed L. A very valuable red dye-stuff is precipitated from the sodic solution by means of alum, and when dried and pressed into cakes it forms L. dye, very much used as a substitute for the more expensive cochineal for dyeing bright scarlets and pinks. Shell L.—the form in which the resin is most commonly found in British markets—is formed by melting seed L., straining it through a cotton bag, and while still viscous pressing it out between flat stones or leaves into thin plates or scales. Chemically, L. is a mixture of several resins, but as a whole it is soluble in a solution of borax. Dyed a golden yellow it is worked in the East into the form of chain bracelets and other ornamental articles. It constitutes the principal ingredient in ordinary sealing wax, a varnish is prepared from it, and it is also the principal substance used by hatters for preparing the stiff bodies of silk hats and for stiffening felt hats.

Lac (Sansk. *laksha*), the term universally used by natives and Europeans throughout India for 100,000. It is primarily applicable to money, but is also in use for other large quantities; at the exchange of 2s. for the rupee, a L. = £10,000. A hundred lacs is called a crore, or £1,000,000. In Indian notation it is important to recollect that the commas marking off the periods are placed, not after the thousands and millions, but after the lacs and crores. From this word is derived the name of the L. Insect (q. v.) on account of its numerous swarms.

Lacc'adives (Sansk. *lakhe*, 'a hundred thousand,' and *dive*, 'an island'), a group of small islands in the Indian Ocean, 100 miles W. of the Malabar coast. They are of coral formation, and from a distance their cocoa-nut trees alone show above the water. The inhabitants, who may number 15,000, are inoffensive and poorly off. The L. are neglected by the British administration of India. They are liable to be devastated by cyclones, and have caused the wreck of many ships. Exports to British India in 1874, including also those of the Maldives, £40,000; imports, £27,000. Since that year the trade has been included with British India.

Lace, a delicate textile fabric much used for ornamental purposes in the clothing of ladies and young children, though in the 16th and 17th centuries its use extended to articles of male attire, and even to the decoration of boot tops. L. and embroidery approach very near each other in character, although they may generally be distinguished readily enough from the fact that embroidery consists of needle-work ornamentation applied to a woven basis, whereas L. is wrought throughout as a distinct ornamental fabric by itself. The medieval 'cut-work' L., however, made chiefly in convents for the decoration of ecclesiastical vestments, altar cloths, &c., having been button-stitched on cloth, may be regarded as a species of embroidery. L. proper consists of two parts, the 'ground' and the pattern. The ground generally consists of a very fine net-work (*réseau*) of small hexagonal meshes which serve to hold the whole fabric together, and connect the various portions of the pattern; but in the case of guipure L. the patterns are connected by 'brides' or threads, strengthened and ornamented with button stitches, &c. Again, in some kinds of L. the ground is wanting, and the pattern so arranged that it either forms a continuous scroll, or so touches and joins edges as to hold the whole together. The fibres used in making L. are flax, cotton, and silk, gold and silver thread being also sometimes employed.

L. is divided into two distinct classes according to its method of manufacture, which are called respectively pillow and point or needle-made L. Two other distinctions may also be drawn classifying the fabric into real or hand-made, and imitation or machine-made L. Pillow L. is so called from its being manufactured with the aid of a large stuffed cushion into which pins are stuck according to the arrangement of the pattern, and around these the L. thread is plaited from a great number of small bobbins. The complexity and delicacy of some of the work may be estimated from the fact that in some instances as many as 1200 bobbins are required for one pillow, and an expert L.-maker working twelve hours a day will not finish more than a third of an inch in a week. For such extremely fine kinds of L. a thread of extraordinary tenuity, spun in damp cellars from specially grown flax, is employed. Such thread will sometimes cost as much as £240 per lb., but in recent times fine cotton yarn has been largely substituted for flax. The following description of the mode of making genuine point L. (*point d'Alençon*) is given by Mrs. Palliser:—'The pattern is printed off on pieces of green parchment about 10 inches long, each segment numbered in its sides; the pattern is then pricked through upon the parchment, which is next stitched to a piece of coarse linen folded double. The outline of the pattern is traced out by two threads fixed by small stitches passed with another thread and needle through the parchment and its linen lining. When the outline is finished, the piece is given over to another worker to make the ground, which is worked backwards and forwards at right angles to the border. The flowers are next worked in; then follow the modes or fillings and other different operations. When completed the threads which unite L. parchment and linen together are cut by passing a razor between the folds of the linen, and there remains only the great work of uniting the different segments together. This process devolves upon the head of the fabric, and is effected by the stitch called "assemblage," by us "fine joining."'

The principal variety of pure point L. manufactured in modern times is the *point d'Alençon*, the preparation of which is described above. A portion also of Brussels L. is needle-made and distinguished as *point à l'aiguille*, although more commonly what is known as Brussels L. is a pillow-made fabric. The varieties of pillow L. are very numerous, and distinct classes of work being characteristic of special localities, the L. is generally distinguished by the name of the place of its production. Thus Valenciennes, Lille, Mechlin, Cluny, Maltese, Brussels, and Honiton laces, which are the principal varieties of pillow-made L., are all distinguished from each other, either by the nature of their grounds, the character of their flowers or fillings, the nature and mode of their joinings, the kind of thread from which they are made, or other characters. To convey an intelligible account of the distinctions between these varieties of L. would occupy much more space than can be devoted to the subject.

The manufacture of imitations of all these varieties of L. is an art which has attained its highest development at Nottingham, where the L. and hosiery trade are the staple manufactures. The machines for making L. are justly regarded as among the greatest triumphs of mechanical ingenuity, being, as remarked by Dr. Ure, 'as much beyond the most curious chronometer in multiplicity of mechanical device as that is beyond a common roasting jack.' The fundamental apparatus for machine-making of L. is the bobbin net frame (see BOBBIN NET), as by it the 'ground' of all common imitations of pillow L. is made. Machine-made L., however, embraces not only imitations of L. having net grounds, but all other classes, and even fine Brussels point, are successfully imitated by means of the machines now in operation. See Mrs. Bury Palliser's *History of L.* (Lond. 1865); Felkin's *Machine-made Hosiery and L. Manufactures* (Lond. 1867); J. Seguin's *La Dentelle* (Par. 1875); and Cole's *Ancient Needlepoint and Pillow-Lace* (Arundel Society, 1875).

Lace-Bark Tree, or *Lagetta lintearia*, belonging to the Daphne family, is a native of the W. Indies. The inner bark after maceration can be separated into layers of a beautiful net-like appearance, whence the name is derived.

Lace-Leaf. See LATTICE-LEAF.

Lacépède, Bernard Germain Etienne de la Ville, Comte de, a French naturalist, was born at Agen, 26th December 1756. Among the authors who first influenced him most was Buffon, and his tastes on entering life were impartially distributed between music and natural science. Having composed music for the opera *Omphale*, besides several symphonies and a chorus, and published an *Essai sur l'Électricité*, none of which brought him distinction, Buffon offered him a demonstratorship in the private museum of the king, and asked him to continue a part of his *Histoire Naturelle*. In 1788 L. published the first volume of his *Histoire Naturelle des Reptiles*. On the outbreak of the revolution he became deputy-extraordinary for the town of Agen, and in 1791 deputy for Paris in the Legislative Assembly, advocating moderate opinions. *L'Histoire des Poissons* appeared 1798–1803, and *L'Histoire Naturelle des Cétacés* in 1804, the two works which give him his principal title to recognition as a natural historian. L. became president of the senate in 1801, and had the opportunity of refusing the office of Minister of the Interior. Providence, as he said, had endowed him with the faculty of obedience to the laws and established government, so that in 1815, under Louis XVIII., he retained his imperial honours. L. died at Épinay, 6th October 1825, after a long and successful career in science and politics. See *Œuvres de M. le Comte de Lacépède* (11 vols. Par. 1826–33), edited by Desmarets, and containing an *Éloge Historique* by Cuvier.

Lacer'ta and Lacer'tidæ. See LIZARD.

Lacertil'ia, an order of the class Reptilia, represented by the various families of Lizards (q. v.). The L. are commonly distinguished from other reptiles by the development of a pectoral and pelvic arch with fore and hind limbs—although some L., such as the blind or slow-worms (*Anguis*), want limbs altogether, while in others (*Chirotes*) the hind limbs may be wanting, and in some (*Bipes*) the fore limbs are undeveloped. The halves of the lower jaw are firmly united by bony union, and the articulation between the lower jaw and the skull does not permit of these bones being separated to the same extent as in the snakes. The body is covered with scales. The dorsal vertebræ are procœlous or concave in part, or more rarely amphicœlous or biconcave. The sacral vertebræ do not exceed two in number, and the sacrum in some cases is wanting. The capitula or heads of the ribs are simple and undivided. The teeth are not lodged in sockets, and the eyes are provided in the majority of cases with movable eyelids. The heart is three-chambered, consisting of two amicles (right and left) and one ventricle, and a urinary bladder is developed. As in all reptilia, the intestine, urinary, and genital organs of L. open into a *cloaca* or common receptacle, the outer aperture of the cloaca in L. being of transverse shape. The best known families of L. are the *Lacertidæ*, including the common lizards; the *Varanidæ*, or monitors; the *Scincidæ*, or skinks; the *Geckotidæ*, or Geckos; the *Iguanidæ*, or Iguanas; and the *Chamæleonitidæ* or chameleons. The chief genera of lizards are described in special articles—such as IGUANA (q. v.), GECKO (q. v.), &c.

Lace-Winged Flies, the name given to certain species of *Neuropterous* insects belonging to the family *Hemerobidæ* (Leach). The genus *Chrysopa* includes the best known species. *C. perla* is a familiar form, which is notable for the habit of its larvæ, which prey upon the aphides or plant-lice so destructive to plants. The wings are of a delicate, gauze-like texture; the body is green, the eyes golden. These flies emit a disagreeable odour when touched. The eggs are supported on pedicles or stalks; the pupa stage being attained late in summer, and the winter being passed within a cocoon generally hidden in the crevices of the bark of trees. *C. oculata* is a familiar American species.

La Chaise, or La Chaize d'Aix, François de, was born August 28, 1624, at the Château d'Aix in Forez, studied at the college of Roanne, became a member of the Society of Jesus and Professor of Philosophy at Lyons, where he published (1661) *Placita*, an abstract of his course. In 1675 he became confessor to Louis XIV., and against Madame de Montespan he directed all his influence, while it is understood that the secret marriage with Madame de Maintenon was the result of his advice. On the foundation of the House of St. Cyr, he revised its constitution. As guardian of the king's conscience he became very intimate with him, and, teaching him to take an interest in coins, was the means of originating l'Académie des Medailles. The cemetery of Père-la-Chaise to the E. of Paris occupies ground, part of which was granted to L. for the purpose of building a house where the Jesuits of Paris might find periodical recreation. L. is accused of having had the chief hand in the Revocation of the Edict of Nantes, and against the Jansenists he used with much perseverance and skill the opportunities afforded by his position. He was in fact a typical Jesuit, being rather an accomplished and acute man of the world than a person devoted to the exercises of religion. His writings, chiefly theological or ecclesiastical, are not important. He died 20th January 1709. See Sismondi, *Hist. des Français* (vols. xxv., xxvi., xxvii.); and Régis de Chatelauze, *La Père de la Chaize, Confesseur de Louis XIV.; Lettres et Documents inédits* (Lyon, 1859).

Lach'esis, a genus of Viperine snakes belonging to the *Crotalidæ* or rattlesnake family, and inhabiting tropical America. The tail ends in a spinous process, and the head is covered with small scales. A familiar species is the bushmaster (*L. umtus*), which may attain a length of 14 feet. Its bite is greatly dreaded.

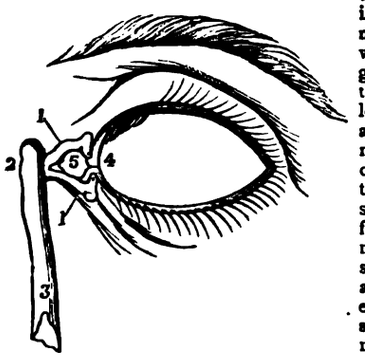
Lach'lan, or Colaré, a river of N.S. Wales, after a W. and S.W. course of 700 miles, joins the Murrumbidgee (q. v.) in the middle of a vast swamp. The country along its course is by turns sandy and marshy, and only fit for sheep.

Lach'mann, Karl, an eminent German philologist, born at Brunswick, 4th March 1793, studied at Leipsic and Göttingen, served as a volunteer chasseur through the Waterloo campaign, received a professorship in the Königsberg University (1818), but exchanged it for one at Berlin (1825), where he died 13th March 1851. L. published editions of Catullus (1829), Tibullus (1829), Lucretius (1850), and other Latin authors; two editions of the New Testament (1831 and 1846), in which he sought to present the authorised text of the 4th c.; and a number of valuable works on old German philology and literature—*Ueber Singen und Sagen* (1833); *Zu den Nibelungen und zur Klage* (1836), and editions of Walther von der Vogelweide (1827), Wolfram von Eschenbach (1833), &c. See Hertz, *Karl L. eine Biographie* (Berl. 1851). L.'s *Kleinere Schriften* were edited by K. Müllenhoff (Berl. 1876).

Lach'rymæ Chris'ti (Lat. 'Christ's tears'), a sweet but spirited muscatel wine, chiefly produced from the grapes of Monte Somma, near Naples. There are two kinds, red and white, and the former is generally counted inferior. Large quantities of spurious L. C. are sold from the Levant and S. Italy.

Lach'rymal Appara'tus consists of a gland and its ducts, the *lachrymal gland*, by which tears are formed and conveyed to the surface of the eyeball, and canals, *lachrymal canals*, by means of which the tears are carried away from the eye into the *lachrymal sac*. From this sac the tears pass through the *nasal duct* into the cavity of the nose. The lachrymal gland is about the size and shape of an almond · externally it is in con-

tact with the inner surface of the orbital plate of the frontal bone; internally it rests upon the upper and outer part of the eyeball. The gland is made up of a number of lobules, which are bound together by connective tissue. Each of these lobules has its duct, and these ducts terminate after passing obliquely through the conjunctiva in a series of openings, fourteen or fifteen in number, which are situated at the upper and outer part of the eyeball. In minute structure the lachrymal gland is a compound racemose gland (see GLAND). The *lachrymal canals* are two in number, situated at the inner angle of the eyelids. Each commences by a minute orifice, *punctum lachrymale*, situated at the summit of an elevation at the inner margin of the eyelids. The upper canal takes a course at first upwards from the *punctum*, then bends at a right angle, and passing inwards and downwards, opens into the lachrymal sac. The lower canal passes at first downwards and then inwards, and opens also the lachrymal sac close to, but below the opening of the upper canal. The *lachrymal sac* may be regarded as the upper dilated portion of the *nasal duct*. It is situated in a deep groove formed by the lachrymal bone and nasal process of the superior maxilla, and is further held in position by fibrous bands derived from the *tendo oculi*. Superiorly, the sac is closed. About its middle it receives the lachrymal canals—below, the sac narrows into and is continuous with the nasal duct. The *nasal duct*, about half an inch in length, is contained in a canal formed by the superior maxillary bone externally, and completed internally by the lachrymal and inferior turbinate bones. It opens into the inferior meatus of the nose. The lachrymal canals, sac, and the nasal duct, consist each of an external fibrous coat, and an internal lining of epithelium, but the character of this epithelium varies. In the canals it is composed of several layers of flattened cells. In the lachrymal sac and nasal duct the epithelium is of the ciliated variety, like that lining the nasal cavities. In the majority of cases, the orifice of the nasal duct is concealed by the mucous membrane of the nose, the object of this arrangement being to prevent the entrance of foreign matters from the nose on violent expiratory efforts. Other valvular arrangements of the mucous membrane lining this apparatus have been described, but their arrangement and presence is not constant. The function of the lachrymal gland is to secrete sufficient fluid to keep the surface of the eyeball moist, and to wash away foreign substances. In both these actions it is assisted by the action of the eyelids in winking. The use of the canals is to convey the tears into their proper excretory channel. If the orifice of the canal be not in its right position to receive the tears, as from the paralysis of muscles, the tears pass downwards over the face. The same results occur when, from any cause, more tears are secreted than can be carried away by the minute canals. This is seen in weeping and after severe injury to the eyes.



FRONT of the LEFT EYELIDS, with the LACHRYMAL CANALS and NASAL DUCT exposed.

1. 1. Upper and lower lachrymal canals, showing towards the eyelids the narrow bent portions, and the *puncta lachrymalia*; 2. lachrymal sac; 3. the lower part of the nasal duct; 4. *plica semilunaris*: 5. *caruncula lachrymalis*.

Diseases of the L. A.—The *secreting* and *excreting* L. A. are subject to various affections interfering with the functions of vision. *Xerophthalmia*, or *ophthalmia tarsi*, consists in dryness of the eye depending on a suppressed or imperfect secretion of tears, or on a deficiency of the mucous secretion which lubricates the surface of the eye. This may be owing to disease of the substance of the gland, enervation, obstruction of the ducts, or pressure from an abscess behind the upper lids. *Epiphora*, or excessive lachrymation, may be caused by the irritation of foreign substances, inflammation of the eye or eyelids, and especially by scrofulous conjunctivitis. The glandulæ congregatæ, and the lachrymal gland, proper, are liable to *inflammation*, *suppuration*, *hypertrophy*, and they may become the seat of *fibro-plastic tumours*, *scirrhus*, and *medullary fungus*. *Encysted tumours* may appear within the lachrymal gland, or in the vicinity of the glandulæ congregatæ and lachrymal ducts, causing protrusion and ultimate disorganisation of the eyeball. *Lachrymal fistula* is usually the effect of abscess on the upper eyelid, or of suppuration of the lachrymal gland. *Sanguineous lachrymation* is of rare occurrence, but there are cases on record in which it was connected with a scorbutic diathesis. *Calculi* are occasionally formed in the ducts. The diseases of the *excreting* L. A. are *dacryocystitis* or acute or chronic inflammation, which, in neglected cases or reiterated attacks, frequently results in fistula of the sac. *Obstruction of the nasal duct* is generally caused by a thickening of the mucous membrane, and this affection often leads to inflammation of the sac, and the formation of a fistulous opening. The introduction of a *style* is a useful method of treating chronic dacryocystitis in every stage of the complaint except the first, when there is merely weakness of the eye, and a gathering of tears at the inner canthus. The style is a nail-headed piece of silver about 1½ inch long, and $\frac{1}{10}$th inch thick. The head should be plano-convex, with its edge rounded off, and the neck should form an angle of about 130° with the body. The style may be worn for an unlimited time with comfort to the patient. D. of the L. A. are numerous, and important from their intimate connection with the organs of vision, and their treatment is too complicated to admit of brief description. See *Manual of the Diseases of the Eye*, by Dr. Macnamara (Lond. 1876); *Leçons Sur les Affections de l'Appareil Lacrymal*, par. F. Panas (Par. 1877); *Traite des Maladies des Yeux*, par le Docteur Ch. Abadie (Par. 1877).

Lac Insects (*Coccus*), a genus of *Hemipterous* insects notable as affording the commercial product known as Lac (q. v.). The general name of 'bark lice' is frequently given to the group of which the genus *Coccus* is a familiar example. The characters of the family are the possession of at least six joints in the antennæ; the two-jointed tarsi; the absence of a beak and hinder wings in the males, and the wingless, scale-like nature of the adult females. The rings of the body and legs become abortive in the female Coccidæ; the males resembling some flies in outward appearance. The genus *Coccus* itself has males in which the antennæ are ten-jointed, and which have two very long bristles attached to the posterior joints of the body. The antennæ of the females are nine-jointed. The cochineal insect (*Coccus cacti*) secretes masses of cochineal from its body. The males are of a carmine hue, with light-brown wings. The average length of the males is three-fourths of a line; of the females one line in length. These insects inhabit Mexico, and live on the *Cactus coccinellifer*, but they have been acclimatised in Spain, Algiers, and Madeira.

Lackawann'a, a small river of Pennsylvania, U.S., flows for some 30 miles of its lower course through, and gives name to the largest and richest anthracite coal-basin in America. The bed has an area of 198 sq. miles, and a thickness of 5–14 feet, at a depth of 100–400 feet below the surface. The annual out-put is over ten thousand tons.

Lacordaire', Jean Baptiste Henri, was born March 12th, 1802, at Recey-sur-Ource, in the Côte d'Or, studied from 1810 to 1819 at the Lyceum of Dijon, went to Paris in 1821, where he began his career as an advocate with marked success. Dissatisfied with his life, and burning with zeal to consecrate himself to some great achievement, L. forsook his profession (May 1823), and was ordained a priest in 1827. He joined Lamennais and Montalembert in the editorship of *L'Avenir*, a journal which, whilst it advocated with radical vehemence such questions as liberty of the press and of the human conscience and universal suffrage, preached ultramontanism in religion. In September 1832, Gregory XVI. denounced it officially, perceiving the inconvenience of the opinions it supported. The editors went to Rome, and L. on his return published a form of submission which announced that their partnership was broken up, and that they knew no other guide than the Church. L. began to lecture at the Collège Stanislas (1834), attracting numerous audiences, and (1835) the Archbishop of Paris opened to him the pulpit of Notre Dame. Here immense crowds, composed chiefly of young men, artists, littérateurs, and politicians, were attracted by his

century. Having passed through the stage of Voltairean scepticism, being profoundly read in literature, history, and philosophy, and discarding the language of the theological schools, he was able to make himself agreeably articulate to the cultivated ear of Paris, while his intense and passionate earnestness seemed a guarantee for practical fruits. After preaching for two years L. went to Rome, became a Dominican friar, returned and sought to revive the order in France, publishing (1840) *Mémoire pour le Rétablissement en France de l'Ordre des Frères Prêcheurs*, and in the same year his *Vie de Saint Dominique*. Again he sought Notre Dame, where among many famous orations he delivered the funeral sermon of Daniel O'Connell (1847). In 1848 he was returned to Parliament, but shortly resigned; in 1854 he took the direction of the College of Sorrèze; in 1858 he published his *Lettres à un jeune homme sur la vie Chrétienne*. L., one of the most spirited and inspired of the sons of modern France, died at Sorrèze, 21st November 1861. The best edition of his *Œuvres* appeared at Paris (9 vols. 1872). See Sainte Beuve, *Causeries du Lundi* (vol. i.), and Foisset's *Biographie de L.* (1870).

Lacq'uer and **Lacq'uering**, a kind of varnish, and the art of applying it to articles of metal, wood, &c. L. is closely allied to japanning. Brass work is commonly lacquered to preserve it from atmospheric and other deleterious influences. The L. used for this purpose is composed of seed-lac dissolved in spirits of wine, turmeric, dragon's blood, or other material being added to give the desired tint. The brass object is first coated cold, and receives a second coat of L. after being heated in a stove. The Japanese excel all other nations in L. wood, an art which originated with them in the 8th c. of our era. Their L. is made with the sap of the 'urushi' or L. varnish tree, which also yields the vegetable wax of Japan; pigments, and powdered silver and gold are most carefully mixed with it, and the most elaborate and tedious processes are pursued in perfecting the ware. Old Kioto and Tokio (Yedo) L.-ware are most esteemed.

Lacroix, Sylvestre François, a French mathematician, was born at Paris in 1765. For some years he taught mathematics in a naval school at Rochefort, and then went to Paris, where he became professor successively in the School of Artillery, l'École Normale, the central schools, l'École Polytechnique, the Sorbonne, and the Collège de France. L. was not a great original mathematician like his contemporaries Laplace and Lagrange, but he was one of the most successful of teachers, and his *Traité du Calcul Différentiel et Intégral* (2 vols. 1797; 2d ed. 3 vols. 1818) supplied a long-felt want, and supplied it well. His other important works are *Traité des Différences et des Séries* (1800; 2d ed. 1810–19), and *Cours des Mathématiques* (9 vols. 1797–1816), besides which he was the author of numerous *Mémoires* and of valuable elementary treatises on various branches of mathematics. L. died at Paris, May 25, 1843.

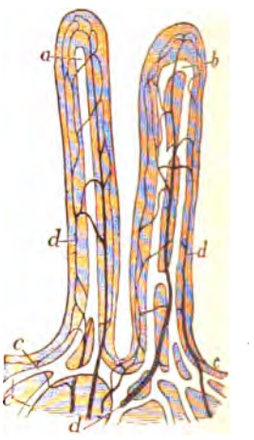
La Crosse, a ball-game of growing interest, which has been introduced within the last few years into Britain from Canada. It is a development or modification of the ball-play of the N. American Indians, and since 1867 has been recognised as the national sport of Canada. A properly constituted game consists of twelve players on each side—twenty-four in all. Each player is paired with an opponent, and the pairs are set at a particular part of the field. This guards against crowding, and makes the game more open and fair, since as a rule no player has more than one opponent at a time. Each player is provided with a *crosse*,—a light, strong stick, of any suitable length, turned round at the extremity like a shepherd's crook. The tip of the turn is connected by a stretched piece of catgut string with the *collar*, which is near the other extremity of the crosse just below the handle. Between the string and the stick is fastened a triangular-shaped netting, on which the ball is caught and carried, or from which it may be thrown. The object of the game is much the same as in Football (q. v.). Each side endeavours to drive the ball through its opponent's goal, one game being finished every time a goal is scored. The ball must not be *handled*, and no player can seize another or check him in any way except by taking the ball from him. Unless the disposal of the players in definite places be particularly attended to, the game, which when properly played requires all the resources which skill, presence of mind, and *physique* can supply, is apt to degenerate into something like the rough schoolboy sport known as 'shinty.'

La Crosse, a city of Wisconsin, U.S., on the E. bank of the Mississippi, and at the embouchure of the La Crosse and Black River, 275 miles N.W. of Chicago by rail. It has fifteen churches, two daily and five weekly newspapers (one German, one Norwegian), nine steam saw-mills, large machine shops, saw-mills, and breweries, and a vast trade in timber and grain. The assessed valuation is 3,000,000 dollars. Pop. (1870), 7785 (State census 1875) 11,012.

Lactan'tius, commonly called *Lucius Cœlius Firmianus*, a Christian father of high repute for learning and eloquence, was born probably in Italy, not later than the middle of the 3d c. He studied in Africa under Arnobius. About 301 A.D., on the invitation of Diocletian, he settled in Nicomedia as a teacher of Latin rhetoric, and at this period he became a Christian. About 312–18 A.D. he was appointed tutor to Crispus, son of Constantine, and ten years or so thereafter is believed to have died at Treves. His chief work is his *Divinæ Institutiones*, a manual of Christianity, in seven books, bearing the following titles:—False Religion, the Origin of Error, False Wisdom, True Wisdom, Justice, the True Worship, the Happy or Blessed Life. His other works include an *Epitome* of the Institutions, *De Ira Dei*, *De Opificio Dei*, *De Mortibus Persecutorum*; and several poetical pieces have been, though erroneously, attributed to him. As a theologian, L. displays grave defects; but the grace and purity of his style won him the name of the Christian Cicero. L. enjoyed great popularity, and the *editio princeps* of his works (1465) is one of the earliest extant specimens of the art of printing. The chief modern editions of L. are those of Bünemann (Leips. 1739), Dufresnoy (Par. 1748), Xavier (13 vols. Rome, 1754–59), Migne (Par. 1844), and Fritzsche (Lips. 1842–44). There is an English translation by Dr. Fletcher in the *Ante-Nicene Library* (Edinb. T. & T. Clark, 1871).

Lacta'tion, the time during which the mammary glands are actively engaged in the secretion of milk. This usually begins two or three days after child-birth, its commencement being marked by the presence of more or less fever, *milk fever*. The glands from this time continue to secrete milk actively for a period of about twelve months; after this time, the milk lessens in quantity and quality, until a few drops only are secreted upon the application of a stimulus to the breasts.

Lac'teals. This name is applied to the lymphatic vessels of the small intestine. In minute structure these small vessels resemble the lymphatic vessels elsewhere. When digestion is not taking place, they contain lymph. During digestion the *L.*, however, are filled by a milky fluid, *the chyle*, which contains, in addition to the lymph corpuscles or globules, numerous molecules and oil globules. These molecules and oil globules are absorbed from the small intestines, the former being composed of oil surrounded by a thin layer of albumen (see CHYLE). The L. are arranged in two sets—a superficial, consisting of vessels which ramify between the peritoneal and muscular coats of the small intestine, and situated in greatest numbers near the mesenteric attachment of the bowel; and a deep set, which ramify in the mucous membrane and submucous coat of the intestine, and pass outwards through the muscular coat to communicate with the superficial layer. From the deep set, loops are given off which are contained in the *villi*. In the lower animals this loop breaks up into a plexus of smaller vessels which frequently communicate with each other in the villus, but in man, there is only a loop, with perhaps one or two



INJECTED LACTEAL VESSELS in the VILLI of the HUMAN INTESTINE.

Two villi in which the L. are represented as filled with white substance and the blood-vessels with dark: 100 diameters (Teichmann); *a*, *b*, the lacteal vessels, single in one villus and double in the other; *c*, the horizontal lacteal vessels with which those of the villi communicate; *d*, the blood-vessels, consisting of small arteries and veins with capillary network between.

intercommunicating branches. The lacteal within the villus is, according to recent observations, connected by minute processes with the flattened cells which make up the basement membrane supporting the epithelial cells which surround the villus. They are also connected with the branched cells of the retiform tissue which surrounds and holds together the constituent parts of the villus. The exact mode by which the molecules and oil globules pass from the small intestine into the lacteal is not known. It is known that fatty matters, taken with the food, are acted upon by certain digestive fluids and converted into a milky fluid; that the fluid disappears from the intestinal canal when passed along the small intestine; that during digestion the L. become filled with this milky fluid, and lastly, that the branched cells of the retiform tissue mentioned above are found filled with oil granules during digestion. It was supposed at one time that the lacteal communicated directly with the surface of the villus; but at the present time, the view most in favour is that these cells of the retiform tissue play an important part in the absorption, and probably act as carriers of fatty granules from the small intestine to the lacteal. The L. of the muscular coat, after receiving the contents of the L. of the mucous membrane, pass from the intestine between the layer of the mesentery and accompany the blood-vessels. They next enter into the lymphatic glands, and after leaving these, they are collected into a few large vessels, which finally pour their contents into the *receptaculum chyli*, the commencement of the *thoracic duct*.

Lac'tic Acid ($C_3H_6O_3$), when pure, is a colourless uncrystallisable liquid of a syrupy consistency, and very soluble in water, alcohol, and ether. It may be prepared in a variety of ways, but the ordinary L. A. is the result of the fermentation of various sugars in the presence of certain albuminous substances (see FERMENTATION.) A convenient method is by mixing together two gallons of milk, six lbs. of raw flesh, twelve pints of water, eight ounces of putrid cheese, and four lbs. of chalk, and subjecting the mixture to a temperature of about 30° C. After a few weeks, a quantity of calcium lactate is formed, which is purified by crystallisation and decomposed by zinc carbonate. The zinc lactate so formed is treated with sulphuretted hydrogen, and L. A. results. The acid may also be extracted from a great variety of liquids containing decomposing vegetable matter, such as *sauer kraut*, a preparation of white cabbage, the sour liquor of the starch-maker, &c. It is also formed in the spontaneous souring of milk—hence the name. It forms *lactates* with barium, calcium, zinc, iron, &c.; and these salts are all insoluble in ether, and sparingly soluble in cold water. When heated in excess of sulphuric acid, they give off pure carbonic oxide.

Lactu'ca (in medicine). The leaves and flowering tops of the wild indigenous plant, *Lactuca virosa*, and the inspissated juice, evaporated to a pilular consistence, are used in medicine as a sedative and narcotic, and sometimes as a diuretic and diaphoretic in cases of dropsy and visceral obstruction. The preparations of L. are highly prized by some practitioners for their sedative qualities, and for allaying cough in phthisis and other pulmonary diseases. Dose—of the *extract*, five to ten grains; of the *succus*, one to two drachms; of the *tincture*, thirty to sixty minims.

Ladakh', or **Middle Thibet**, a province of the State of Cashmere, in feudatory connection with the British Government of India. It is bounded by Cashmere proper on the W., and by Thibet on the E. Area, estimated at 30,000 sq. miles; pop. about 300,000. It forms part of the upper valley of the Indus, averages 11,000 feet above the sea, and is shut in by snow-clad mountains. The crops are wheat and barley, but the most valuable products are borax, and the wool of the sheep, goat, and yak. The inhabitants are of Thibetan origin, and Buddhist in religion. Leh (q. v.) is the capital. L. was conquered by the Sikhs, under Golab Singh, the father of the present Rajah of Cashmere.

La'dies of the Queen's Household, the personal attendants of Her Majesty, consisted in 1877 of eight Ladies of the Bedchamber, four Extra Ladies of the Bedchamber, eight Bedchamber Women, two Extra Bedchamber Women, three Honorary Bedchamber Women, seven Maids of Honour, one Extra Maid of Honour, and the Mistress of the Robes, who has the superintendence of the others, the custody of the robes, and accompanies the Queen on all state occasions. On ordinary occasions Her Majesty is accompanied by a Maid of Honour.

Lading, Bill of. See under BILL—*Bill of Lading*.

Lad'islaus, the name of seven kings of Hungary and one of Naples (of the house of Anjou).—**L. I., the Saint**, king of Hungary, 1077–95, surnamed from his care for the diffusion of Christianity, was conqueror of Croatia.—**L. V.**, the same as Vladislav III. of Poland.—**L. VI., Postumus**, king of Hungary and Bohemia, son of Albrecht II., king of the Germans, of Hungary, and Bohemia, and grandson of the Emperor Sigismund, born 1440, and succeeded L. V. in Hungary in 1444 under the regency of János Hunyady, who defended the kingdom bravely against the Turks. After the death of the latter the young king suffered himself to be led by favourites, especially by Count Cilly; he died in 1457, only seventeen years old.—**L. VII.**, king both in Hungary and Bohemia, son of a brother of L. V. and a sister of L. VI., was of the house of Jagello (q. v.).

Lado'ga, Staraia ('old'), a Russian town in the government of St. Petersburg, on the E. bank of the Volkhof, 12 miles from its entrance into Lake L., is notable as the place which Rurik, the founder of the Russian monarchy, made his residence in 861.

Ladoga, the largest lake of Europe, lies between the Russian governments of St. Petersburg, Olonetz, and Viborg. Area, 6804 sq. miles. It is 120 miles long, 70 broad, and 1000 feet deep. In great part, however, it is rendered dangerous by shallows, sandbanks, and sunken rocks. It receives the waters of lakes Onega, Sarina, and Ilmen, through the rivers Volkhof, Sarim, and Svir, and is drained into the Gulf of Finland by the Neva. In the N. of the lake there is a group of islands, the chief of which are Valaam and Konevetz, with their celebrated monasteries. The shores of the lake are mainly rocky. The L. Canal, skirting the S. shore, and linking the rivers Volkhof and Neva, enables vessels to avoid the dangers of a lake passage on their way from the Volga to the Baltic. Lake L. has also communication with the White Sea. See the work on L. by Colonel Andrief (1875).

Ladrones' (Span. 'thieves'), or **Marianne Islands**, a group in the N. Pacific, lying between 13°–21° 35′ N. lat., and 145°–147° E. long. Area, 1254 sq. miles. They were discovered in 1521 by Magellan, who called them the L. on account of the thievish propensities of their inhabitants. Their second name was bestowed on them in 1668 by some Jesuit missionaries, in honour of Maria Anna of Austria, widow of Philip IV. The L. are of volcanic origin, mountainous, densely wooded, and fertile, producing cotton, indigo, rice, and sugar, but only five of the twenty islands composing the group are inhabited, and the population has fallen from 100,000 to 5000. The L. belong to Spain, and the seat of government is San Ignazio de Agaña in Guahan, the largest and most southerly island of the group.

Lady. See LORD.

Ladybird (*Coccinella*), a well-known genus of *Coleoptera* (q. v.) or beetles, the species of which have hemispherical bodies of yellow or red colour, variegated with black spots. Well-known species are the *C. ocellata*, the *C. bipunctata*, *C. trifasciata*, &c. The eggs are deposited in May, and are hatched during the succeeding month. The larvæ are black, and do good service to the gardener by the ravages they commit amongst the aphides or plant-lice.

Lady Chapels, dedicated to the Blessed Virgin, in churches prior to the 13th c. are generally a later addition, placed eastward of the high altar, and projecting from the main building. In churches of a subsequent date, as in the present Catholic usage, the Lady Chapel usually occupies the eastern extremity of the N. or S. aisle.

Lady-Day, 25th March, an English and Irish term, on which rent is usually payable. Ecclesiastically, it is the Feast of the Annunciation of the Virgin Mary, hence its name.

Lady Fern (*Asplenium Filix-fœmina*), a beautiful and variable British fern of world-wide distribution, Australia excepted.

Lady of Mercy, Our, an order of knights founded by Jacobo I. of Aragon in 1218, whose object was to redeem Christians taken prisoners by the infidel. The knights were of great service in the struggles before the expulsion of the Moors.

Lady of Monte'sa, Our, an order of knights founded in 1317 by Jacobo II. of Aragon, who, after the suppression of the Knights Templar, was permitted by Pope John XXII. to appropriate the estates previously held by them in his dominions to the maintenance of the new order, whose headquarters were fixed at Montesa.

Lady's Mantle, the popular name for the genus *Alchemilla*, is specially applied to the common representative species *A. vulgaris*, on account of the shape and vandyked edge of the leaf. The genus belongs to the tribe *Potentieæ* of the Rose family, and consists of thirty species, chiefly natives of the Arctic region. *A. Alpina*, with divided leaves, silvery below, is a striking ornament on damp rocks and by streams in the Scotch Highlands.

Lady's Slipper, *i.e.*, slipper of our Lady—the Virgin Mary—is the name given to the Orchidaceous genus *Cypripedium*, from the shape of the lip of the flower. The species number about fifty, and are widespread in temperate and tropical regions. *C. calceolus* is one of the rarest British plants.

Lænnec', René Théodore Hyacinthe, a famous French physician, was born 17th February 1781, at Quimper, in Bretagne, studied medicine at Paris, and devoted himself with particular enthusiasm to pathological anatomy, following the lead of Corvisart. From 1808 to 1810 the best fruits of his investigations into the organic causes of disease were contributed to the *Dictionnaire des Sciences Médicales*. In 1819 L. published the treatise upon which his celebrity rests, *Traité de l'Auscultation médiate et des Maladies des Poumons et du Cœur*. In it he developed the scheme of diagnosis practised by means of the stethoscope. He was appointed Professor of the College of France in 1822, but, overcome by mental exertions, he retired to Bretagne, where he died, 13th August 1826. See Parisel's *Éloge de L.*

Lætare Sunday, or **Mid-Lent,** was the fourth Sunday of Lent, and was so called from the first word of the Introit of the Mass or Holy Communion-service for that day—Isa. xvi. 10; as the second was called Reminiscere (*cf.* Ps. xxiv. 6, Vulg.); and the third Oculi (*cf.* Ps. xxiv. 15).

La Farina, Giuseppe, an Italian author and politician, was born at Messina, Sicily, in 1815, graduated at the University of Catania, became an advocate, and in 1837 had to leave the island owing to the propagation of revolutionary views. Returning in 1839, L. started the *Spettatore* and *Faro*, at both being suppressed he retired to Florence, where the reforming spirit was strongly at work, and published the *Dante*, in which he attacked the papal system and preached democracy. In 1848 he again returned to Sicily, the Provisional Government appointing him on a mission to Rome, Tuscany, and Piedmont, for the purpose of enlisting sympathy in their cause. L. was unsuccessful, but joining the Ministry he held the portfolios for the Interior, Instruction, and Public Works. His last appearance in Sicily was made along with Garibaldi, with whom, however, he quarrelled (1861). L. died in September 1863. His chief works are *Studies in the Thirteenth Century*, *History of the Sicilian Revolution in* 1848-49, and *History of Italy from* 1815-50; *L'Epistolario di La F.* appeared at Milan in 2 vols., 1869.

Lafayette, a city of Indiana, U.S., and a great railway centre, on the river Wabash, and the Wabash and Erie Canal, 60 miles N.W. of Indianopolis. It formerly derived its importance from being at the head of navigation on the Wabash, now abandoned by commerce. In 1875 it had twenty five churches, three daily newspapers, street railroads, an opera-house, a State agricultural college (Purdue University), and a large trade in groceries, boots and shoes, &c. Pop. (1871) 13,500.

Lafayette, Marie Jean Paul Roch Yves Gilbert Motier, Marquis de, was born 6th September 1757, of an ancient French family, at the Château de Chavagnac, in Auvergne, educated at the *Collège du Plessis*, married Mdlle. de Noailles 11th April 1774, became enthusiastically attached to the idea of political liberty, and on the outbreak of the American Revolution was tempted across the Atlantic, landing at Georgetown in Carolina in the summer of 1777. L. fought at Brandywine and in Canada, but went back to France in 1778, on hearing that war had broken out between his country and England. Returning to America in February 1779, he defended Virginia with prudence and skill, compelled Cornwallis to capitulate at Yorktown, and again returned to France. In 1784 he once more revisited America, being received with the strongest manifestations of enthusiasm. For some years L. devoted himself to the cause of constitutional freedom in France, and in the Assembly of Notables (1787) demanded a convocation of the States-General. In the National Assembly (1789) L. spoke with great ardour, was appointed vice-president, and became commandant over the armed citizens, whom he named the National Guard. With this appointment began the most difficult part of his career, that of restraining the unruly multitude. By his endeavour to obtain for the king the courtesies due to his position, L., even at the moment he was advocating the abolition of aristocratic titles, and acting upon the principle that 'insurrection is the most sacred of duties,' fell under the suspicion of the Jacobins. He therefore retired to Auvergne (October 1791), but was called to take the command of one of the armies organised after the coalition of Pilnitz. From the camp of Maubeuge (1792) he denounced the clubs and advocated the upholding of a constitutional throne in a letter addressed to the Assembly and even appeared there in person to enforce his demand. The course was regarded with coldness by the court and with indignation by the Jacobins. His effigy was even burnt at the Palais-Royal. He sought a neutral country, but being captured by the Austrians (19th August 1792) was sent to Wesel. It was not till September 1797 that he regained his freedom. L. was both against the consulate and the empire, and hailed with pleasure the return of the Bourbons, believing in 'a popular throne surrounded by republican institutions.' From 1818 to 1824 he sat in the Chamber of Deputies for the department of Sarthe. It the latter year he revisited America, and was voted 200,000 dollars and an estate in gratitude for his services. He was prominent in the revolution of 1830, and died 20th May 1834. See Jules Cloquet, *Souvenirs de la Vie Privée du Général F.* (1830); La Bédollière, *Vie Politique du Marquis de La F.* (1833); *Mémoires, Correspondance et Manuscrits du Général F.* (6 vols. Par. 1837-38), edited by his family.

Lafayette College, at Easton, Pennsylvania, U.S., was chartered in 1820, and has now classical, scientific, and law (since 1875) schools, and technical ones of mining, civil engineering, and chemistry. It grants degrees, and the number of resident professors and tutors is 28, of non-resident lecturers 4, and of students 319.

Laffitte', Jacques, the son of a carpenter, was born at Bayonne, 24th October 1767, went to Paris in 1788, entered the bank of Perregaux, and after going through the different grades of the office with rapidity, succeeded to the business in 1800. In turn L. was elected president of the Chamber of Commerce, judge of the Tribunal of Commerce (1813), and governor of the Bank of France (1814). He conducted a financial operation for Louis XVIII. to the amount of several millions of francs after Napoleon escaped from Elba, and took charge of five millions for Napoleon after the defeat of Waterloo. When Blücher demanded 600,000 francs from the town of Paris, L. became guarantee for the amount. In 1816 he was chosen deputy for Paris, and spoke with great authority upon questions of finance, combating the system of forced loans, and advocating the freedom of the press. For the next few years he was one of the most prominent men in the capital, and earned for himself an enviable repute for actions of the most generous kind and on the most magnificent scale. He held the portfolio for finance, and was president of the Council in the first Ministry of Louis-Philippe, but retired in 1831, being too conservative for the majority of the assembly. The financial panic of the same year bore hard upon his house, and he was compelled to sell off the whole of his private property, by which he retained a surplus of 8,000,000 francs. L. died at Paris, 26th May 1844. Some of his publications are *Opinion sur le Projet de Loi de Finances de* 1818 (1818), *Réflexions sur la Réduction de la Rente et sur l'État du Crédit* (1824), *Dix millions de Profits à garder*. See Louis Blanc, *Histoire de Dix Ans*. See Marchal's *Souvenirs de J. L.* (Par. 1844), *Vie de M. J. L.* (Par. 1844), and the work of Büdinger (1870).

La Flèche. See FLÈCHE, LA.

La Fontaine, Jean de, a French poet and fabulist of exquisite talent, was born at Château-Thierry, in Champagne, 8th

July 1621, received a slender education in his native village, was sent to Reims (1641) with the view of adopting a religious life, gave up the idea in a year and a half, after which he plunged into a course of dissipation. Having commenced the study of the old French poets, L. in his twenty-second year felt the impulse of his own genius for the first time. After his marriage, which took place in his twenty-sixth year, he widened his reading to the fields of Latin and Italian literature, and in 1654 appeared his translation of the *Eunuchus* of Terence. In the same year he made the friendship of Fouquet, who offered him a pension on the condition that he should produce something poetical every quarter. Until the fall of his patron in 1661, L. wrote *Le Songe de Vaux*, *l'Adonis*, besides numerous epistles and ballads. Other patrons were forthcoming in the Duchess of Bouillon and Marguerite of Lorraine, but, though he was on intimate terms not only with them, but with Moliere, Racine, and Boileau, he made no effort to appear at court. Before the fall of the Duchess of Bouillon in 1680, he published his *Contes et Nouvelles en Vers* (1665), *Fables Choisies mises en Vers* (1668), *Les Amours de Psyché et de Cupidon* (1669). In the *Vers de Circonstance*, written under the roof of his first patron, he showed a marked capacity for the production of light and graceful trifles. His *Contes* took higher artistic ground. They were based upon the material supplied in the old *fabliaux* and, in the tales of Boccaccio and Ariosto, which he handled with dexterous simplicity, penetrating them with the spirit of vivacity and movement, enriching them with piquant reflections, but at the same time preserving them in a state of ingenious immorality. L. is at his best in the *Fables*. Their purity is irreproachable, their style as near perfection as any French writer has attained, their good sense conspicuous, and their sympathy for all vital creation profound and tender. In France they are known and admired by every age and rank. After 1680 L. was pensioned by the Duc de Vendôme, was appointed in 1683 to a vacant chair in the *Academie*, much to the king's displeasure, whom he attempted to appease with ballads. The last years of L.'s life are but a record of sins and attempted amendments. His ideal *d'etre sage* was never reached, the moral law did not exist for him. In 1693, being overtaken with a serious malady, he determined, on his recovery, to expiate his follies by writing hymns. He died at Paris, 13th April 1695. The best edition of L.'s *Œuvres* is that by Walckenaër (18 vols. Par. 1819–20; new ed. 6 vols. 1822–23; 4 vols. 1857–60). See Sainte Beuve's *Portraits Littéraires* and *Causeries du Lundi*, Taine's *Essai sur les Fables de L. F.* (Par. 1860), and Paul Lacroix's *Bibliographie La Fontainienne* (Par. 1875).

Lag'omys, a genus of Rodent Mammalia, belonging to the *Leporidæ*, or hare and rabbit family. The legs in L. are better proportioned than in the hares. Complete collar bones are developed, but the tail is very rudimentary. *L. Alpinus*, found in Siberia, is a familiar species. It is hunted for the sake of its skin.

Lagoon', an Italian form of the Latin *lacuna*, 'a pool,' from *lacus*, 'a lake.' See ATOLL.

Lag'opus, a genus of Rasorial birds, represented by the Grouse (q. v.) (*L. Scoticus*), ptarmigan (*L. vulgaris*), and allied forms. The tarsi and toes are provided with hair-like feathers, giving to the legs rather a clumsy appearance. The bill is short and broad, and the nostrils are feathered.

La'gos, a British colony on the W. coast of Africa, and on the Bight of Benin, comprises a strip of coast-land 12 miles broad, stretching from the river Yerewa to Ode, and the island of L. in a deep inlet at the mouth of the river L. or Soa. Area, 5000 sq. miles; pop. (1871) 62,021, of whom, however, only a small number are whites. The town of L., at the W. end of the island, is the seat of Catholic and Wesleyan missions, and has a pop. of 36,000. Badagry, Palma, and Leckie are trading stations, and export palm-oil, cotton, indigo, and ground nuts. Formerly a great centre of the slave trade, L. was seized by the British in 1851, and was formally made a settlement in 1861.

Lagos ('the town on the bay;' anc. *Lacobriga*), a seaport of Portugal, in the province of Algarve, 19 miles E.N.E. of Cape St. Vincent, is a fortified place with a sand-choked harbour, which in 1875 had only three ships of 233 tons burden. Pop. 7500. In L. Bay Admiral Boscawen defeated the French Toulon fleet under De la Clue, August 18, 1759.

Lagrange', Joseph Louis, Comte, one of the most celebrated of mathematicians, was born at Turin, January 25, 1736. His father was of French birth, but had taken service with the Duke of Savoy. In 1753 L. began the study of modern mathematics with such extraordinary zeal and success that within the next three years he had established a world-wide reputation as a mathematician of marked originality. In 1755 he had made researches which laid the foundation of the calculus of variations, and elicited the high encomium of Euler, who had long been working in the same direction. In 1766 he succeeded this famous mathematician (who had gone to St. Petersburg) as director of the mathematical division of the Berlin Academy, of which he had been a member since 1759. During his stay here he contributed some sixty papers to the *Mémoires* of the Academy, the most remarkable of which is the demonstration of the periodicity of the variations of the major axes of the planetary orbits (1776). In 1787 he removed to Paris, and the same year appeared his immortal work, the *Mécanique Analytique*. In this treatise the whole of dynamical science is based upon one principle, which L. calls the principle of *virtual velocities*. From this, aided by D'Alembert's analytical expression, which reduces all kinetical problems to pure statical ones, L. developed by mathematical processes of rare beauty generalised formulæ which apply to every dynamical problem. On the foundation of l'École Polytechnique in 1794, L. became Professor of Mathematics, and in this capacity published his *Théorie des Fonctions Analytiques* (1797), and *Résolution des Équations Numériques* (1798). The former aims at establishing the differential and integral calculus by means of ordinary algebra without making use of the doctrine of limits. His method, however, cannot logically exclude this doctrine, and is in itself defective, but it is most powerful in its applications to algebraic developments. Napoleon made L. a grand officer of the Legion of Honour and a member of the imperial senate, in recognition of his scientific eminence. L. died at Paris, April 10, 1813. Besides his great works above mentioned, he wrote numerous valuable papers and memoirs upon the propagation of sound, the theory of probabilities, the dynamics of fluids, the libration of the moon, the planetary theory, &c., &c. His *Œuvres* were published by Serret (new ed. 1867). See MM. Virey and Potel, *Précis Historique sur la Vie et la Mort de L.* (Par. 1813).

La Guay'ra. See GUAYRA, LA.

La Guéronnière, Arthur, Vicomte de, was born in 1816, started a journalistic connection with *L'Avenir National* (1840), and has remained a publicist throughout life. Along with Lamartine he founded *Le Bien Public*, and after writing for Emile de Girardin in *La Presse*, he joined *Le Pays*, and defended the *coup-d'état* of 2d December. His notoriety is chiefly founded upon the influence he now obtained as the literary mouthpiece of Napoleonic ideas. Besides conducting the *Pays* and *Constitutionnel*, he was elected a State Councillor. Some of his *brochures*, especially *L'Empereur Napoleon III. et l'Angleterre*, created a profound sensation throughout Europe. In 1868 L. was sent to Brussels as ambassador, and thence to Constantinople. After the establishment of the Republic, he edited the *Presse* for a time, but resigned, owing to a difference with the proprietors, October 1873.

La Harpe'. See HARPE.

Lahijan', a town of Persia, in the province of Ghilan, on the Langarud, 25 miles S.E. of Resht, is an ancient place, with extensive bazaars, a college, and good caravanserais. Silk, which is largely manufactured here, is the staple commodity. Estimated pop. 15,000.

Lahore', the capital of the province of the Punjaub, British India, and the chief town of the district of the same name, one mile S. of the Ravi river, 1080 N.W. of Calcutta, with which it is connected by railway, and 270 S.E. of Peshawur, to which place the railway is now (1877) being continued. Pop. (1868) 125,363, including 12,682 in the suburbs, and 13,757 in the cantonment of Mean-Meer. L. has always been one of the greatest cities of the East, and as such is included by Milton in his sounding roll of Oriental monarchies. Situated on the high road from the N.W. frontier, it was the capital of the first dynasty of Mahommedan invaders, and subsequently of the great Sikh ruler. It is surrounded by a brick wall 16 feet high, 3 miles in circumference, with 13 gates, but a large space outside is covered by ruins of its former grandeur. The historical build-

[illegible] the tomb of Jehangir, the palace of Runjeet Singh, the Mogul emperors, the Lahore Museum, and the mausoleum of Runjeet Singh. Many [illegible] cultural faculty. The chief [illegible] and University College, the Mayo [illegible] Lawrence and Montgomery Halls, and the [illegible] There are thriving manufactures of [illegible] lace. The trade is mostly [illegible] (grain, &c., being valued at £331,000), the exports at £18,000. The situation is not healthy. [illegible] troops were removed in 1852. The [illegible] had been 84 per 1000. L. was the capital [illegible] dynasty; it was taken by the Moslem A[illegible] attained its chief prosperity under the [illegible] 1524-1660. It was ravaged by [illegible] rattas. Runjeet Sing established himself here in 17[illegible] city was almost in ruins. On March 29, 18[illegible] the second Sikh war, L. was finally [illegible] British province. During the Mutiny the [illegible] Immediately on the news of the outbreak at Meerut, the two regiments of sepoys at Mean-Meer were disarmed by the European force, one-fourth their strength, and the native guard of the fort of L. was also quietly removed. The district of L. is bounded S.E by the river Sutlej, and traversed by the Ravi. Area, 3659 sq. miles; pop. (1868) 789,000. The crops are wheat, pulse, millet, and cotton. It contains the town of Kasur (pop. 15,209), which carries on manufactures of leather.

Lahr (Old Ger. a 'site,' or 'field'), a town in Germany, in the Grand-Duchy of Baden, on the Schutter, a tributary of the Rhine, 50 miles S.S.W. of Karlsruhe, with important manufactures of tobacco, wool, cotton, silk, linen, chicory, and leather. Pop. (1875) 8490.

Lai'bach (Ger. 'the warm or leafy brook;' Slav. *Liubliana*; Lat. *Labacum*, or *Æmona*), the chief town of Carniola in Austria, on the Laibach, an affluent of the Save, 170 miles S.S.W. of Vienna by rail. The town itself is close and old-fashioned, but the suburbs have fine streets and squares. It has a cathedral, an Ursuline church with a magnificent altar, and several educational institutions. There is an extensive commission-trade, besides manufactures of cotton, sugar, leather goods, machinery, and chemical preparations. Pop. with suburbs (1869) 22,593. Here met (January 26–May 12, 1821) a congress, composed of the Russian and Austrian Emperors and their ministers, with envoys from the other great powers, and from the Italian princes, which agreed to restore the old order of things in Naples and Sardinia, in spite of England's protest.

Laing, Malcolm, a Scottish historian, born 1762 at Stryndia, in Orkney, was educated at Kirkwall. He passed advocate at the Scottish bar in 1785, but was little employed as a lawyer, and devoted several years to historical study, after which he spent the later portion of his life in agriculture on his paternal estate in Orkney, and died there in 1818. His chief works were a *History of Scotland from the Union of the Crowns* (1603) *to the Union of the Kingdoms* (1707); *with Two Dissertations, Historical and Critical, on the Gowrie Conspiracy, and on the Supposed Authenticity of Ossian's Poems* (1800), an able, though prejudiced work, in which he is equally severe on Macpherson and on Mary; *The Poems of Ossian, &c., Containing the Poetical Works of James Macpherson, Esq., in Prose and Rhyme, with Notes and Illustrations;* and a second edition of his history in 1804, with a *Preliminary Dissertation on the Participation of Mary Queen of Scots in the Murder of Darnley.* L.'s works have few graces of style, but have gained him the character of an acute and judicious historian.—**David L.,** a distinguished Scottish antiquary and man of letters, the son of a well-known Edinburgh bookseller, was born in that city about 1706. From his earliest years he was a close student of the national literature. His long career of learned authorship commenced about 1821, when he published the poems of Alexander Montgomery in connection with Irving. This was followed in 1822 by an edition of the *Early Popular Poetry of Scotland*, and the publication of Sir David Lyndsay's *Heraldic Manuscript*, a magnificent *œuvre de luxe*, containing 133 coloured plates. Since then he has edited *Fugitive Scottish Poetry* (2 vols. 1825–53); *Golagrus and Gawane, and other Ancient Poems* (1827), the first work printed in Scotland (1508); *Early Metrical Tales* (1826); *Dunbar's Poems* (1834, with Suppl. 1865); *Works of John* [illegible] *Henryson's Poems* (1865); [illegible] *Lyndsay's Poems* (1871). L. was [illegible] the Bannatyne Club from its foundation in 18[illegible] [illegible] 1875 with the publication of the *Earls of Aberd*[illegible] [illegible] have edited either personally or by help[illegible] [illegible] the series of its publications. He also edited several [illegible] the Maitland and Abbotsford Clubs, and at present [illegible] is engaged in new editions of Lyndsay and Wynto[illegible] [illegible] as Foreign Secretary to the Antiquarian Society.

Lais was the name of two celebrated Grecian courtesans. The [illegible] was born in Corinth, lived in the time of the Peloponnesian War, and was equally notorious for her beauty, [illegible] and caprice. The younger was a native of Sicily, [illegible] [illegible] from its early fame. She was a contemporary of [illegible] of Athens, Phryne, and is said to have [illegible] [illegible] the Thessalian women, jealous of her beauty.

Laity [illegible] the people'), a term used as [illegible] [illegible] persons not belonging to the Clergy.

Lake [illegible] a land-locked sheet of water. The [illegible] [illegible] those through which rivers flow; [illegible] which have inlets but no outlets; and (3), those in which rivers [illegible] lakes of the second kind—of which the largest examples are the Caspian and Aral Seas—exhaust their supply [illegible] evaporation. Their waters are salt or brackish. Asia is the great home of salt lakes. In Europe, lakes are large [illegible] and most numerous in the N. of Russia, Finland, and Sweden, but the most beautiful are the lakes of Switzerland, N. Italy, and Scotland.

Law Regarding Lakes in Britain.—The proprietor has a right not only to the water of a lake surrounded by his land, but also to the ice, which he may make any use of that he chooses. L. which are the permanent sources of rivers cannot be drained by the owner of the ground in which they are situated. L., though navigable, are not usually *inter regalia* like navigable rivers.

Lake, Viscount, a distinguished Anglo-Indian general, born in 1744 was appointed commander-in-chief in India in 1800, during the administration of Lord Wellesley. He commanded the army in Hindustan Proper during the second Mahratta War (1803–4; took Aligarh, Delhi, and Agra, and won the battles of Laswari, by which the power of Scindiah and Holkar was broken and that of England established in the N.W. provinces. In two months he destroyed thirty-one battalions officered by Frenchmen, and took 420 guns. L. was created baron in 1804 and viscount in 1808, and died in 1809 after his return to England. See *Selection from the Wellesley Dispatches* (Oxf. 1877).

Lake Dwellings. The first discovery of the remains of prehistoric L. D. was made in 1829 at Meilen, on the Lake of Zurich, but it was not followed up, and the matter was almost entirely lost sight of until the winter of 1853–54. The lakes and rivers of Switzerland then fell to an unprecedentedly low level, and the inhabitants of Meilen took advantage of the occurrence to reclaim a piece of land from the lake. The excavations which took place in the execution of this work led to the discovery of the piles of an ancient lake settlement, besides a quantity of animal remains and various implements. The discovery was the precursor of many others made in most of the Swiss lakes, as well as in those on the Italian side of the Alps. The pile dwellings were all constructed in the same manner, those of the bronze age differing from those of the stone period simply in their greater solidity, and in the piles being sunk in deeper water. The piles consisted of the stems of trees roughly pointed and driven into the bed of the lake, the trees most commonly used being the oak and alder, though the beech, fir, willow, and hazel were also sometimes employed. In the great majority of cases the stems were neither split nor barked. Their heads were brought to a level, and other stems, or in a few cases, boards, were laid upon them and fastened either with wooden pins or by mortising, while occasionally the piles were strengthened by means of cross timbers below the platform. This last was covered with a bed of mud and gravel, which was beaten firm with wooden mallets. The huts erected on this floor were probably of rectangular shape, and their walls consisted of stakes inwoven with a wattle or hurdle-work of small branches coated with clay. The roofs appear to have been thatched with straw or reeds. In a few cases the L. D. seem to have been approached from the shore by means of a narrow platform also built on piles, but usually they were only accessible in boats. Those belonging to the stone age are

found all over Switzerland, those of the bronze age chiefly in the central and western lakes, and those of the iron age in the lakes of Neufchâtel and Bienne alone.

The large quantities of remains obtained on the sites of these ancient settlements throw considerable light on the manner in which their inhabitants lived. In the most remote times the lake dwellers appear to have subsisted almost entirely by hunting and fishing, but subsequently they domesticated cattle, which were herded on the platforms, as the deposits of manure testify. Still later, pigs, dogs, and sheep were domesticated, but no remains of the domestic cat or fowl have been found, and those of the horse are few and comparatively recent. Dr. Rütimeyer gives a list of thirty-seven species of mammalia, twenty-four of birds, four of amphibians, and nine of fishes, bones of which have been found in the lake settlements. The lake dwellers cultivated wheat, barley, and flax, and oats also, during the bronze age, but neither rye nor hemp. They made cakes (some of which still exist) of corn rudely crushed in stone hand-mills. Wild fruits and berries were also largely consumed by them, and a cake made of the seeds of the opium poppy was found at Robenhausen. In all 115 species of plants have been determined as having been known to them. They had manufactures of linen, nets and cordage, leather, and pottery. In the few settlements of the iron age, coins and glass have been found, in addition to the implements and weapons of stone, horn, bone, and bronze, found generally distributed in the older dwellings. The religion of the inhabitants is still unknown, and their mode of sepulture was also a mystery till 1876, when a discovery was made in the Canton of Vaud of what is believed to have been a family grave of a date transitional between the stone and bronze ages. It consisted of an underground chamber supported by stones, and contained fifteen human skeletons, two stone hatchets, a smooth bone disc, a copper ring, and a needle and four small bracelets of bronze.

Prehistoric remains of L. D. similar to those of Switzerland have been discovered in Bavaria, Saxony (near Leipsic), Mecklenburg, Pomerania, and insular Denmark. Similar dwellings are mentioned by Herodotus as having been constructed by the Pæonians, and the Saracen geographer Abulfeda (q. v.) records their existence in Syria in the beginning of the 14th c. They were also common along the shores of the Lake of Mexico at the time of the Spanish conquest, and Bancroft states that one of the towns there situated 'was founded entirely on piles, and had canals instead of streets.' Commander Cameron reports the existence of a settlement of the same kind in Lake Mohrya, a small lake to the W. of Lake Tanganyika, Central Africa. The houses are 6 feet above the water, and can only be reached in canoes. Habitations built on piles are common in the rivers and sheltered inlets of New Guinea, being so erected to protect their inhabitants from alligators. See also CRANNOGES.

See M. Frédéric Troyon's *Habitations Lacustres de la Suisse* (1857); Dr. F. Keller's *Lake Dwellings of Switzerland and other Parts of Europe*, translated and arranged by J. E. Lee (1866); Sir J. Lubbock's *Prehistoric Times* (1869); Bancroft's *Native Races of the Pacific States of N. America* (vol. ii., 1875); Cameron's *Across Africa* (1877).

Lake of the Woods, a lake of N. America, on the border line of Canada and Minnesota, U.S., is connected by the Winnipeg with Lake Winnipeg on the N.W., and by the Rainy River with Rainy Lake on the S.E. It is 977 feet above sea-level, has a circuit of about 300 miles (much indented by bays and inlets), and is studded by numerous small wooded islands. A roadway of 90 miles was constructed (1870) from its shores direct into the heart of the Red River Settlement.

Lakes (colours) are pigments prepared by mixing colouring matters or dyestuffs with earthy ingredients, such as alumina, oxide of tin, powdered chalk, baryta, or with starch. The most common lake colours are red, the finest of which—Carmine (q. v.)—is composed of the colouring matter of cochineal and alumina. Madder lake is a compound of madder with alumina and oxide of tin, and Brazil wood similarly compounded also yields a much-used red lake. Aniline colours are also prepared as L., and more rarely yellow L. are made with Persian berries and flavine.

Lakshmi', the Hindu goddess of fortune and beauty, and the consort of Vishnu. It is in her honour that the Kayet or writer caste of Bengal celebrate their great annual festival in February. Pen and ink, the emblems of their craft, are scrupulously put aside, and no writing may be done. See Wilson's Works, vol. ii., *Religious Festivals of the Hindus* (Lond. 1864).

Lalande, Joseph Jérôme le Français de, a celebrated French astronomer, was born at Bourg (Ain), July 11, 1732. At Paris he applied himself to mathematics and astronomy with such success that when only eighteen years of age he was deputed by the Academy of Sciences to go to Berlin to make observations for determining the parallax of the moon. In 1760 he became director or editor of the *Connaisance des Temps*, the method of which he completely changed. The following year he succeeded De Lisle as Professor of Astronomy in the Collége de France, and in 1764 published his *Traité d'Astronomie*, whose peculiar value lies in its *practical* character. L. died at Paris, April 4, 1807. He wrote many other works, geographical and astronomical, of which the chief are *Voyage en Italie* (1769), *Traité des Canaux* (1778), *Bibliographie Astronomique* (1803), and numerous memoirs on the theories of various planets. See Delambre's *Éloge de L.* in the *Mém. de l'Institut*, t. viii. (1807).

Lally, Thomas Arthur, Baron de Tollendal, Comte de, the last of the great Frenchmen in India in the 18th c., was born at Romans in Dauphiné, January 1702. His family was of Irish extraction, and emigrated in the train of the Stuarts. L. received a thorough military training, was a soldier at eighteen, took part in the sieges of Kehl (1733) and Philisbourg, and when war broke out between England and France in 1741 greatly distinguished himself at Dettingen, Menin, Ypres, and Furnes. His Irish regiment captured Tournay, and decided the battle of Fontenoy. He joined Prince Charles Stuart in Scotland, was present at the skirmish of Falkirk, and after the disaster of Culloden re-entered the French army. In 1755 L. proposed to contest with England the possession of India. In 1758, the year after the battle of Plassey, he landed at Pondicherry. He took Fort St. David from the British, but failed in an attack upon Madras. In 1759, along with Bussy, he was sigually defeated by Sir Eyre Coote at Wandewash, a blow from which the French power in India never recovered. In 1761 Pondicherry was taken by the British, and L. sent a prisoner to Madras, and thence to London. Learning that he was accused of betraying the interests of France, he quitted England on his parole, and appeared before the French Court demanding justice. The result was his imprisonment in the Bastile. His trial commenced in January 1764. He was condemned, and beheaded at Paris 9th May 1766. Three years afterwards the French East India Company ceased to exist. See Colonel Malleson's *Essays and Lectures on Indian Historical Subjects* (2d issue, Lond. 1876).

La'ma. See LLAMA.

La'maism, the religion of Thibet and the surrounding countries, presents a singular medley of Shamanism, Sivaism, and Buddhism, which last faith was introduced into Thibet in the 7th c. A.D., suppressed in the 10th, but revived in the 11th c. In 1357 was born, in the province of Amdo, Tsong-Kapa, of whom it is related that he was distinguished from his birth by a long white beard and by powers of gifted utterance, and that at the age of three he professed the religious life. After a careful study of the Buddhistic classics, he created an eclectic system of his own, whose followers he distinguished from the red-capped professors of the established faith by a revival of the original yellow cap of Buddhism, whence their nickname 'Yellow Caps.' He also founded (1409) the lamaseries or 'monasteries' of Galdan, Sera, and Braipung in the neighbourhood of H'Lassa, and of Tas-chi Lumpo. L., as established by him, centres in a spiritual and (since 1640) territorial sovereign, residing at Potala near H'Lassa, on whom towards the close of the 15th c. was conferred the title *Dalai Lama* ('sea-priest'). He is regarded as the incarnate Buddha, who may only attain *nirvana*, when by the world-wide promulgation of his doctrines he has freed humanity from all its sorrows. Hence the *Dalai Lama* never dies, his soul merely passing from one body to another, that generally of a child, who must be discovered by such tests as the recognition of a bell or answers relating to the *Dalai's* former stage of existence. His duties are simple—to sit cross-legged in his temple, and from time to time extend his hand in benediction to his worshippers. There are many other grand lamas, of nominally equal dignity, the chief of whom reside at Krashis-lun-po in Further Thibet, at Great Kouren, and at Pekin. Subordinate to these are the *khutuktus*, incarnate Buddhist saints; the *khubilghans*, incarnate founders of lamaseries;

charmers, or 'mana' [illegible] and *gafeti*, hermaph[illegible] the Ark [illegible] must have [illegible] veliers have [illegible] Catholicism. [illegible] tism, confirmation, and penance [illegible] bishops, [illegible] forth. That these [illegible] purely external [illegible] wide difference between a [illegible] which, if it [illegible] having neither [illegible] mitting its 'monks' [illegible] no case of Hentry of [illegible] by the common [illegible] books of L., comprising 333 [illegible] tions from the Sanskrit, [illegible] Tibetan writers. See Hue's [illegible] *la Chine* (Par. 1852; [illegible] *Kirche* (Berl. 1859); and Markham's [illegible] *G. Bogle to Thibet and of the Journey of* [illegible] (Lond. 1876).

La'mantin, or Lamantine. See Manatee.

Lamarck', Jean Baptiste Pierre Antoine de Monet de, a French naturalist, was born at [illegible] 1, 1744, and educated at the Jesuits' College at [illegible] view to entering the Church; but after [illegible] he joined the army. An accident [illegible] He then entered the service of a banker, devoting [illegible] leisure time to the study of meteorology and botany. His *Flore Française* (1778) led to his being elected a member of the Academy of Sciences; and in 1792 he was appointed one of the professors of Natural History in the Jardin des Plantes. Geoffroy St. Hilaire had charge of the *vertebrata*, L. of the *invertebrata*—a branch of science which he had hardly as yet studied. He speedily mastered the details, however, and in 1815–22 published his *Histoire des Animaux sans Vertèbres* (7 vols.; 2 ed. [illegible] by Deshayes and Milne Edwards, 11 vols., 1836–45), one of the truly classical works on zoology. His other chief work is *Philosophie Zoologique* (2 vols. 1809), in which he speculates on the variability of species, forestalling in some measure Darwin's theory of the origin of species. L. died at Paris, December 18, 1829. See Cuvier's *Éloge de L.*

La Marmora, Alfonso Ferrero Marchese di, an Italian general and politician, was born of a good Piedmontese family, November 17, 1804, early distinguished himself in the War of Independence, became General of Brigade in 1848, and was appointed Minister of War by Victor Emmanuel in 1849, in which office he showed great activity in the cause of military reform. During the Crimean War L. was despatched from Sardinia with an army of 17,000 men, which did good service on the banks of the Tchernaya. In the ministry of Cavour he took the portfolio for war, and (1861) succeeded General Cialdini as commander-in-chief of the troops of the king of Italy, served as Premier (1864–65), and in the Austro-Prussian War (1866) met with a reverse at Custozza, which brought him into great unpopularity. Accused by Cialdini of a secret understanding with Napoleon, L. met the charge by laying before the Italian Parliament (July 21, 1868) a despatch of the Prussian ambassador, dated June 17, 1866, which clearly proved the understanding to have been rather with Prussia. From 9th October 1870 to 25th January 1871, L. stood at the head of the Roman Government, as Governor General and Viceroy, and is now (1877) commander-in-chief of the Italian army.

Lamartine', Alphonse de, an illustrious French poet and politician, was born at Mâcon, 21st October 1792. At the village of Milly L. received the rudiments of his education, and about 1808 was sent to the College de Lyon, from which he was speedily withdrawn, and lodged at a Jesuit house at Belley. Returning to Milly (1808) he plunged into a course of Italian, English, and French poetry, fell in love, and was despatched to Paris [illegible]. The winter of 1811–12 he spent at Rome; in 1811 he was dreaming away his time in a courtship at Naples; in 1811 he took military service under Louis XVIII.,

[illegible] retired to Switzerland; in it[illegible] his esteem for the young wife of a [illegible] he entered his *Méditations Poétiques*, a [illegible] with [illegible] and drew upon [illegible] [illegible] the great [illegible], while [illegible] [illegible] poetical [illegible] nature, and its passio[illegible] [illegible] rendered it peculiarly acceptable to [illegible] [illegible] immediately appointed secretary to [illegible] [illegible] the way thither married Miss Birch [illegible] [illegible] Englishwoman. In 1823 was [illegible] [illegible] in 1824 he became secretary to [illegible] [illegible] 1825 appeared *Le Dernier Chant* [illegible] [illegible] offered Colonel Perier [illegible] [illegible] was fought between them. L. [illegible] [illegible] elected a member of the Academy [illegible] [illegible] Revolution of July, L. desired to serve [illegible] [illegible] entered his diplomatic career. In 1830 [illegible] [illegible], which ushered him into [illegible] [illegible]. Failing to obtain a place [illegible] [illegible] in the East for nineteen months, [illegible] [illegible] Pilgrim's Notes. In 1835 he gave to the [illegible] *Poésies et Paysages foudroyants* [illegible] magnificent descriptive passages, [illegible] [illegible] varied verse; in 1839 appeared [illegible] *Jean Aragon*. During this year [illegible] [illegible] in Parliamentary esteem, began [illegible] [illegible] reformative party, made vigorous speeches [illegible] [illegible] and 1845 denounced the government [illegible]. In 1847 came forth the *Histoire* [illegible] [illegible] great revolutionary epoch of France was [illegible] [illegible] enthusiasm. This book is commonly [illegible] [illegible] immense influence in producing the [illegible] [illegible] during which L. became a member of the [illegible] [illegible] and Foreign Minister of the Republic. [illegible] was mainly exercised in restraining the vehemence [illegible] [illegible] extreme members of the party, but his popularity [illegible] [illegible] when he competed against Louis Napoleon [illegible] [illegible] for the office of President he obtained the lowest [illegible] [illegible]. After the *Coup-d'état* of 1851, L. retired into [illegible] [illegible] entered into straitened circumstances, was compelled [illegible] [illegible] writing. Among his later works are [illegible] [illegible] 1849); *Nouvelles Confidences* (1851); *L'Histoire de la Restauration* (8 vols. 1851–53); *Histoire de Turquie* (6 vols. 1854); *Histoire de Russie* (2 vols. 1855); *Cours Familier de Littérature* (1856, &c. &c.), and *Toussaint L'Ouverture*. In 1867 he received a pension, and died March 1, 1869. His *Œuvres Complètes*, in 40 vols., were published in 1860–63. See the *Autobiography of L.* by Pelletan (1869), Janin (1869), *L.'s Own Memoires* (1871), and the *Correspondance de L.* (6 vols. 1873) published by Mme. Valentine de Lamartine.

Lamb, Charles. Born in Crown Office Row, London, 18th February 1775, was a schoolfellow of Coleridge at Christ's Hospital, obtained a clerkship in the South Sea House, and afterwards served the East India Company for thirty-three years, retiring on an allowance of £400 per annum. L. first appeared in the literary world along with Coleridge and Charles Lloyd, as joint author of an unpretending and unsuccessful volume of poems. Next, in 1798, he wrote *Rosamund Gray*, a daintily-told story with slender plot. His tragedy of *John Woodvil*, printed in 1801, was rejected at the theatres, while his only other dramatic attempt, a farce entitled *Mr. H.*, was damned on the first night of representation, its author himself hissing from the pit most lustily. The well-known *Tales from Shakespeare* (partly written by his sister Mary) appeared in 1806; the *Specimens from Dramatic Poets contemporary with Shakespeare*, and *Adventures of Ulysses* (culled from Chapman's Homer), in 1807. In the following year L. and his sister worked together at two charming little books, *Mrs. Leicester's School* and *Poetry for Children*, the latter of which, published in 1809, was thought to have totally disappeared till a copy was discovered in S. Australia in 1877. Meanwhile his pen was busy in the service of the magazines, one or two of his best essays—those, for instance, on Hogarth and Shakespeare—being contributed to the *Reflector*, edited by Leigh Hunt. The *Essays* were first collected from the *London Magazine* in 1823; the *Last Essays of Elia* and *Popular Fallacies* were published by Moxon in 1833. L. died at Edmonton, 27th December

1834, and his sister on the 20th May 1847. L. was not a voluminous writer, yet some of his earlier prose efforts have passed into oblivion; while of his poems, the *Farewell to Tobacco*, *Familiar Faces*, and *Hester* alone continue to be read. His fame rests on the *Elia Essays*—a sufficient foundation. In these, all moods are reflected, all chords touched, and by a master's hand. L.'s style is at once easy and inimitable, witty and tender, sometimes giving a picture in a single word, or sounding the depths of pathos with the simplest phrase. The old English dramatists, humorists, and moralists—such men as Massinger, Browne, Wither, Jeremy Taylor—these were his friends more than any living associates. With these he delighted to company, writing, as he whimsically said, not for posterity, but for antiquity; and with these in imagination by his side, he penned his immortal Essays—ripe, rich, and fragrant, like old wine. His letters to Coleridge, Southey, Leigh Hunt, Hazlitt, Talfourd, &c., are now included in his *Collected Writings*, the best edition of which is in six volumes (Moxon, 1876).

Lamballe', Maria Theresa Louisa, of Savoy-Carignan, Princess of, was born at Turin, September 8, 1748, and was married in 1767 to Louis Alexandre Joseph Stanislas de Bourbon, Prince of Lamballe. The Prince died in 1768, leaving his young widow to deplore the career of debauchery by which he was cut short. Louis XV., who had neither wife nor mistress, seemed at one time likely to share with her the honour of the crown, but L. attached herself to the Dauphin and Marie Antoinette. When they ascended the throne, L. was appointed superintendent of the household, and became the Queen's most attached friend. Urged by her to take refuge in England, L. set out, but returned to share the royal captivity, was dragged (August 12, 1792) to the prison of La Force, and on the 3d September put to death under circumstances of frightful brutality. See Mme. Guénard's *Mémoires de la Princesse de L.* (Par. 1801), and Lescure's *La Princesse de L.* (Par. 1864).

Lambaye'que, a town of Peru, in Libertad, on the river L., 15 miles from the Pacific, and 425 miles N.W. of Lima. It has manufactures of woollens and cottons. Pop. 10,000.

Lambert, Johann Heinrich, a German philosopher and mathematician, born August 29, 1728, at Mühlhausen, in Alsace. The last fourteen years of his life were spent at Berlin, where he died, September 25, 1777. As a mathematician he was among the first of his time, and in the universality and depth of his knowledge, philological and metaphysical, he rivalled his great predecessor Leibnitz. Of his many works, the most important are *Photometria* (1760), *Neues Organon* (2 vols. 1764), *Anlage zur Architektonik* (2 vols. 1771), and *Logische und Philosophische Abhandlungen* (2 vols. 1782). He was, besides, the author of valuable memoirs upon the planetary theory, the velocity of sound, the mathematics of music, the motions of fluids, and various meteorological and other physical and astronomical phenomena. See Huber, *L. nach seinem Leben und Wirken* (Basel, 1829).

Lambert, John, an English general, was born at Kirkby-Malhamdale in Yorkshire, 7th September 1619. He was a colonel in the Parliamentary army at Marston Moor, became major-general 1648, reduced Pomfret in 1649, and fought at Worcester in 1651. He took a leading part in the deposition of Richard Cromwell, when he virtually became Dictator. He quelled the Royalist insurrection of Sir G. Booth, but on the opposition of Monk his army deserted, and he was committed to the Tower in January 1660. He was banished to Guernsey in 1662, where he died, March 1694.

Lam'beth, formerly **Lomehithe** ('clayey haven'), the western portion of the metropolis, in the county of Surrey, a parliamentary borough; pop. (1871) 379,112. It contains many churches and charitable institutions, notably St. Thomas's Hospital, facing the Houses of Parliament, and abounds in manufactories. Lambeth Palace, the residence of the Archbishop of Canterbury, dates from 1197. It has a magnificent library, and records of the archiepiscopal see since 1278.

Lambeth, Degrees of. See DEGREES OF LAMBETH.

Lambrequin. See MANTLING.

Lamb's Lettuce. See CORN SALAD.

Lamb's-Wool, a beverage of strong ale and pulped roasted apples, formerly much esteemed in Britain. In some parts of Scotland anything very delicious is said to 'gang down like lam'-oo.' The name is a corruption of the Cymric *la maes abhal* (pronounced *lamasool*), 'the feast or ingathering of apples.'

Lamego, a town of Portugal, province of Beira, near the left bank of the Douro, and 46 miles E. by N. of Oporto, with trade in wine and hams. Pop. 8000. Here was held in 1143 the first *Cortes*, which gave Portugal a constitution.

Lamell'ibranchia'ta ('plate-gilled'), a class of Mollusca represented by the oysters, cockles, mussels, and by all our common bivalve shellfish. In this class the shell is always bivalve. It is in the great majority of cases *inequilateral*, or more developed to one side of the middle line than to the other, and is usually *equivalve*, or composed of equal halves. The shell is formed by the *pallium* or *mantle* which lines each half of that structure. It is shut by special (*adductor*) muscles, but is opened by the action of an *elastic ligament* which comes into play when the muscles relax. One or two adductor muscles may be developed; the oyster illustrating the former condition. The mouth is not provided with any teeth, and a perfect digestive system exists. The heart is two or three chambered, and is *systemic* in its nature. The gills consist of two plate-like organs existing on each side of the body. Water is admitted to the gills either by the simple unclosing of the shell, or by special tubes named *siphons*. Hence the class is divided into the *Asiphonata* (oysters, mussels, pimiæ, scallops, &c.), and *Siphonata* (clams, cockles, razor-shells, pholas, teredo, &c.). The *foot* may be well developed or rudimentary (as in the oyster). It may be used for leaping (cockle), for burrowing (razor-shell), or for forming a *byssus* or *beard* (mussel and pimia). The organs of sense consist of tentacles developed around the mouth, of hearing organs, and of rudimentary eyes—well seen in the scallops (pecten).

Lamell'icor'nes, a group of Coleoptera or Beetles, including forms in which the tarsi are five-jointed (*Pentamera*). They are so named from the peculiar conformation of the terminal joints of the antennæ or feelers, these joints being lamellar or plate-like, and disposed like the joints of a fan. To this group belong the cockchafers, dung-beetles, stag-beetles, &c.

Lamell'iros'tres, a division of the *Natatorial* birds or Swimmers, represented by ducks, geese, flamingoes, &c. The bill is flat, and covered with a soft membrane. Its edges are further provided with a series of horny plates or *lamellæ*, serving as a kind of straining apparatus, whereby the solid parts of the food are strained off from the liquid portions. Four toes are developed; the fourth or hinder toe being unconnected by the web with the others.

Lamenn'ais, Hugues-Félicité-Robert, Abbé de, a celebrated French religious and political writer, was born at St. Malo, 19th June 1782. Educated by an eccentric uncle, he quickly developed into premature manhood, having for companions at the age of ten Livy and Rousseau, and at twelve fighting with his *curé* over the truths of religion. In 1809 was published his *Réflexions sur l'État de l'Église*, a work which Government suppressed. Three years passed, and with the help of his brother he produced the *Tradition sur l'Institution des Evêques;* but the hostility of the moderate political party drove him to England, where he supported himself by teaching. Returning to France, L. at once rose to the pinnacle of fame by publishing the first part of the *Essai sur l'Indifference en Matière de Religion*. Its author at this time upheld the ruling of the Church as the only and absolute law for society. In the *Conservateur*, *Défenseur*, and *Drapeau Blanc*, ephemeral party journals, he continued the crusade against secular power. When the last two volumes of the *Essai* appeared, L. was offered a cardinal's hat, but declined it. His next work, in which his theory of government was propounded in its most extreme form, was entitled *De la Religion, considérée dans ses Rapports avec l'Ordre Civil et Politique* (1825). After the July Revolution he founded *L'Avenir*, a journal whose pages, as revolutionary in tendency, were soon laid under ban by Gregory XVI. The natural reaction of sentiment had set in: from this time L. became less and less a churchman. The *Paroles d'un Croyant*, written in a week, made his changed opinions public. In the

columns of journals and by means of [illegible] exercise an influence [illegible] ances of importance [illegible] *sophie* '4 vols. 1841-42. [illegible] 1854, and was buried [illegible] observance of [illegible] vols., were published in 1844, [illegible] vols. in 1855-58. [illegible] *Deux Mondes* August 1857, and [illegible] *sur L.* Par. 1858.

Lamenta'tions [illegible] in the Hebrew canon [illegible] of his prophecies. [illegible] next to the prophecies of [illegible] miah over Jerusalem. [illegible] miah is regarded as the [illegible] question this traditional view. [illegible] the agreement of the L. with [illegible] spirit, purport, tone, and [illegible] says about his own fortunes [illegible] time of composition was [illegible] in the eleventh year of [illegible] perhaps, although not certainly, after the burning of the city and temple.

Lamin'ation is the disposition of [illegible] in laminæ or layers, which are not [illegible] as the strata. The laminæ rarely exceed an inch in thickness, and may be as thin as the finest paper, while strata may vary from an inch in thickness to many feet. L. is well marked in sandstones and shales.

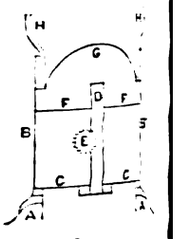
Lamm'as Day, the 1st of August. It is one of the four *cross quarters* of the year, the other three being Whitsuntide, Martinmas, and Candlemas. Some rents are still payable on these days in England, and they are the terms generally in force in Scotland. The name is a corruption of the Old English *hlafmæsse*, 'the loaf mass,' a festival held at the beginning of the harvest.

Lammergei'er, or **Lammergey'er** (*Gypaëtus barbatus*), a large species of Vulture (q. v.), inhabiting S. Europe and W. Asia, and attaining a length of 4 feet, while the wings may reach an expanse of 10 feet. This bird is also known by the name of the bearded vulture, from a tuft of bristles rising from beneath the bill. Its colour is a grey-shade brown marked with white above, each feather having a white streak in its centre. The head and neck are dark brown. The under parts are white tinted with brown. The head and neck are feathered, and the bill is long and sharply curved at its tip. The second and third quills are the longest, and the tail is long and wedge-shaped. The L. feeds on carrion, but also picks up lambs, rabbits, kids, and other small animals, bearing them to its nest, which is constructed on the summit of a cliff. The eggs number two, and are of a dirty white colour mottled with brown.

Lammermoors', a range of hills in Scotland, forming in part the boundary between the counties of Haddington and Berwick, and extending from the Moorfoot Hills to the rugged coast S. of Dunbar. The L. reach a height of 1534 feet in Spartleton, and of 1732 feet in Lammer Law.

Lamor'cière, Christophe Léon Louis Juchault de, a French general, was born at Nantes, 6th February 1806, educated at the Polytechnic School (1824-26), became lieutenant (1830), and, after serving with distinction in the African war, rose to the rank of colonel (1837). In 1844 L. was appointed commander of the Legion of Honour, and temporary governor of Algeria, with the military rank of general. Owing to his energy and skill, the African war was brought to a conclusion in 1847. During the revolution of 1848 L. proclaimed the abdication of Louis-Philippe, was wounded at the barricades when commanding against the mob, and took office in the Cavaignac Ministry. After the *coup-d'état* of Louis Napoleon, he was imprisoned, then sent into exile. In 1860 L. appeared in Italy as commander of the Papal troops during the War of Independence, but was compelled to surrender to Cialdini at Ancona. He died 11th September 1865, at his château of Prouzel near Amiens. See Pougesis, *Le Général de L.* (Par. 1866).

Lamp (*lampas*, 'a torch,' from *lampō*, 'I shine'), [illegible] apparatus for producing artificial light by means of [illegible] inflammable liquid separating a wick of twisted [illegible] Lamps are of two kinds—1) *Suction lamps*, in which the oil is raised from a reservoir to the top of the wick by capillary attraction; and 2) *pressure lamps*, in which a contrivance for forcing the oil to the burning wick at constant pressures with unvarying regularity. The [illegible] ments in the construction of modern lamps date from [illegible] in 1784, of the Argand oil-lamp, the [illegible] which was the burner. In it a cylindrical [illegible] the space between two metallic tubes, [illegible] with a constant stream of air passed, [illegible] to increase the [illegible] of the oil; a glass chimney [illegible] over the burner to increase the draught. [illegible] the Argand L. varied with the change of [illegible] to remedy this defect the Carcel L. [illegible] in which the burner is supplied with a [illegible] quantity of oil by clockwork, ensuring a [illegible] every time. The Carcel L., though still retained by [illegible] as the standard in photometric investigation, is not a [illegible] lamp. Like it the moderator lamps, invented [illegible] 1836, are [illegible]. The oil is stored in the body of these lamps, [illegible] by the pressure exerted by a spiral spring, [illegible] and rises up through a tube in the pillar [illegible] and in the ascending tube is placed a 'modérateur' [illegible] consisting of a toothed rack to control and regulate the flow [illegible] according to the pressure of the spring. The principle of [illegible] supplying the oil to the burner in the foregoing [illegible] was designed to burn animal or vegetable oils, [illegible] suitable in lamps for consuming mineral oils, as petroleum, [illegible] paraffin, &c. These liquid hydro-carbons are [illegible] from [illegible] that to prevent smoke, only as much [illegible] the wick can suck up should reach the flame; and to ensure [illegible] the carbon present, a plentiful and regular supply of air must [illegible]. These conditions have been fairly met in numerous [illegible] of mineral oil-lamps. The brass burner of the [illegible] mouth-piece, A, form is shown in section in the annexed [illegible]. The upper portion of the oil reservoir, which may be [illegible] glass, porcelain, or metal, is seen at A. Fixed to it is a metal cylinder B, perforated with numerous small holes for the inlet of air, and closed at the foot by a disc C, to prevent the escape of oil from below. D is a flat tube to support the wick, and having a hole in it to allow of the wick being raised or lowered by a toothed wheel E. A perforated partition F is placed across the air chamber to hold any fragments of wick that may fall, and to steady the currents of air. B is capped with a dome G which deflects the air currents on the flame as it passes through a slit on the crown of the dome. Around the [illegible] is a gallery for supporting a glass chimney (partly seen at [illegible]) to increase the draught through the air chamber, and to shield the flame from wind. In the 'Paragon L.' recently patented by M. Dietz, for burning petroleum, there are [illegible] air chambers, from which an abundant and well-regulated supply of heated air is directed on the lower as well as the upper part of the flame. The 'Anucapnic' (Gr. 'without smoke') L., invented in 1866 by Messrs. Rowatt & Son, of Edinburgh, is noteworthy on account of the glass chimney being dispensed with. The burner in this L. is provided with an inner and an outer dome, which cause a powerful draught, and the air in circulating between them becomes so hot that on impinging on the flame the oil is completely burned without smoke. M. A. M. Silber has lately introduced a L. for burning paraffin petroleum, which gives remarkable results, and is well adapted for most of the purposes of illumination for which gas is now used. The Silber lamps are provided with modified Argand burners with circular wicks of varying diameter, and the petroleum is consumed, to a great extent, in a vaporised condition, owing to the lowering of the oil level in the wick case, with the effect of greatly increasing the illuminating power. The supply of oil to the wick is regulated according to the consuming power. Where a large number of lights are used, the oil is distributed from a tank in the upper part of the building to a series of



Lamp

little cisterns placed on a level with the lamps to be fed, and provided with automatic mechanism for equalising the flow of the oil to the lamps. A saving of 20 to 40 per cent. of cost is effected by the Silber L. over that of gas, reckoned at 3s. 9d. per cubic foot. See SAFETY LAMP.

Lamp'black is an intensely black pigment formed of the soot deposited from the smoke which results from imperfect combustion of various substances. The finest and most lustrous qualities are obtained from the combustion of camphor or of various oils, but common L. is generally made from refuse resinous substances, pine-tree roots and knots, &c., by burning in furnaces specially constructed for impeding combustion and favouring the deposition of soot. L. of fine quality is the basis of Indian Ink (q. v.).

Lam'prey (*Petromyzon*), a genus of fishes forming one of the two genera included in the order *Marsipobranchii* (q. v.). In this group the skeleton is very imperfect, and is represented chiefly by a persistent *notochord*. The skull is cartilaginous, no distinct cranial bones are perceptible, and no lower jaw is developed. The gills exist in the form of a series of sacs or pouches borne on the sides of the neck, and opening externally by seven apertures along the side of the neck. No limbs (or paired fins) are represented, although a medium dorsal fin continued backwards to form a tail-fin, is developed. The mouth has the form of a circular opening, with a number of horny processes developed in its margin. The round form of the mouth gave origin to the term *Cyclostomata* ('circular mouth') by which the L. order was formerly known. The best-known species is the great L. (*P. marinus*), which attains a length of from 16 to 20 inches or more. The colour of this species is olive-brown, spotted with dark brown and black. The L. adheres to fixed objects by means of its rounded mouth; respiration being conducted by the gills. The lampern (*P.* or *Lampetra fluviatilis*) is common in many English rivers, and attains a length of from 12 to 15 inches. Its colour is a bluish-grey above, and white beneath. The pouched L. (*Geotria Australis*) of Australia has a large dilatable pouch on each side of the head. The mud L. or sand pride (*Ammocœtes branchialis*) is a doubtful species of L.

Lampshells, a familiar name given to many *Brachiopodous* molluscs, from the shape of their shells. The species of the genus *Terebratula* have in particular received this name; one of the valves being deep and bowl-shaped, while the beak is prominent, and pierced by a hole for the protrusion of a ligament. Many fossil species of Terebratulæ are known—the existing species being found in warm seas.

Lampyr'idæ. See GLOW-WORM.

Lan'ark (Cymric, *Llanerch*, 'a separate piece of ground), a market-town beautifully situated near the Clyde, 29 miles S.E. of Glasgow by rail. Handloom weaving is its chief industry. The Falls of Clyde in the neighbourhood attract numerous visitors. L. unites with Hamilton, Airdrie, Linlithgow, and Falkirk in sending a member to Parliament. Pop. (1871) 5099. —**New L.** (pop. 973), a village one mile S. of L., founded in 1784 by the father-in-law of Robert Owen, was from 1815 to 1827 the scene of that socialist's philanthropic labours.

Lan'arkshire, or **Clydes'dale**, a county in the W. of Scotland, occupies the whole basin of the Clyde (q. v.), and is surrounded by the counties of Dumbarton, Stirling, Midlothian, Linlithgow, Peebles, Dumfries, Ayr, and Renfrew. Area, 889 sq. miles; pop. (1871) 765,339. L. stretches 52 miles from N. to S., and from E. to W. 34 miles. It is judicially divided into three districts or *wards*, the upper (one-half of L.), of which two-thirds are moorland or mountain, producing lead, and the middle and lower wards, which are very rich in coal and iron. L. is mountainous in the S., where the Lowther Hills rise to 2403 feet, Tinto Hill to 2335 feet, Rodger Law to 2257 feet, Culter Fell to 1801 feet, and White Craig to 1425 feet, undulating in the middle, and flat in the N. The soil of the arable parts of the county is clay with an admixture of sand. In 1876 there were 52,151 acres under corn crops, 18,441 in green crops, 72,016 under various grasses, and in permanent pasture 100,217. Horses numbered 7522; cattle, 65,147; sheep, 213,535, and pigs, 8268. Pasturage and dairy-farming are thus more general than the rearing of grain. L. has from the earliest times been famous for its fruit. Its breed of draught horses is highly valued. L. is the greatest manufacturing and mining county of Scotland. Its chief industries are clustered round Glasgow (q. v.), and include cotton-weaving, ironworking, shipbuilding, and the manufacture of sugar, woollens, silk, and chemical preparations. The county sends two members to Parliament

Lan'cashire, a north-western county of England, is bounded W. by the Irish Sea, E. by Yorkshire, N. by Cumberland and Northumberland, and S. by Cheshire. Area, including the outlying portion of Furness, 1884 sq. miles; pop. (1871) 2,819,495. It is entered in the N. and traversed along the E. by the Pennine range, but is flat towards the coast, which is indented by Morecambe Bay, and the estuaries of the Ribble and Mersey. The chief rivers, besides the two last-named, are the Lune, Leven, Duddon, and Winster. The district of Furness, detached by Morecambe Bay, and stretching N. to Lake Windermere, is mountainous and picturesque. Throughout L. the chief formation is carboniferous, but new red-sandstone prevails in the W., and is lined with post-tertiary deposits. The soil is for the most part a fertile loam, and in 1875 there were 102,353 acres under corn crops, and 50,126 under green crops, while 73,336 were in clover, sanfoin, and grasses in rotation, and 532,955 in permanent pasture, exclusive of mountain or heath. In 1875 L. had 231,057 head of cattle, 314,664 sheep, 34,348 horses, and 38,443 pigs. The chief crops are oats, wheat, barley, potatoes, and turnips. L., however, derives its great importance from its vast textile and mineral industries. It is the greatest seat of the cotton manufacture in the world, having some 2000 factories, employing between three and four hundred thousand persons. Since 1770 the cotton industry has developed with a rapidity that may be judged by the eightfold increase of the inhabitants. Manchester is perhaps the greatest seat of manufactures in the world; other leading 'cotton towns' are Preston, Blackburn, Burnley, Wigan, Chorley, &c. (See COTTON.) In L. there are also large flax and silk mills, smelting-works (see BARROW-IN-FURNESS), coal-mines, &c. Liverpool (q. v.) is the principal port, and shipbuilding is carried on extensively on the Mersey. In 1871 the annual value of all property in L. on which direct taxes were paid was £27,923,057. Eight members of Parliament are returned for the county, and twenty-four for the boroughs. The county town is Lancaster, and the principal remains are the beautiful Furness Abbey, date 1127, and an abbey of the same period in the E. of L., township of Whalley. Near Whalley is the Roman Catholic College of Stonyhurst. See *The L. Library*, a critical catalogue of works on L. topography and local history, by Lieut.-Colonel H. Fishwick (Lond. 1876), and a *Glossary of the L. Dialect*, by Nodal and Milner (Lond. 1875).

Lan'caster ('the town on the Lune'), the county town of Lancashire, on the left bank of the Lune, 6 miles N.E. of its entrance in L. Bay, and 60 N.N.W. of Manchester by rail. It is a picturesque town, and the hill on which it is built is boldly crowned by the castle, now used as a jail, parts of which date from the reign of Edward III. The other noteworthy buildings are the parish church of St. Mary, with a lofty tower, and many old monuments and brasses; Christ Church, in the Second Pointed style, built in 1857; a Roman Catholic church, convent, and schools, covering an area of two acres; Ripley Hospital, for the maintenance and education of 150 boys, endowed and erected in 1864; the Town-hall on the market-place, the Custom-house on St. George's Quay, &c. There are large manufactures of cotton, silk, and oilcloth, besides iron-foundries, iron shipbuilding yards, furniture factories, railway-carriage works, and steam marble-mills. In 1875 there entered and cleared 519 vessels of 80,924 tons. The Lune is here crossed by an aqueduct and by a bridge of five arches. A dock at Glasson, 5 miles down the river, enables large vessels to discharge their cargo into lighters. Pop. (1871) 17,245. L. was disfranchised for corrupt election practices in 1867. It is supposed to occupy the site of a Roman station. In *Domesday* it appears as *Loncastre*. The town received its first charter from King John, and was made a county palatine by Richard III. It suffered much during the Wars of the Roses and the Parliamentary War.

Lancaster, a city of Pennsylvania, U.S., 68 miles W. of Philadelphia by rail, has thirty-three churches, a theatre, eight banks, the Franklin and Marshall College of the German Reformed Church, three daily and seven weekly (two German)

papers, &c. Its chief manufactures are [illegible] hands, tobacco 20,000,000 [illegible] barrels annually. There are also large [illegible] factures of every description. [illegible] was the meeting-place of [illegible] the seat of the State government from [illegible] (1870) 20,233.

Lancaster Gun. See RIFLED ARMS.

Lancaster Herald. The [illegible] six English heralds, [illegible] 1362, on the [illegible] the dukedom of Lancaster, [illegible] of a king-at-arms, [illegible] by Henry VII.

Lancaster, Joseph. [illegible] known for his enthusiastic [illegible] monitorial system to the [illegible] and for his connection with the [illegible] in the formation of the National [illegible] School Societies. (See ANDREW BELL.) [illegible] moned to an interview with George [illegible] have said to him, 'I highly approve of [illegible] wish that every poor child in my [illegible] to read the Bible.' The subsequent career [illegible] chequered. In 1812 he became [illegible] to America. He died in poverty, 24 [illegible] 1838, from the effects of an accident in the streets of New York.

Lancaster, Sir James. an English [illegible] 1550. He had command of the first expedition [illegible] East India Company (1600–3), when he established commercial relations with Java and Sumatra. L. was knighted by Queen Elizabeth, and died in 1620. He was a sanguine believer in a N. W. Passage. Baffin named the sound at the entrance of Baffin's Bay after him. See Purchas's *Pilgrims*, vol. [illegible] and Hakluyt's *Voyages*, vol. i.

Lancaster Sound, an inlet, 250 miles long, stretching W. from Baffin's Bay to Barrow Strait, and so forming part of the N. W. Passage. It is enclosed by North Devon Island on the N., and the minor islands of Cockburn Land on the S. Discovered by Baffin in 1616, it was first navigated by Parry in 1819.

Lance (Lat. *lancea*), a weapon of offence consisting of a pointed or spear-head fixed to a long, smooth, wooden shaft. It was in use among the Assyrians and Egyptians, and in the hands of the Macedonian and Roman soldiers proved a most effective weapon. Several European cavalry regiments are armed with the L.; in the British army such horsemen are termed lancers, and their L. is 9 feet long, with a triangular spear-head adorned with a red and white pennon.

Lance'let (*Amphioxus*), the lowest fish and Vertebrate, forming the only representative of the order *Pharyngobranchii* (q.v.). It has no distinct skeleton, the spine being a mere cellular notochord. No skull, lower jaw, or limbs are developed. No brain or organs of hearing are present, and a distinct heart is wanting, its place being supplied by contractile dilatations existing on many of the blood-vessels. The blood differs from that of all other vertebrates in being colourless. The breathing organs of the L. consist of a greatly distended pharynx, the walls of which contain cartilaginous filaments and are perforated, whilst its interior is covered by a delicate ciliated membrane. Water taken in by the mouth passes through the slits in the pharyngeal sac, aerating the blood contained in its lining membrane; whilst it ultimately passes into the abdominal cavity, from which it escapes by an opening situated in front of the anus, and known as the *abdominal pore*. The digestive system is simple, and the liver is represented by a long cæcum-like organ. The mouth is a longitudinal slit. It is surrounded by a horny ring, to which filaments or *cirri* are attached: hence the origin of the name *Cirrostomi*, sometimes applied to this group. No kidneys exist, and no lymphatic or absorbent system has been discovered. The L. attains a length of about 2 inches. It inhabits sandy coasts and sandbanks, and has a tapering body, provided with a lancet-shaped tail fin. The L. has of late years been regarded with great interest by biologists, from the use which has been made of its structure and affinities in supporting the doctrine of evolu-

[illegible] It is presumed to present the starting-point of vertebrate organisation.

Lancelot of the Lake [illegible] figure in the [illegible] Arthur. He is [illegible] by the Welsh [illegible] Malory, [illegible] Mammoth. He is [illegible] knight of the Round Table, and his adventures in search of the Sangreal are [illegible] of chivalric fantasy which [illegible] from the historic Arthur of Nennius [illegible] Geoffrey. L. was the son of Sir Ban, King of Benwick, [illegible] circumstance of his [illegible] [illegible] Vivien, the mistress of Merlin, [illegible] [illegible] time with in the bosom of a lake, [illegible] [illegible] to the court of Arthur, [illegible] [illegible] prowess in a thousand [illegible] [illegible] adventure is presented in a [illegible] [illegible] poets than by Tennyson. The [illegible] that of the story was Chrestien of Troyes [illegible] [illegible] are numerous old versions in French [illegible] English.

Lancers, a branch of the English cavalry service, [illegible] [illegible] lance, sword, and pistols, and answering to [illegible] Hussars and the French Lanciers. The first [illegible] was raised in 1742 by Marshal Saxe, [illegible] distinguishing weapon. In 1816 [illegible] had one of their squadrons with lances. [illegible] 1857 [illegible] a regiment of Polish Uhlans [illegible] He also formed four regiments of L. in [illegible] 1812 were increased to nine, with a total force of [illegible] All these were suppressed in 1815, with the exception [illegible] that were shortly after reorganised, and in [illegible] the British army includes eight regiments of L. During [illegible] Wars Lancer regiment was raised at Philadelphia [illegible] [illegible] as mounted for the thick woods [illegible] The L. were introduced into the English service [illegible] the French Polish L., and compose five regiments. See ARMY.

Lancet Window, a tall narrow window, the arch of which [illegible] an acute-angled triangle, common in the first [illegible] Early English style of architecture, or from 1190 to 1245. [illegible] lancet windows came to be grouped [illegible] [illegible] two to seven, and when thus combined [illegible] sometimes surmounted by a large arch, the space between [illegible] and the tops of the windows was often pierced with circular [illegible] &c.

Lance-Wood, a strong, light, and elastic wood believed to be [illegible] a W. Indian species of two genera (*Guatteria* and *Duguetia*) belonging to the natural order *Anonaceæ*. [illegible] [illegible] [illegible] for shafts and carriage poles [illegible] [illegible] [illegible]

Landau', an old town of Rhenish Bavaria, on the Queich, 30 miles S.W. of Heidelberg by rail. It is beautifully situated, and has an important tobacco industry. Pop. (1875) 7579, of whom one-half are Protestants. L. was a stronghold from an early period, and during the Thirty Years' War it was besieged and taken seven times. It was captured by Louis XIV. in 1680, and fortified by Vauban in the form of an octagon in 1686. After repeatedly changing hands between 1702 and 1713, it remained with France till 1815. Its walls were levelled as no longer serviceable in 1867.

Land Crab, a general name applied to those species of *Decapodous* crustacea, which subsist in damp situations on land, and which may therefore be regarded as differing materially in habits from the ordinary members of the crustacean class. The genus *Gelasinus* (of which *G. masionis* and *G. bellator*, or the fighting crab, are good examples) contains familiar species of L. C., and the racer crabs (*Ocypoda*) are also well-known examples. The violet crab, or black crab of Jamaica (*Gecarcinus rubicola*), is perhaps the best known L. C. These creatures live in burrows, which may be distant at least a mile from the coast. They seldom visit the sea, save for the purpose of laying their eggs. In December and January they are at their best, but in May are poor and unfit to be eaten. When they proceed to the coast to deposit their eggs, they march in immense bodies, and usually in a straight line, their march being an event conspicuous in the calendar of the W. Indian Islands.

Landed Estates Court, the name of an Irish Court originally called the *Encumbered Estates Court*. It was created by Act of Parliament in 1848, its original function being to facilitate the sale of deeply encumbered estates in Ireland, by granting a fresh title to the purchaser, free from encumbrances. All having any interest in the property were cited to appear, and plead their claims before the court. Judgment was then given upon these, and the proceeds of the sale divided accordingly. The clear title brought a high price in the market; so that it was found advisable to extend the jurisdiction of the court to unencumbered land, and to make permanent that jurisdiction which had been originally meant to be only temporary.

Landed Men. In criminal trials in Scotland, when the panel (*i.e.*, the accused) is a proprietor of land he may insist on being tried by a jury of whom the majority are proprietors of land; that is, according to the law term, *Landed Men*.

Lan'der, Richard, an African explorer, was born at Truro, Cornwall, in 1804, accompanied 'Clapperton,' as an attendant, to Sakkatu, and after the death of the latter, returned to England, and published a narrative of the expedition in 1829. Accompanied by his brother John, he discovered (1830) that the Niger entered the Bight of Benin by many mouths. After publishing his *Course and Termination of the Niger* (3 vols., Lond. 1832), he set out for the Upper Niger on a trading expedition with two steam-vessels. In a collision with the natives, L. was severely wounded, and died at Fernando Po, 27th February 1834.—**John L.** received an office in the customs, and died 16th November 1839.

Landerneau ('the enclosure on the water'), a seaport town in France, in the department of Finistère, on the Élorn, 12 miles N.E. of Brest, with a good harbour, and some manufactures of linen and leather. Pop. (1872) 6285.

Landes ('heaths') the third largest department of France, is bounded N. by the Gironde, S. by the Basses-Pyrenées, W. by the Bay of Biscay, and E. by Gers and Lot-et-Garonne. Area, 3599 sq. miles; pop. (1872) 300,528. In the S. and S.E. the surface is hilly and fertile, and is watered by the Adour, and its branches the Gave de Pau and Midouze. The rest is arid plateau land, dry and sandy, here and there dotted with sombre forests of pine and cork trees, and fringed along the coast with extensive *étangs* or lagoons. From this desert tract, which is about the most thinly peopled in France, the department derives its name. The inhabitants, of Gascon race, are called *Parens*, and subsist mainly in the L. proper by rearing sheep and swine, and by charcoal burning and cork cutting. The shepherds in the marshy districts are mounted on high wooden stilts. No less than 1270 sq. miles are covered with forest, and 77 with vines. The *Vins de Sable*, from the Maransin, are nearly equal in quality to those of Bordeaux, and the annual value of the total vintage is £140,000. In the S. and E. there is also considerable culture of wheat, maize, millet, rye, and oats. L. is traversed by the railway *Bordeaux-à-Bayonne*, and by branch lines. Mont-de-Marsan (pop. 1871, 6964) is the capital, and other towns Dax and St. Sever.

Landgraf. See GRAF.

Landlord and Tenant. By common law, any person may grant a lease for any term shorter than the term of his own interest. A lease for the whole term is rather an assignment than a lease. A lease may bear date as far back as the parties please, but its date must not be subsequent to its execution. In husbandry leases, a covenant is always implied, though not expressed, that the tenant will use the land demised to him in a husbandlike manner, and that he will not exhaust the soil by neglectful or improper tillage. With regard to *Fixtures*, see that article. An outgoing tenant should be careful not to leave any ground for an action for dilapidation, otherwise he may be dragged into an expensive lawsuit which he has no power to avert or stop. No outlay or improvements made by the tenant during his occupancy will be allowed to set off the landlord's claim; and any amount of damage awarded will carry costs (case of *Cooke* v. *Anderson*). In the absence of express stipulation in writing, the tenant cannot set off any debt due to him by the landlord against so much of his rent. But the occupier or sub-tenant may deduct the ground-rent, if he has paid it, from the first payment of rent due from him. *Notice to quit* is necessary where no time is fixed for the expiry of the tenant's term. If a tenant takes possession of a house, he is bound to retain it for a year; and though he may sublet it, the landlord —unless he accept the sub-tenant—may still hold him bound for the rent. The half-year's notice to quit should be given so as to expire on the *same quarter-day* as that on which the tenant took possession. So, if a person begin to hold at Christmas and wish to leave at the end of the first year, the notice must be served on or before Midsummer-day. If one day beyond Midsummer be allowed to elapse without notice being given, the tenant may be compelled to hold the house for *two years*, there being no intermediate quarter-day till the following Midsummer on which he can give notice, so as to end his holding on the same term as that on which it began. For legal method of enforcing payment of rent by the landlord, see DISTRESS, EJECTMENT, REPLEVY AND SALE.

Lodgings.—The law between householders and lodgers is in almost every respect the same as between L. and T. What has been above stated applies to both kinds of tenure. It seems that if householders who let rooms with attendance do not keep them clean enough to be comfortable and wholesomely inhabitable, lodgers may leave them without notice or liability for rent. Thus, if bugs be found in a bed after entering into possession, a lodger is not obliged to stay in the house (12 M. and W. 52). A housekeeper has the same power to distrain the goods of his lodger for rent as a landlord has over those of his tenant. See LODGING-HOUSES. For Scottish law of L. and T. see LEASE, CONTRACT OF.

Landlord's Hypothec. See HYPOTHEC.

Lan'don, Letitia Elizabeth, an English poetess, was born in Chelsea in 1802. At the age of nineteen she began to contribute verse under the initials L. E. L. to the *Literary Gazette*, which at once captivated the public fancy. *The Fate of Adelaide*, a Swiss tale, which appeared in 1821, was followed at intervals by *Improvisatrice*, *The Troubadour*, many poems and sketches, and three novels. In 1838 L. E. L. married Mr. M'Lean, Governor of Cape Coast Castle, but died October 15, 1839, from an accidental overdose of prussic acid. Her poems are instinct with a certain tender and romantic pathos, which betrays the influence of Byron. See Blanchard's *Life and Literary Remains of L. E. L.* (Lond. 1841).

Lan'dor, Walter Savage, was born at Ipsley Court, Warwick, 30th January 1775. At Rugby and Trinity College, Oxford, he attained the reputation of a fine classic, and at twenty published a volume of poems. On the death of his father he succeeded to large estates, mismanaged them, sold them, and went in 1808 to Spain, then invaded by Napoleon. There he equipped a body of troops at his own expense, and marched under Blake with the rank of colonel; but taking offence at a supposed insult from the British envoy he returned to England as hastily as he

left it. He married, and unhappily, in 1811; in 1812 unsuccessfully contested Monmouthshire for Parliament, and four years later took up residence in Italy, where the remainder of his life was chiefly spent. His chief works are:—*Gebir*, a poem (1798), translated into Latin (1802); *Count Julian*, a tragedy (1812); *Idyllia Heroica* (1820); *Latin Poems* (2 vols. 1824); *Imaginary Conversations of Literary Men and Statesmen* (5 vols. 1824-29); *Citation and Examination of Shakespeare* (1834); *Pericles and Aspasia*, and *A Satire on Satirists* (1836); *Pentameron and Pentalogue* (1837); *Giovanna of Naples, Andrea of Hungary, and Fra Ruperto* (1840-41); *Poemata et Inscriptiones* and *Hellenics* (1847); *Last Fruits off an Old Tree* (1853); *Scene for a Study, Dry Sticks* (1858); *Hellenics Enlarged* (1859); *Letters of an American* (1860). L. was of a passionate nature, and allowing his pen the utmost liberty was looked upon by many readers of his books as the incarnation of unreasonableness and extravagance. One or two of his fiercest pamphlets have dropped out of sight; the judgment of to-day upon his writings is calmer; while his friends have had opportunity of offering their unanimous testimony to his lovable and generous disposition. His works never were, and never will be, widely read; they must remain the delight of the cultured few. He is the poet of intellect rather than of fancy; indeed Coleridge declares him destitute of imagination in its highest form. But the *Imaginary Conversations*, written in the purest English, display an intensity of dramatic genius, an exquisite discrimination of character, a ripe scholarship, an abundance of wit and humour, and a wide sympathy which give them a place among the choicest treasures of our literature. L. died at Florence, 17th September 1864 aged ninety. His biography was written by John Forster (1869, new ed. 1874). A complete edition of his works is published by Chapman & Hall (7 vols. 1876).—**Rev. Robert Eyres L.**, brother of the above, was also known in the literary world, chiefly as the author of four fine tragedies, *Count Arezzi* (1824), *The Earl of Huron, Faith's Fraud*, and *The Ferryman* (1841). He died at the rectory of Birlingham, Worcestershire, 26th January 1869, aged eighty-seven.

Landsberg on the Warthe, a town of Prussia, province of Brandenburg, on the river Warthe, 83 miles E. by N. of Berlin by rail, has great woollen markets and river traffic, and manufactures leather, woollens, tobacco, paper, and machinery. Pop. (1875) 21,444.

Land'scape Gardening, the art that grasps the varied characteristics and surroundings of ground intended to be devoted to gardens, public parks, or other similar uses, and so plans the arrangement and adornment as to bring the whole into harmonious combination. What Loudon remarks concerning the flower garden is equally applicable to the present subject, namely, that taste must be the principle that must serve as a guide. Embodied taste is style or character, and the art of the designer is, having fixed on a suitable style, to follow it out unmixed with other styles, or with any deviation which would interfere with the kind of impression which that style is calculated to produce. On the one hand, however, to bring everything to geometric precision is objectionable, as, on the other hand, is the introduction of extravagant attempts at wildness. The great object must be to exhibit to advantage the graceful forms and glorious hues of flowering plants, shrubs, and trees; to create pleasing effects by their judicious combination or by their disposal over varying levels, to use them in the enrichment of desirable views, and to utilize them in shutting out undesirable prospects, at the same time and in all cases taking full advantage of all the local peculiarities of the selected site for further artistic embellishment, by the introduction of rock-work, water, &c.

Lands Clauses Act. The statutes 8 Vic. c. 18, for England, and 8 Vic. c. 19, for Scotland, are so called. They prescribe the law applicable to taking compulsory possession of any one's land for public purposes.

Land'seer, Sir Edwin, the greatest of English animal painters, the son of John L., a well-known engraver and writer on art, was born in London in 1802. For more than half a century he was a constant exhibitor. His works include 'Low and High Life' (1831), 'Sir W. Scott and his Dogs' (1832), 'Comical Dogs' (1836), 'Peace and War' (1846), 'A Dialogue at Waterloo' (1855), 'Deer Stalking' (1858), and a legion of equally fine pictures, many of which are in the National Gallery, London. His magic brush encircled his dumb subjects with a halo of almost human interest. He was elected A.R.A. in 1827, knighted in 1850, and appointed President of the Royal Academy in 1865, an honour he immediately resigned. His latest effort, the well-known lions in Trafalgar Square, attest his power as a sculptor. He died October 1, 1873. An exhibition of between four and five hundred of his works took place at Burlington House in the spring of 1874. The copyrights range from £100 for early works to £3000 for later ones. See the *Early Works of Sir E. L.*, by F. G. Stephens (Lond. 1808), *Memoirs* by the same (1874), and a series of elaborate papers in the *Art Journal* for 1876-77.—**Thomas L.**, the elder brother of the above, is a celebrated line engraver, and his finest works are reproductions of Sir Edwin's pictures, and of Rosa Bonheur's *Horse Fair*, published in 1861. He is the author of a *Life of Etzeick* (2 vols. Lond. 1871).—**Charles L.**, another brother, born in 1799, is a painter of historical subjects, and held the office of Keeper to the Academy from 1851 to 1873.

Land's End, a bold rocky promontory, and the most south-westerly point of England, at the toe of Cornwall, 8 miles S.W. of Penzance. It is the *Penwith* of the Britons, and the *Belerium*, *Iverium*, or *Antivestæum Promontorium* of Ptolemy. Off the headland, which meets the full surge of the Atlantic, are three small islands, one of which supports a lighthouse. The erection of a new rock lighthouse—the Longships—was laid 7th August 1871.

Landshut' ('land's defence'), the chief town of the province of Nieder Bayern, S. Germany, on the river Isar, 37 miles N.E. of Munchen by rail, has manufactures of paper, woollens, earthenware, and leather, great breweries, and trade in corn, cattle, and hops. There is a church of St. Martin (about 1430) with a tower 462 feet high. The university removed to L. from Ingolstadt in 1800, was again removed to München in 1826. Pop. (1875) 14,784.—**L.**, a town in Prussia, in the province of Schlesien, on the river Bober, 30 miles S. by W. of Liegnitz, with manufactures of linens, cottons, and woollens. Pop. (1875) 5815.

Landskro'na ('the crown of the land'), a town in Sweden, in the lan of Malmohus, on a large harbour 30 feet deep on the E. shore of the Sound, 16 miles N.E. of Copenhagen, and connected by rail with the interior of Sweden. It has iron-foundries, and manufactures sugar and woollens. In 1870, 1185 vessels entered the port; cleared, 1175. Its fortifications were kept up till 1870, when its castle was made a prison.

Land'slips are dislodged portions of cliff or slope which have slid down from their original position. The undermining action of streams, and the disintegrating effect of freezing of percolating water, are the usual agents in producing these dislocations. One of the most remarkable of L. occurred at Rossberg, behind the Righi, in 1806, when, after a rainy summer, thousands of tons of hard red sandstone and conglomerate slid over the sloping beds of the underlying sandy deposits and across the valley of Goldau, burying four villages and about 500 inhabitants.

Land'sturm. See LANDWEHR.

Land Surveying. See SURVEYING.

Land-Tax is a territorial impost introduced in its present form in the reign of William III. The method of raising it is by charging a sum on each county according to the valuation of 1692, and this sum is assessed on individuals by commissioners being the principal landholders in the county, and their officers.

Land Transport Corps, a name formerly given to an army corps charged with the transport of provisions, war material, the wounded in battle, &c. It was dissolved after the Crimean War, and its place taken by the Military Train with similar functions. The Military Train was in turn disbanded in 1870, and its functions transferred to the Transport Section of the Army Service Corps, which is not a combatant force.

Land'wehr ('land-defence'), is that part of the German military force which does not strictly belong to the standing army, but is a sort of militia composed of those who have already served their time in that army. It was first organised in Prussia according to a plan of Scharnhorst in 1813. Every Prussian subject is enrolled as a soldier as soon as he has completed his twentieth year, and after seven years' service in the standing army he enters

the L. for five years longer, during which period he is liable to be called out twice a year for practice, and to be re-incorporated in the regular army in time of war. An exception is made, however, in the case of any one who can pass a certain examination, and maintain himself for one year. He is next enrolled in the 'Landsturm,' of which he remains a member till the age of fifty. The landsturm is only called out in case of invasion of the country. By the constitution of April 1871 the Prussian obligation of military service was extended to the whole German empire. In 1876 the German army numbered 293 battalions of L., comprising on the war-footing 250,244 men.

Lane, Edward William, an English Orientalist, who for life-long devotion to study worthily bears comparison with the great Germans. He was born at Hereford in 1801, and spent many years in Egypt, where he was induced by the fourth Duke of Northumberland, who bore the main share of the expense, to undertake his great work, the *Arabic Lexicon*. The first volume was published in 1863; four more appeared before his death at Worthing, 10th August 1876, and the remaining three are left completed in his own manuscript. He also wrote *Manners and Customs of the Modern Egyptians* (Lond. 1835), and translated *The Thousand and One Nights*.

Lan'franc, a famous Churchman and scholastic theologian, was born at Pavia about 1005, studied law at Bologna, and became a skilful advocate in the courts of his native city. Crossing the mountains to France, he established a school of law at Avranches, but in a journey which he made from that town to Rouen, he is supposed to have been waylaid near the Abbey of Bec by robbers, and to have been kindly succoured by Herlouin the knight-abbot. More probably, however, L. was drawn to the abbey through religious impulse. In 1042 he took the monk's robe, and in 1045 was appointed prior, and founded the most famous of the mediæval schools—pupils coming to sit at his feet from all parts of England, Germany, Italy, and France, the most famous being Anselm and Pope Alexander II. L. established for himself a reputation for orthodoxy (1050) by the exposure of the fallacies involved in a treatise of Berengar of Tours concerning the mysteries of the Eucharist, in which 'the real presence' was denied. L. was selected by William the Conqueror as his chief adviser, but having opposed the duke's marriage with Matilda of Flanders, he fell into temporary disgrace, and a sentence of banishment was passed upon him. His courageous *bonhommie* re-established him in favour, and 'from that time L. became his (William's) minister and counsellor, whether for the affairs of the Church, or the more daring schemes of foreign oppression which were opened up to him by the position of England.' As 'the fruit and seal of that reconciliation,' L. was appointed in 1066 Abbot of the house of St. Stephen at Caen, where he established a school which rivalled that of Bec. In 1067 he was nominated Archbishop of Rouen, but declined the office, being necessary to the Conqueror's schemes for organising the Church in England, as a check on the aggressive spirit of the feudal baronage. L. was raised to the see of Canterbury after the completion of the Norman Conquest, and he it was, says Mr. Freeman, who taught William 'to cloke a wrongful aggression under the guise of a holy war.' His policy was one with his master's, and the two men ruled together 'as no Pope and Cæsar ever ruled together in the imperial city itself.' The first act was that of compelling the Primate of York to make full submission to the new Primate of Canterbury, and after he had made professions of canonical obedience to L. they went to Rome for their pallia (1071). But it was not until the following year that a final decision was obtained before the Papal legate, the king settling the superior jurisdiction of Canterbury. After this began the undisputed ecclesiastical reign of L. Norman churchmen, men upon whom William could rely, were placed at the head of the religious houses. Ecclesiastical courts were originated, and the usage of holding a Convention was confirmed. A sterner discipline was established in the monasteries, a more vigorous impulse given to learning, whilst the local duties of L. were administered with diligence and detail. His reforms were, however, accompanied by much injustice to the English churchmen whom he found in office and numerously ejected. Though there was gain in ecclesiastical administration, there was a loss of sympathy in relation to the people. 'L. never,' says Mr. Freeman, 'became a naturalised Englishman. . . . Perhaps his character, hard if lofty, his devotion to interests spread over a field far wider than the isle of Britain, hindered him from ever thoroughly throwing himself into any purely local or national position.' After the death of the Conqueror, L. secured the crown for William the Red, but his influence was misdirected, as the new king exhausted the royal hoard in profligacy and extravagance. L. died May 28, 1089. Several editions of L.'s collected works have been published, the latest at Oxford (1844), edited by Dr. Giles. See Freeman's *Norman Conquest*, vols. iii. iv. v.; Green's *Short History*; A. Charma, *L., Notice Biographique, Littéraire, et Philosophique* (1850).

Lang'eland ('long land'), called from the 15th c. to the 17th, **Lavind**, an island of Denmark, between the Great Belt, the Baltic, and the Little Belt, 33 miles long and 4 broad. Area 107 sq. miles; pop. (1870) 19,631. The surface is wooded and undulating, and the soil is a rich loam in the S. and middle.—Rudkjöbing, on the W. coast, is the market-town. Pop. (1870) 2785.

Lang'enbeck, Konrad Johann Martin, a German anatomist and surgeon, was born December 5, 1776, at Horneburg in Hanover. In 1804 he became professor in Göttingen, and in 1807 established there a surgical and ophthalmic hospital. He died January 24, 1851. His chief writings are *Nosologie und Therapie der Chirurgischen Krankheiten* (5 vols. 1822–40), *Icones Anatomicæ* (8 vols. 1826–39), *Handbuch der Anatomie* (4 vols. 1831–47).—**Maximilian Adolf L.**, son of the above, was born January 11, 1818, at Göttingen, where in 1845 he obtained a professorship. In 1851 he removed to Hanover, and has since remained there practising as a physician and oculist. His chief writings are *Klinische Beiträge* (1840–45), *Impfung der Aranei-körper* (1856), *Insolation des Menschlichen Auges* (1859).—**Bernard Rudolf Konrad von L.**, a cousin of the latter, has a wide reputation as a skilful surgeon. In 1847 he became professor at Berlin, and in 1866 was appointed general staff physician in the Prussian army.

Langenbie'lau, or **Bielau**, a cluster of villages in Prussia, in the province of Schlesien, 32 miles S.W. of Breslau, has important manufactures of linens, woollens, and beet-sugar. Pop. (1875) 13,360.

Langensalz'a, a town in Prussia, in the province of Sachsen, on the Salza, 11 miles N. by W. of Gotha by rail, has a medicinal sulphur spring, and manufactures woollens, cottons, and beer. Pop. (1875) 9484. L. was (27th June 1866) the scene of a conflict between a Hanoverian army of 20,000 men under King Georg V. and the Prussian advanced guard, 9000 strong. The Prussians, at first repulsed, were reinforced during the night, and the Hanoverians capitulated on the 28th.

Lang'holm ('the long meadow'), a town of Scotland in Dumfriesshire, on the Esk, 30 miles N.E. of Dumfries by rail. It has considerable weaving industries, dyeworks, and flour-mills. Pop. (1871) 3275. L. is an interesting old Border town, and its castle, now in ruins, was the stronghold of the freebooting Armstrongs.

Lang'horne, John, was born at Kirkby Steven, Westmoreland, in March 1735, and studied at Clare College, Cambridge. He spent the earlier years of his life teaching and writing for the press, but obtained preferment in the Church through the influence of his wife's relatives, who were rich. He was first preacher at Lincoln's Inn Chapel, and afterwards prebendary of Wells Cathedral. Of his prose works nothing remains but his well-known translation of Plutarch's *Lives* (1770), executed with the help of his brother. L. died 1st April 1779. His poems, with a biographical memoir, were published by his son in 1804.

Lang'land, William, the probable name of the author of a striking and powerful poem called *Piers the Plowman*. Of the author's Christian name at least we are sure; he repeatedly calls himself 'Will' in the course of his work. The authority for the surname is an entry in one of the Dublin MSS. in a handwriting of the 14th c., and a passage in Bale (16th c.). All that we really know of the poet is to be gathered from allusions occurring in his poem. Assuming the credibility of these, L. was born about 1332, probably at Cleobury Mortimer in Shropshire, received the education of a *clerk* or scholar, and in 1362 wrote the first draft of his great work. He then went to London, and lived in Cornhill for many years with his wife Kitte and his daughter Calote. About 1377 he began to recast and expand

his poem, introducing his varied experience of city life. A third version, of somewhat later date, shows him still in London 'earning a precarious living by singing the psalter, dirige, and the 'seven psalms' for the good of men's souls.' In the poem entitled *The Deposition of Richard II.* was written by him, as Mr. Skeat believes, L. was alive in 1393, and as this poem is unfinished, L. may have died soon after the accession of Henry IV. Forty-three MSS. of *Piers the Plowman* still exist, all of which exhibit the work in one of the three forms already indicated. The second of these, dating from 1377, is the fullest, most graphic, and most original. It consists of an Introductory Prologue and Seven 'Passus' (= Books), which may again be subdivided into two portions: (1) The Prologue, or Vision of the Field full of Folk, of Holy Church, and of Lady Meed (Pass. i.–iv.); (2) The Vision of the Seven Deadly Sins and of Piers the Plowman (Pass. v.–vii.). In terse, trenchant, alliterative verse he paints with satiric touch the motley array of mankind gathered before his vision in a field; but in the main his strictures and outcries are provoked by the corruptions of the church rather than of the world. Milman's words (*History of Latin Christianity*, vol. 6, p. 536, ed. 1855) are both eloquent and true. After noticing the academic revolt and defiance of Wiclif, he goes on to say: 'In the vision of Piers Plowman is heard a voice from the wild Malvern Hills, the voice, it should seem, of an humble parson or secular priest. He has passed some years in London but his home, his heart is among the poor population of central Mercian England. . . . Whoever he was, he wrote in his provincial idiom, in a rhythm perhaps from Anglo-Saxon times familiar to the popular ear; if it strengthened and deepened that feeling, no doubt the poem was the expression of a strong and wide-spread feeling. It is popular in a broader and lower sense than the mass of vernacular poetry in Germany and England.' See the Rev. Walter W. Skeat's edition (1869) in the *Clarendon Press Series*—one of the most perfect specimens of editing to be found in the English tongue.

Langnau', a town in the canton of Bern, Switzerland, 16 miles E. of Bern by rail, on the Ilfis, an affluent of the Emmen, is the chief town of the Emmenthal. Weaving is the main industry; there is a market for cheese and linen yarn. Pop. (1870) 6214.

Langres, a town of France, in Haute-Marne, near the sources of the Marne, and 20 miles S.E. of Chaumont by rail. Among its historical monuments are the *Porte Gallo-Romaine*, a triumphal arch of the third c., the Roman church of St. Didier, with its rich collection of antiquities, and the cathedral of St. Mammès, dating from the 11th c. There are important manufactures of the finest cutlery, of woollens, leather, &c., and a trade in iron, cereals, timber, oils, and groceries. Pop. (1872) 6822. L., one of the oldest towns of France, was the capital of the ancient *Lingones* (of which name L. is a corruption), and became a centre of Christianity in the third century.

Lang'ton, Stephen, a great English Churchman, was born some time in the middle of the 12th c. in the county of Sussex, studied philosophy and theology at Paris, became canon of Notre Dame, and chancellor of the university. In 1206 he was created a cardinal by Innocent III. About the same time the monks of Christ Church, Canterbury, claimed the right of filling up their recent archbishopric, and elected Reginald their sub-prior. The bishops and king were both angry, so an appeal was made to the Pope, who confirmed and consecrated L. (June 1207). John declined to receive the archbishop until May 1213, after having suffered the effects of the papal interdict. In July, L. absolved the king at Winchester, exacting from him an oath to observe the promises made at his coronation to maintain good laws and abolish evil customs. He became the leader of the barons, and, says Mr. Green, 'through his line the charter was the first object of his care.' After the pope interfered to quash the charters, L. was suspended for some years, but in 1220 he was at Westminster, and crowned Henry III. with much ceremonial. During the remaining years of his life L. interested himself less in current politics than in the cultivation of letters and ecclesiastical reform. *De Benedictionibus* and *De Maledictionibus*, *Summa Theologiæ* and *Summa de Diversis* are treatises attributed to L. He died 9th July 1228, and takes rank as one of the most patriotic figures in the early contest for English liberty. See Freeman's *History of the Norman Conquest* (vol. v. 1870), and Green's *Short History of the English People* (1873).

Lan'guage, the outward embodiment of thought, includes in its widest sense writing, telegraphy, speaking on the fingers, and all other modes by which man communicates his ideas. It is the one great barrier between him and the brute, for all these animals, manifold though they be, are expressions not of thought but sensation, analogous to our exclamations of pain or joy. Whence, then, did man obtain this pre-eminence? Is it innate, or merely acquired, like the use of fire or the arts of building, writing, &c. Is it a work of human art, a production of nature, or a divine gift? According to the leading philosophers of last century L. is an invention, arbitrary and conventional; words are artificial signs; and the varieties of human speech are due to different nations having fixed on different sounds as the first signs of their different ideas. This, the old *Thesei* or Hermetic theory, is that which was held by Locke, advocated by Adam Smith, and adopted with slight modifications by Dugald Stewart. By it *daughter* might stand for 'father,' or *twenty* for 'thirty'—the father the 'milker' for the family, or thirty the product of '10 × 2'! A second theory regards L. as a production of nature, dependent on, but not necessarily resulting from the powers of man; like the art of swimming, distinct on the one hand from the invention of a life-preserving apparatus, and on the other from such innate faculties as those of breathing or walking. Its advocates all hold man to have been originally in a state of mutism, but they differ as to the means by which he emerged from that condition, one party ascribing the constituent elements of human speech to the exercise of imitation, the other to a development of interjections. These two theories are known as the Onomatopœic and Interjectional, or as their opponents have irreverently dubbed them, the Bow-wow and Pooh-pooh theories. The former relies on such isolated words as *cuckoo* or *peewit*, but stumbles over *thunder* (root, *tan*, 'to stretch') or *squirrel* ('shade-tail'); the latter derives *foul*, *filth*, and *foe* from the interjection *fauch*, but fails to account for the Sanskrit 'to hate,' of which *fiend* is clearly a cognate. According to the last and now most generally accepted theory—the radical—there remains in every L., after we have explained all that can be explained, a certain inexplicable residuum of some 500 roots, each of which is the expression of a general and material concept. Thus the words *spy*, *spectacle*, *species*, *spice*, *scepsis*, and a host of others can all be traced back to the single root *spek*, 'to see.' Beyond this root it is impossible to go, nor is there any intelligible reason why it should convey the notion of seeing more than of hearing or speaking. We must simply accept this as a fact. Call them the gift of nature or of God, roots are the postulates of speech, and it is impossible to conceive that L. has a beginning without a pre-existing store of them to draw upon. And what their resources are, scanty though they may at first sight appear, is seen in the fact that the 42,718 words of Chinese are all reducible to 450 roots, the 94,464 of German to 250, while Hebrew is content with 300 radicals, and Sanskrit with 1706 according to the Sanskrit grammarians, but in reality with less than one-third that number. See PHILOLOGY; Max Müller's *Science of L.* (2 vols. Lond. 1862–64); Sayce's *Principles of Comparative Philology* (Lond. 1874); and Whitney's *Life and Growth of L.* (New York, 1875).

Langued (from Fr. *langue*, 'tongue'), or **Lampassé**, a heraldic term, meaning tongued.

Langue'doc, one of the old provinces of France, was bounded E. by the Rhone, W. by Gascony and Guienne, S. by Foix, Roussillon, and the Mediterranean, and N. by Lyonnais and Auvergne. It was the *Gallia Narbonensis* of the Romans, and in the middle ages received the name L. (*langue d'oc*) from its inhabitants using the word *oc* (an abbreviation of Lat. *hoc*) for *yes*, while the affirmative of the Romance dialect spoken N. of the Loire (the *langue d'oil*) was *oil* (from Lat. *illud*) modified in the later *oui*. L. was finally annexed to the crown of France in 1361. It is now divided into nine departments.

Lani'adæ, or **Laniidæ**, a family of *Insessorial* birds belonging to the *Dentirostral* section of that order. The bill is long, straight, and frequently hooked at its tip; the wings are of moderate size, the tail long, the tarsi strong, and the hinder toe greatly developed. In the sub-family *Laninæ* (including the

typical genus *Lanius*, to which the shrikes belong) the nostrils are on the sides of the bill, and the hind toe bears a broad pad on its sole.

Lann'er (*Falco Lanarius*), a species of falcon inhabiting N. Europe, and rarely visiting the British coasts. This bird is larger than the Peregrine falcon, and may equal the Jer- (or Gyr-) falcon in size. The male is smaller than the female, and is named a *Lanneret*. The name 'L.' is often, but erroneously, given to the young females of the Peregrine falcon.

Lannes, Jean, Duc de Montebello, a famous French marshal, born at Lectoure, 11th April 1769, was apprenticed to a dyer in his fifteenth year, joined the army in 1792, came under the notice of Napoleon in 1794, and having distinguished himself at the battles of Montenotte and Millesimo, was made a colonel in 1796. At the battle of Arcola he led as general of brigade, at Aboukir as general of division, and at Acre he was wounded. In 1799 L. was made commander of the consular guard, in 1800 he led the vanguard of the French army across the Great St. Bernard, and at Montebello he exhibited the highest qualities of personal bravery and generalship. He acted as plenipotentiary at Portugal for some time, and on his return was created Marshal of France and Duc de Montebello. L. fought with eminent coolness and ability at Austerlitz, Jena, Eylau, and Friedland; but in the battle of Aspern he was mortally wounded, and died at Vienna, May 31, 1809. Napoleon wrote of him at St. Helena, 'He was a man of extraordinary bravery; calm in the midst of fire, possessing a sure and penetrating glance, ever prompt to profit by eventualities, passionate and quick sometimes even in my presence. But he loved me. . . . I found him a pigmy; I lost him a giant.' See René Perin, *Vie Militaire de J. L.* (Par. 1810).

Lann'ion (Celt. 'the little enclosure'), a town of France, department of Côtes-du-Nord, 35 miles W.N.W. of St. Brieuc, and 42 miles from the mouth of the river Guer, has a harbour, with trade in hemp, grain, and animal charcoal. Pop. (1872) 5462.

Lansdowne, Henry Petty Fitzmaurice, Third Marquis of, was born 2d July 1780, and educated at Westminster, Edinburgh, and Cambridge. He graduated in 1801, in which year he was elected for Calne. He became Chancellor of the Exchequer under Fox (1806–7) at the age of twenty-five, and succeeded to the title in 1809. A staunch Whig, he was in opposition with his party for twenty years, but on their return to power in 1830 he became President of the Council. He filled the latter office in every Whig Administration till 1858, when he retired from public life. L. more than once refused the premiership. He died at Bowood, January 31, 1863.—**Henry,** fifth marquis, grandson of the above, born in 1845, was Lord of the Treasury (1868–72), and Under Secretary of State for War (1872–74) in the second Gladstone ministry.

Lan'sing, the capital of Michigan, U.S., 84 miles W.N.W. of Detroit, on Grand River, is the junction of six lines of railway. It was laid out in 1847 with fine wide avenues, and has sixteen churches, four banks, an opera house, a State library of 20,000 volumes, &c. A new capitol is in course of erection, at an estimated outlay of $1,200,000. There are extensive iron-works, and a noted mineral spring. Pop. (1874) 7445.

Lan'singburgh, a post village of New York, U.S., on the Hudson River, nearly opposite the mouth of the Mohawk, 200 miles N. of New York city by rail. It is perhaps the chief point in the United States for the manufacture of brushes, oil-cloth, and crackers, and communicates with Waterford by a bridge over the Hudson. L. is named after Abraham Lansing, who settled here in 1771. Pop. (1870) 6804.

Lantern (Fr. *lanterne;* Lat. *laterna*), a portable perforated case, with open or transparent sides for the emission of the light of a candle or lamp placed inside. Lanterns were known to the ancients, the frame being commonly formed of metal, and the sides of bladder, or thin plates of mica, or of horn. The streets of Roman cities, subsequent to the 2d c., are believed to have been lighted by lanterns. A mediæval brass L., having five rows of fine crystals set in perforations, is preserved at Oxford. On shipboard lanterns are named after their position, as the *poop* and *top* lanterns. In Christian art, a L. is the attribute of St. Gudule and St. Hugh. *A la lanterne,* a cry of the Sans-Culottes during the French Revolution, preceded the hanging of their victim on a street lamp. L., in architecture, a drum-shaped erection, on the top of a building or dome to give light, or to crown the edifice.

Lantern-Fly (*Fulgora*), a genus of *Hemipterous* insects belonging to the family *Fulgoridæ*. The antennæ have three joints, and two simple eyes or ocelli below the compound eyes. The head is very large, and the body convex. The hinder legs are long, and adapted for leaping. The vertex or front part of the head is enormously developed to form a long snout-like process, which in some species equals the body in length. The *Fulgora lanternaria* is found in Surinam; the *F.* (or *Hobinus*) *candelaria* in China. The average length of *F. lanternaria* is 2 or 2½ inches. Many entomologists doubt the luminosity of these insects; but there appears to be little doubt, from the observations of Madame Merian, that they occasionally exhibit this property.

Lan'thanum (symbol, La; atomic weight, 93.6), a metal whose silicate occurs with the corresponding compounds of Serium and Didymium in cerite, allanite, orthite, and other minerals. It was discovered in 1839 by Mosander, who named it L. from its having long escaped notice (Gr. *lanthanein,* 'to lie hid'). Its salts are colourless and unimportant.

Lan'yards (from Fr. *lanière,* 'a thong'), a nautical term for short ropes used for various purposes, but especially to stretch the shrouds and stays of the masts.

Lanzaro'te, the most north-easterly of the Canary Islands. Area 325 sq. miles; pop. 17,500. It is very fertile, producing the finest Canary wine. Droughts, however, are frequent and severe. Among the hills, which rise to a height of 2000 feet, are several active volcanoes. The capital is Teguise, and the chief port Arrecife.

Lanz'i, Luigi, an Italian antiquary, born at Monte dell' Olmo in the province of Macerata, June 14, 1732, entered the Order of Jesus in 1749, and developed at Rome a taste for the remains of ancient art. On the suppression of his order, he received the sub-directorship of the gallery at Florence, where he died, March 30, 1810. His most important works were *Saggio di Lingua Etrusca* (3 vols. Rome, 1789) and *Storia Pittorica d'Italia* (Bassano, 1795; Eng. trans. by Roscoe, 6 vols. 1828). His *Opere Postume* appeared at Florence (2 vols. 1817), and a *Biografia* by A. Cappi (Forli, 1840).

La'ocoön, a Trojan hero, priest of Apollo or Neptune, who strongly dissuaded his countrymen from drawing into their city the wooden horse left behind by the Greeks. While L. and his two sons were standing beside the altar, two fearful serpents swam to the Trojan coast, entwined the boys, and then the father, who went to their assistance, and all were killed. The Trojans believed that this death had befallen L. as a punishment for having thrust his lance into the side of the wooden horse. A magnificent group of statuary, representing the fearful death of L. and his children, was found in 1506, on the side of the Esquiline Hill, and is now in the Vatican. For details of the legends of L. see Heyne's *Excursus* v., *Æneid* ii.; and for an exposition of the beauties of the Vatican group see Lessing's *L. oder über die Grenzen der Malerei und Poesie.*

Laodice'a, a city of Phrygia, built by Antiochus Theos in honour of his wife Laodice, was situated in the valley of the Meander, on the small river Lykos. It was a place of extensive trade and great wealth. It was completely destroyed by an earthquake in the reign of Tiberius, and at once rebuilt by the inhabitants. Soon thereafter Christianity was introduced into L., and it became a great Christian city, the see of a bishop, and in 363 and 476 the meeting-place of Christian councils. It was destroyed by the Mahommedan invaders, and is now in ruins, the extent of which, however, proves its former greatness.

La'on, the chief town of Aisne, France, 80 miles N.E. of Paris, on a bold eminence, at the foot of which is a branch station of the *Nord* Railway. It is still girt with remains of its old fortifications, and preserves one of its quaint, barbicaned gateways. The chief buildings are the cathedral of Notre Dame, of mixed Roman and Gothic style, dating from 1115, an episcopal palace,

and a chapel of the *Templiers*, assigned to the 12th c. The library contains 20,000 vols., and MSS. ranging from the 7th to the 16th c.; the museum is rich in Gallo-Roman antiquities. L. has slight industries. Pop. (1872) 8600. The ancient *Bibras* of the Gauls and *Lugdunum* ('the fortress in the marshy land') of the Romans, L. was besieged by the Vandals in 407, and by Attila in 451. After the conquest of the Franks it became the seat of a bishop, and subsequently the residence of the last of the Karolings. Under its walls Napoleon was defeated by the allies, after a battle of four days, 10th March 1814.

Laou-tsze ('ancient sage'), or **Lao-kiun** ('ancient prince'), a celebrated Chinese philosopher, the reputed founder of one of the great religions of China, Taouism, was born, according to the Annals of Se-ma-Tsièn (70 B.C.), at Kuhien (mod. Luhien) in the kingdom of Tsou (Hu-nan), in the year 604, or, according to a later account, 565 B.C. He is said to have filled the post of archivist under the Emperors King-wang and Keng-wang (530–510), and to have been visited during this period by Confucius (q. v.), who marvelled at the wisdom of his answers, but compared him to a dragon, neither fish, beast, nor fowl. At length, appalled by the disorders of the Tscheu dynasty, L. mounted a black ox and rode away towards Thibet. Coming to a pass in the mountains he was met by an officer, who begged him to leave behind him a volume of instruction. He accordingly composed his famous *Tâo-te king* ('Road to virtue'), and then departed to end his days in some unknown solitude. Unlike the active patriotism of Confucianism, the virtues of Taouism are strictly passive. Its followers are required to withdraw from the turmoil of the world to meditation and the contemplation of *Tau* ('road' or 'reason'), the one great cause of being, which takes the place of a supreme deity. So far the fundaments of Taouism show many points of contact with Buddhism, but in modern practice its whole system is so overgrown with magic and superstitions, many of which centre round the *elixir vitæ*, that it has lost almost all its original features, whilst becoming the most popular religion with the Chinese vulgar. The *Tâo-te king* has been translated into German by Victor von Strauss (Leips. 1870) and Plänckner (Leips. 1870), and into French by Stanislas Julien (Par. 1840), on whose work is based *The Speculations of L. on Metaphysics, Polity, and Morality*, by John Chalmers (Lond. 1868).

La Paz de Ayacucho, the chief commercial city of the republic of Bolivia, beautifully situated at the elevation of 12,226 feet, and on both sides of the Chuquiapo. It has a fine cathedral, 14 other churches, a university, &c., and carries on a large foreign trade with the Peruvian ports of Arica and Islay, with the latter by means of the Arequipo Railway to Puno on Lake Titicaca. It was founded in 1548. Pop. 76,372.

Lap'idary Work (from Lat. *lapis*, 'a stone') is the art of cutting, polishing, and mounting hard stones for ornamental purposes. The cutting of diamonds is regarded as a distinct art, not generally included under the term L. W., which deals chiefly with the cutting of agates, jaspers, carnelians, cairngorms, and other varieties of quartzose stones, to the exclusion of the rarer and more valuable precious stones. The art is also to be regarded as distinct from that of the seal or cameo engraver, although the materials employed are the same, and the processes followed are analogous. The sphere of the lapidary is thus very much confined to the preparation of that class of jewellery and ornament into which agates and the other ornamental quartzose stones largely enter, and which jewellery, though extensively manufactured in Birmingham and Germany, is distinctively known as Scotch jewellery. The opaque stones for this class of work are usually prepared in thin slices, shaped in accordance with the requirements of the design, and set in a backing and sides of silver or more rarely gold, while the transparent coloured quartzes, as cairngorm and amethyst, are cut and facetted like the more valuable precious stones. For the preparation of agate and similar stones, three processes, slicing, cutting, and polishing, are required. The slicing of these slabs from the rough agate is accomplished by means of a thin disc of soft iron made to revolve horizontally, the edge of which is charged with diamond dust mixed with oil. Emery powder may also be used for slicing quartzose stones, but its action is much slower than that of diamond dust. The cutting or shaping of the slices is effected also on a horizontally revolving wheel or disc made of lead, and fed with emery powder and water; and finally the polishing is done with tripoli or with putty powder and water on wheels of tin or zinc. Cairngorms, &c., are cut and polished in a similar manner, but with special arrangements for holding the stone against the abrading and polishing surfaces, so as to produce regular and equal facets. When the pieces of stone operated on are too small to hold conveniently in the hand, as is usually the case, they are cemented on the end of short sticks or rods. See the works of King, Holtzapfel, Dr. Feuchtwanger, and Dr. A. Billing.

Lap'is Laz'uli, a rich blue mineral crystallising in dodecahedrons, and consisting principally of silicate and sulphate of alumina. It occurs in granite and granular limestone, and is used when richly coloured for making vases. The finer varieties come from Persia, China, Siberia, and Buchara. When powdered it constitutes a most beautiful and durable blue known as *ultramarine*. The ordinary ultramarine is prepared artificially, as that obtained from the native mineral is very costly.

Lap'ithæ, a Thessalian people, who inhabited the mountainous districts near Olympus and Pelion. They were descended from Lapithes, son of Apollo, and brother of Centaurus. In the war which broke out at the marriage of Perithous and Hippodameia, the L. defeated the Centaurs. See CENTAURS.

Laplace', Pierre Simon, Marquis de, a celebrated French mathematician and astronomer, was born March 23, 1749, at Beaumont-en-Auge, in Normandy. Carrying to Paris letters of introduction to D'Alembert, the latter soon obtained for him the mathematical chair at the military school at Paris. Henceforth he devoted as far as possible his whole attention to mathematical and physical science; but, like many other savans of this revolutionary period of European history, he became embroiled in politics, in which he evinced singular unfitness and deplorable lack of firm principle. He died at Paris 5th March 1827. L.'s fame rests solely on his attainments in science, in which he is to be ranked almost as the compeer of Newton. His great work, the *Mécanique Céleste* (5 vols. 1799–1825), is a systematic development from the first principles of dynamics of the whole theory of the solar system. The theory of the moon, the theory of the satellites of the larger planets, and the theory of the two great inequalities of Jupiter and Saturn, are handled with rare power; and attractions, rotations, and tidal phenomena are treated by methods as beautiful as they are original. The *Mécanique Céleste* is in great measure a republication of various memoirs published during the forty years succeeding 1772; and a popular (i.e., non-mathematical) exposition of his results is given in *L'Exposition du Système du Monde* (2 vols. 1796), the fifth and last book of which contains a brief, lucid, and accurate history of astronomy. His other chief works are *Théorie Analytique des Probabilités* (1812, 3d ed. 1820), and *Essai Philosophique sur les Probabilités* (1814, 5th ed. 1825). The best English translation of the *Mécanique Céleste*, with a valuable running commentary, is by Bowditch (4 vols. Boston, 1829–38). *L.'s Œuvres* were published in 7 vols. (1843–47). See Fourier's *Éloge historique de L.*

Lap'land, the general name for the tracts of land inhabited by the *Lapps* in the N.W. of Russia, and the N. of Sweden and Norway. In Sweden the districts occupied by Lapps are the *Lappmarks* Tornea, Lulea, Pitea, Umea, and Asele.—The Lapps are an Ugric or Chudic race, with a language closely allied to that spoken by the Finns (q. v.). But the life of the Lapps, nomads and fishermen contrasts unfavourably with that of the agricultural Finns. Their features are also of a lower type, though the common accounts of the low stature and Mongolian ugliness of the Lapps compared with the height and European beauty of the Finns are much exaggerated. The Lapps subject to Russia, called *Enare-Lapps*, also *Ter-Finns*, inhabit the peninsula of L. or Kola in the government of Archangel, and scarcely number 2000. They are nominally Christians, but believe in witchcraft and other superstitions. A form of serpent-worship still exists among them. In that part of Sweden which is called generally 'the Lappmark,' and which stretches as far as Kjölen (q. v.), dwell about 6000 Lapps. In Norway they number about 16,000. The Lapps are thus in all scarcely 24,000 people, scattered over wide deserts, and speaking three distinct dialects. In 1865 there were in Norway 1000 persons of Norwegian-Lappish descent, and 900 half Lapp, half Finn. Of the Norwegian Lapps about 1600 keep flocks of

eindeer on the mountains; the rest, called *Sölapper* ('Sea Lapps'), have fixed abodes, and live much as the Norwegian fishers on the coasts. See Ihre, *Lexicon Lapponicum* (Holm, 1780); Rask, *Lappisk Sprogloere* (Cop. 1832); Stockfleth, *Norsk-Lappisk-Ordbog* (Christ. 1852); Thomsen, *Ueber den Einfluss der Germanischen Sprachen auf die Finnisch-Lappischen* (Halle, 1870).

La Pla'ta. See ARGENTINE CONFEDERATION.

La Porte, a city of Indiana, U.S., 12 miles S. of Lake Michigan, and 59 E. of Chicago by rail. It is the seat of Indiana Medical College, and has fifteen churches, three weekly newspapers, and a public library. A chain of seven beautiful lakelets in the vicinity attracts crowds of summer visitors. Pop. (1870) 6581.

Lapp'enberg, Johann Martin, born in Hamburg, 30th July 1794, studied at Edinburgh, London, Berlin and Göttingen, was made (1818) resident representative of his city at Berlin, took part in the Troppau Congress (1820), and became (1823) 'Archivar' to the Senate of Hamburg. In 1850 he shared in the movement for the restoration of the German federal diet, and died 28th November 1865. L. gained a high reputation for learning and research by his *Geschichte von England* (2 vols. Hamb. 1834–37). An English translation of vol. i. was published by B. Thorpe as *A History of England under the Anglo-Saxon Kings* (2 vols. Lond. 1845), and of vol. ii. as *A History of England under the Norman Kings* (Lond. 1857), and three supplementary volumes have been added by Professor Pauli (q. v.). He also published many texts and tracts relating to the history of Hamburg and the Hansa; *Hamburgisches Urkundenbuch* (i., 1842); *Zeitschrift für Hamburgische Geschichte* (6 vols. 1841–66); *Chronika der Stadt* (Hamb. 1852-61); also several on the philology of the German tongue; and later, *Quellensammlung der Schleswig-Holstein-Lauenburg Gesellschaft für Vaterländische Geschichte* (3 vols. 1862–65).

Lapsed' (Lat. *Lapsi*) were those Christians who, in the times of persecution of the early Church, complied to a greater or lesser extent with the demands of the authorities to take part in heathen worship. They were classified as (1) Libellatici, holders of a certificate from the magistrate that they were not Christians; (2) Sacrificati, who had sacrificed, and (3) Thurificati, who had offered incense to idols; (4) Idolatri or Blasphemati, who had formally denied Christ; (5) Mittentes, who had sacrificed by deputy, and (6) Traditores, who had surrendered church property.

Lap'wing (*Vanellus*), a genus of Grallatorial or wading birds, the common species of which—*V. cristatus*—is also popularly known as the 'peewit,' from its peculiar cry. The bill is straight, and its sides grooved for two-thirds of its length. The second and third quills are the longest; and the thighs are sometimes feathered to the knee. The hinder toe is short. The L. attains a length of 12 inches. The colour of the head and crest is black. The sides of the head are white; the chin, throat, and breast black. The back is a dark green, glossed with a metallic lustre, and the under parts are white. The food consists of worms, slugs, insects, &c. The nest is simply a hollow in the ground, and the eggs, numbering four, are of olive, spotted with dark brown. Curiously enough the eggs are placed with the smaller or pointed ends together, so that they assume a crossed appearance when viewed in the nest. The L. is readily tamed.



Lapwing.

Lar, a town of Persia, capital of the province of Laristan, at the foot of a range of hills, 174 miles S.E. of Shiraz. It is a decayed place, but is still famed for the manufacture of cloth and muskets, and its bazaar is the finest in Persia. Pop. 12,000.

Lar'board (*lo bordo*, contr. from Ital. *quello borda*, 'that side'), a nautical term for that side of a ship which is on the left hand of one standing on the deck and looking to the head. *Port* is now substituted for L., as less likely to be confounded with *starboard*, the name given to the other side.

Lar'ceny, or Theft. L., which is the legal term for stealing, is the felonious carrying away of personal property with intent to despoil the owner, without employing force or intimidation (see ROBBERY). When the abstraction of the property is without aggravating circumstances, the crime is *simple* L. When aggravated by circumstances, as by being committed on the person or in a dwelling-house (see BURGLARY), the crime is *compound* L. By *felonious* taking away is meant that the act is against the will of the owner. Mere removal of goods from the place in which they are deposited is sufficient to constitute L. When a person has lawfully obtained possession of goods under a charge of keeping them, he will be guilty of stealing if he apply them to his own use; but if money be entrusted to any one for a special purpose and he applies it to his own use, this would seem only to constitute the minor crime of Embezzlement (q. v.). The appropriation of money entrusted, but not for a special purpose, under ordinary circumstances is not criminal.

A wife is not guilty of L. in taking the goods of her husband, unless she commit adultery, in which case she forfeits her privileges as a wife. Wild animals cannot be stolen, but animals enclosed and domestic animals are subjects of theft. Regarding the human body, see GRAVES, ROBBING. See also GARDENS, STEALING FROM.

Larch (*Larix*), a genus or sub-genus of Coniferæ, closely related to the cedars and the spruce and silver firs. The common L. (*L. Europæa*), a native of Alpine districts up to 7000 feet in Europe and W. Asia, is now much cultivated as a forest tree in Britain, particularly in Scotland, and is available for many useful purposes, the wood possessing the advantages of being very durable, not liable to rot through moisture, nor subject to insect destruction. The tree, however, is a comparatively recent introduction, the two first plants grown in Scotland having been sent from London by the Duke of Athol, in 1727, along with some orange trees. All were treated alike as greenhouse exotics for several years until the hardy nature of the L. became known. The growth of this tree is rapid, and the height attained about 100 feet (exceptionally as much as 150 feet), whilst the pyramidal form, the pendent branches, the light-green leaves, and the purplish cones, render it a very ornamental object. The bark has tanning properties, and is the base of a tincture employed in medicine as an astringent and stimulant. Venice turpentine is also yielded by the L., as is also a sugary matter, an exudation from the leaves known as manna of Briançon, and a gum termed Orenburgh gum is collected in Siberia from the scorched stems after the not unfrequent forest fires in that country. Two American species of L. (*L. pendula* and *L. tenuifolia*) constitute notable features in the scenery of Canada and the Northern States, growing to a large size and furnishing useful timber.

Lard is the fat of the common pig prepared by melting at a gentle heat, and preserved generally in bladders. It is now an article of commerce in very extensive use, the finer qualities being used in cookery as a substitute for butter, and as the basis of ointments in pharmacy, while the inferior and tainted qualities are employed as a source of L. oil. L. oil is a very pure and limpid fluid obtained from L. by submitting it in woollen bags to enormous hydraulic pressure. The supplies of L. come chiefly from the United States, whence in the year 1874–75, 160,859,168 lbs. were exported.

Lard'ner, Dionysius, LL.D., a well-known mathematician and scientific author, was born at Dublin, April 3, 1793. In 1828 he became Professor of Natural Philosophy and Astronomy in University College, London; and two years later projected the publication of a series of treatises on natural, physical, and economic science by the most eminent authors of the day. Several, on *Hydrostatics, Pneumatics, Heat, &c.*, are from his own pen. There were 135 vols. published in all, under the name of

[illegible] **Nathaniel L DD** [illegible] *Hebrew and Talmudical Exercitations upon the Gospels* (1727) [illegible] *Jewish and Heathen Testimonies* (1729) [illegible] He [illegible]

Lares [illegible] The Lares were the deified [illegible] The Lares were [illegible] **Manes** [illegible] **Penates** were the [illegible]

Lar'gesse (Lat. *largitio*), in the days of chivalry, was money [illegible] It appears from the *Ceremonial de France*, vol. ii. p. 742, that at the Lord of the Castle of Good Company the festival [illegible] 'were given great rewards by vessels of gold.' The custom has [illegible] but an interesting survival of it [illegible] where the entrance of a stranger into a manor-hall is at once the sign for 'hallooing L.'

Lar'go (Ital.), a musical term indicating slowness of rate, and breadth of character.

Largs (*Gaelic, 'the slope of a hill'*), a town of Scotland, in Ayrshire, county of Ayr, situated on the Clyde, 14 miles S. by W. of Greenock. It has some [illegible] and weaving industries, and its fine scenery attracts summer visitors in great numbers. Pop. (1871) 2,560. Here Alexander III. of Scotland defeated Haco of Norway in 1263.

Lar'idæ, the gull family, belonging to the order *Natatores* or swimming birds. The bill is straight and compressed, and the wings long and pointed; the tail is also long, and the tarsi have transverse scales. The hinder toe is usually rudimentary. In the typical gulls (*Larinæ*, genus *Larus*) the bill is curved at its tip, and is not longer than the head. The nostrils are placed at the sides of the bill near the middle of its length. The tail is even, and the first quill is the longest. The chief genera, in addition to Larus, included in the family L., are *Sterninæ* (including the terns or gulls), and *Rhynchopinæ* (including the kittiwake gull). The *Stercorarinæ* form the genus *Rhynchops*.

Larissa (Turk. *Yenishehér*, 'new town'), a town of Turkey, in the vilayet of Janina, on the Salambria (*Peneus*) 60 miles E. of Janina, stands in a sandy plain, has twenty-four mosques, and is the seat of a Greek archbishop, whose cathedral occupies the site of the ancient acropolis. Silk and cotton weaving form with vineyard cultivation the chief industries, and there is a lively transit trade. Pop. 30,000.

Laristan', a province of Persia, on the N. shore of the Persian Gulf, is 210 miles long by 120 broad. Its northern portion is traversed by a range of mountains, which enclose fertile tracts, yielding corn and fruits; but the lower country is a desert, only diversified by rocky hills and sandy valleys, and almost wholly destitute of water. The chief towns are Lar (q. v.), Tarom, and Kongun.

Lark, a name applied generally to many insectivorous [illegible] but the birds of the genus *Alauda* and family *Fringillidæ*. The [illegible] the skylark [illegible] as [illegible] The [illegible] and tuneful [illegible] the [illegible] The tail is [illegible] and may be [illegible] Of the larks the [illegible] is the [illegible] It is [illegible] The [illegible] of insects, worms, &c., but the diet in spring [illegible] chiefly of vegetable matter. The eggs number [illegible] or five, and are of a greyish-yellow tinted with brown. The young leave the nest before they are fully fledged. The song of the skylark is perhaps the most celebrated among [illegible] the bird creation. The woodlark (*A. arborea*) is of smaller size than the preceding species, and the tail is shorter. It has a streak existing over the eye. The breast is of reddish-brown, as in the skylark, and the under parts are yellowish-brown. The average length is 6 inches. The *Otocoris* or eared L. is named from the tufts of feathers borne on the head. Of this genus the pencilled L. (*O. penicillatus*) is a familiar example. The shore L. (*O. alpestris*) is also included within its limits. The former occurs in Persia, the latter in N. America.



Lark.

Larkha'na, a town in the district of Shikarpur, Sind, [illegible] India, on the S. bank of the Ghar Canal, 6 miles E. of the [illegible] river, and 150 miles N. of Hydrabad. Pop. (1872) 10,[illegible] It is situated in the most fertile part of the province, and [illegible] gardens and tree-lined roads, has been called the 'Flo[illegible] Sindh.' It has manufactures of silk, cotton, dyeing, [illegible] leather; and carries on a large transit trade with Kelat.

Lark'spur, is the genus *Delphinium*, the flower [illegible] resembling the name L. or lark's-toe or -claw. There are [illegible] forty species distributed through the N. temperate zone, [illegible] *Aparte* as an alien or colonist is sometimes found in [illegible] corn-fields. Several species are common in gardens. [illegible] genus partakes largely of the acrid properties of the *Ranunculaceæ*, to which natural order it belongs.

Lar'naka (near anc. *Citium*), the chief seaport and [illegible] town of Cyprus, near the S. coast, 25 miles S.E. of Le[illegible] exports cotton, silk, wheat, salt, wine, opium, and fruit. It [illegible] a Greek church of St. Lazarus in the Byzantine style of the [illegible] or 11th c., a fine Roman Catholic church, and a Franci[illegible] monastery, founded in 1848, but is a dirty, unhealthy [illegible] In 1873, 918 vessels of 90,967 tons cleared the port. [illegible] timated (1875) at 6000. Marina or Alikai (*i.e.*, 'the salt-[illegible] on the shore, is inhabited by Europeans.

Laroche'foucauld, François Duc de, Prince de Marillac, was born 15th December 1613, received but a [illegible] education, as his father made him enter early into [illegible] service, and in his seventeenth year fought at the siege of [illegible] In 1632 he was exiled to Blois, where he married Mademoi[illegible] de Vivonne, and the next few years of his life were swallowed up in unsuccessful political intrigue, and in a protracted [illegible] with Madame de Chevreuse. Richelieu discovered his plots, [illegible] he was kept at a distance from the court. Returning [illegible] after the Cardinal's death, he was still kept from preferment, [illegible] joined the army under the Duc d'Enghien to forget his disappointments. At the siege of Mardik he was seriously wounded. L. took the side of the Princes de Condé and Conti in the war of the Fronde, and occupied Bordeaux with troops (October 1650

In July 1652 L. was again wounded, after which he settled into the calmer life of the court, and gave to the world as fruits of his literary leisure, *Mémoires* (in 1663–64), and *Réflexions ou Sentences et Maximes Morales, avec un Discours sur les Réflexions* (in 1665). The *Maximes* have secured for L. a conspicuous place in the roll of French ethical writers. 'He is,' says Prevost Paradol, 'the most profound of the moralists who have made war upon human pride.' His maxims bear the mark of the most incisive insight, and a pitiless capacity for emotional analysis. Viewed in the light of his career, it is not surprising that the results of his ethical observations, as embodied in brief paragraphs of concentrated sagacity, should be summed up in a doctrine of self-love. *L'amour propre, l'amour de soi*, is the key-note of his theory of human conduct, disinterested virtue he can nowhere recognise, positive and negative views which he has embodied with authoritative exactness and admirable clearness of language. L. died at Paris 17th March 1680. In *Les Grands Ecrivains de la France* there is an admirable edition of the works of L. by Regnier (2 vols. 1875). See Voltaire's *Siècle de Louis XIV.*; Sainte Beuve's *Études sur La Rochefoucauld*; and Madame de Sevigné's *Lettres*.

Larochejaquelein, Henri du Verger, Comte de, was born at the Château de la Durbellière, 3d August 1772, adopted a military career, and in 1791 was an officer in the constitutional guard of the king. He fought at Fontenay (1793), and preserved, by his daring, the Vendean troops from defeat at the battle of Luçon. L. led the Vendeans triumphantly against the Republicans, and took several towns. He was killed at Nouaillé, 4th March 1794. Though a dashing soldier and full of promise, L.'s fame among his countrymen is probably kept alive from the Cæsarean address attributed to him in entering battle, 'If I advance, follow me; if I withdraw, slay me; if I die, avenge me.' His brother, **Louis du Verger, Marquis de L.**, born 30th October 1777, was also a soldier, but was in the West Indies during the Revolution. He headed the royalists of La Vendée in 1813, but fell in battle at Pont des Mathias, 4th June 1815. His wife, **Marie Louise Victoire** (born 1772, died 1857), is the author of *Mémoires* of the first Vendean war, of which she was an eye-witness. See A. D. Nettement, *Vie de Madame de L.* (Par. 1859).

La Rochelle'. See ROCHELLE, LA.

Larr'ea, a small genus of *Zygophyllaceæ*, of which *L. Mexicana* has obtained the name of Creosote plant, from its repulsive odour. It is very abundant in some parts of Mexico, forming a dense and almost impassable scrub, thereby constituting a barrier against drifting sands in the desert regions of that country. Three other species are found in Chili and Paraguay.

Larr'ey, Dominique Jean, Baron, was born near Bagnères de Bigorres, July 1766, studied surgery at Toulouse under his uncle, went to Paris in 1787, whence he departed for N. America as a naval surgeon. In 1792 he held an appointment in the French army of the Rhine, where his 'flying ambulances' brought him into notice. L. was elected Professor of the Military School in 1796, and two years later accompanied the French army to Egypt. The literary result of this was his *Relation Historique et Chirurgicale de l'Expédition de l'Armée d'Orient en Égypte et en Syrie*, published in 1803. After the battle of Wagram he received the title of Baron, and (March 1812) he was nominated chief surgeon of the grand army, with which he remained until Napoleon's abdication. At Waterloo he was wounded, and after the Restoration degraded; but before his death became surgeon-general of the Hôtel-des-Invalides, and inspector of military hospitals for Algeria. L. died at Lyons, 25th July 1842. He was the author of many treatises on the art of surgery.

Lar'va, the name applied in zoology especially to the first stage in the development of *Insects* (q. v.) after they leave the egg, but also given to the miniature forms of many other animals. Larval forms in modern zoology are accounted of the greatest importance, as affording a clue to the true relationship and descent of animals. Thus animals which exhibit true affinities will as a rule present a close resemblance in their larval state, whatever be the differences or distinctions between their adult forms. Of this the Crustacea furnish good examples. Thus the young of a barnacle, of a sacculina (a sac-like parasite on crabs), of some prawns, and of many other crustacean groups, present a close resemblance, and appear as free-swimming bodies, each known as a *nauplius*.

Laryn'goscope. The L. is a reflecting mirror so constructed and adapted as to enable the observer to explore the recesses of the larynx. It was not until 1857–58 that the importance of exploration by means of the L. was generally recognised through the influence of two German physiologists, Drs. Turck and Czermak. The small mirror, placed on a stalk attached to its margin at an angle of from 120° to 150°, is placed against the soft palate and uvula. The rays of the sun or of a good lamp are concentrated by means of a reflector on the laryngeal mirror, which throws the light downwards, and illuminates the parts to be examined, reflecting at the same time the images of the parts into the eye of the observer through the central opening of the reflector. By means of the L., the trachea or windpipe can be explored through the larynx, and the condition of the parts examined with the greatest precision and accuracy.

Laryngot'omy is performed by making a vertical incision in the mesial line, between the sterno-thyroid muscles, about an inch in length, and then a cross cut through the crico-thyroid membrane. A silver tube, curved on the flat, is then introduced into the air-passage and retained by tapes round the neck. The operation of L. is occasionally necessary, in order to save life, in cases of acute disease, more especially supervening on chronic laryngitis. In some cases the more difficult and dangerous operation of tracheotomy is necessary.

Lar'ynx, *Anatomy of L.*—The L. is that portion of the respiratory passage which is situated between the pharynx and the trachea. It is composed of a number of cartilages, joined together by ligaments, and lined on the internal surface by a mucous membrane which covers in the ligaments and muscles. The cartilages are the *thyroid*, the *cricoid*, the *arytenoid* cartilages, and the *epiglottis*. These are present in all mammals, but present variations in shape and position in different animals.

In *man*, the *thyroid* cartilage consists of two lateral halves, continuing in front, but separated from each other behind. At the point of union of the two halves an angular projection, more prominent in the male than in the female, is formed. To this projection, in the male, the name *pomum Adami* is given. From the posterior or free borders of the cartilage there projects upwards and downwards two processes; the upper are connected with the *hyoid* bone by means of ligaments, the lower are directed downwards and forwards, and each presents at the tip a small smooth surface for articulation with the side of the *cricoid* cartilage.

The *cricoid* cartilage is in shape like a signet ring, the broad part of the ring being situated behind. It is placed between the thyroid cartilage above and the trachea below. Upon the upper border of this ring, posteriorly, there are two convex oral articular surfaces upon which the arytenoid cartilages rest. Upon the posterior and lateral surfaces of the ring there are the surfaces for the articulation with the inferior processes or *cornua* of the thyroid cartilages.

The *arytenoid* cartilages, two in number, are three-sided pyramids about half an inch in height, the bases of which rest upon the oral surfaces on the *cricoid* cartilages. The surfaces are named, from their position, anterior, internal, and posterior. Upon the anterior surface there is a slight projection to which the *false vocal cord* is attached. The external margin of each is rounded and gives attachment to muscles; the anterior is pointed, and has extending from it, to the thyroid cartilage, a ligament, the *inferior thyro-arytenoid* ligaments. As these ligaments are the essential parts in the production of the voice, they are called the true *vocal cords*.

The *epiglottis* is a leaf-like cartilage which, during the act of swallowing, covers over the superior opening of the larynx. Ordinarily it projects upwards behind the base of the tongue. It is connected with the *thyroid* cartilage and with the tongue with fibrous tissue, covered by mucous membrane. Besides these cartilages, there are four other cartilages which are small and not so important. Two of these surmount the *arytenoid* cartilages, and are called the *cornicula laryngis*; the other two are placed between the arytenoid cartilages and the epiglottis, and situated in the fold of the mucous membrane which extends between these



Muscles of the L.—The muscles of the L. are [illegible] These are [illegible] between the cricoid and thyroid cartilages, [illegible] to depress the thyroid cartilage, and thus to increase the tension of the vocal cord. Laterally [illegible] to the external angle of the thyroid cartilage, on each side the *posterior crico-arytenoid muscles*. The action of the former is upwards, backwards, and outwards to the external angles of the thyroid cartilage, and of the latter backwards, each other, the arytenoid cartilages [illegible] movement of rotation, and also [illegible] the vocal cords, bearing the true vocal cord, [illegible] from the vocal process. Acting as antagonists to the [illegible], on each side, a muscle passing from the [illegible] forward, backward to be attached to the external angle of the thyroid cartilage. By pulling forward the external angle of the [illegible] approximate the anterior angles to each other. These are the *lateral crico-arytenoid muscles*. Passing between the arytenoid cartilages [illegible] the single muscle, the *arytenoid muscle*. This muscle draws the arytenoid cartilages [illegible] approximate the vocal [illegible] to the middle line. [illegible] part [illegible] the arytenoid cartilages [illegible] the arytenoid muscle [illegible] the thyroid cartilage [illegible] the thyroid cartilage [illegible] the thyroid cartilage

river to the southern markets. There is a good supply of bituminous coal in the vicinity. Pop. (1870) 5452.

Las'car, a name commonly applied to Oriental sailors on board British ships, more especially to Mohammedans from the neighbourhood of the Kutch and Gangetic delta. It is derived from a Persian word meaning 'army,' which, in Hindustani, came to be used of camp followers, and of the site of a stationary camp.

Lasca'ris, Constantine, a Greek grammarian, who, on the fall of Constantinople (1453), came to Italy, where he instructed Ippolita, daughter of Francesco Sforza, Duke of Milan, in the Greek language, composing for her his *Grammatica Græca* (Mil. 1476)—the first work printed in Greek. Quitting Milan, he lectured successively at Rome, Naples, and Messina, where he seems to have died at the close of the year 1493. To Messina he bequeathed a magnificent library, which was afterwards transferred to the Escurial.—**Andreas Johannes L.**, surnamed **Rhyndacenus**, because born on the banks of the Bithynian Rhyndacus (*circa* 1445), also came to Italy, and there found a patron in Lorenzo de' Medici, who twice despatched him to Greece to collect MSS. Returning from his second mission, L. found Lorenzo dead (1492), and thereupon betook himself to the court of Charles VIII. of France. Louis XII. sent him on two embassies to Venice (1503 and 1505), whence in 1513 Leo. X. called him to Rome to act as principal of a newly-founded Greek College, and as superintendent of the Greek press. In 1518 he revisited France, where François I. employed him, jointly with Budæus, in forming the Fontainebleau library, and in 1535 at the urgent request of Paul III. he returned to Rome, only to survive the toils of the journey by a few days. L.'s chief works are *Commentarii in septem Tragœdias Sophoclis* (Rome, 1518); *Orationes* (Frank. 1575); *Anthologia Epigrammatum Græcorum* (Flor. 1594), &c. See Villemain's *L., ou les Grecs du 15me Siècle* (Par. 1825).

Las Casas, Bartholomé de, the 'apostle of the Indians,' was born at Seville in 1474. He studied at Salamanca, and accompanied Columbus on his second, third, and fourth voyages to America. In 1502 he went to Hispaniola as a missionary, and was the first ordained priest in the New World. The shocking treatment by the colonists of the natives, induced him to sail to Spain in 1515 with an appeal to the crown. Cardinal Ximenes responded by sending out a commission of inquiry in 1517, which decided, however, in favour of the invaders. For many years, against much opposition, he continued to plead the cause of the Indians. He published in 1539 his celebrated *Brevissima Relacion de la Destruccion de las Indias*. In 1544 he was appointed Bishop of Chiapa, Mexico. He returned to Spain in 1551, and died in a convent at Madrid in July 1566. His MS. *Historia General de las Indias*, 3 vols., the fruit of forty years' labour, is in the royal archives at Madrid. Two vols. of his works, edited by Llorente, were published in Paris in 1822. His life was one of wonderful devotion. He was a heroic preacher of tolerance and Christian charity in a bigoted and persecuting age. See Arthur Helps' *Life of Las Casas* (Lond. 1868).

Las Cases, Emmanuel Augustin Dieudonné, Comte de, a French historian, was born at the Château of Las Cases, Languedoc, in 1766. In his youth he served in the navy, and being a royalist fled from France on the Revolution. After his return in 1809, when he gave his adherence to the empire, he filled several important offices of state under Napoleon. He was the companion of Napoleon during the first year of the latter's imprisonment at St. Helena, but was arrested on suspicion in November 1816, and confined at the Cape, and subsequently at Frankfurt. On Napoleon's death he was permitted to return to France, where he published his *Mémorial de Ste. Hélène* (8 vols. 1822–23), by which he is said to have gained £80,000. He also published an excellent *Atlas Historique* in 1803-4 (later ed. 1824–28), and an autobiography in 1819. He was elected to the Chamber of Deputies in 1831 and 1839. L. died at Passy-sur-Seine, May 15, 1842.

La Sere'na, the chief town of the province of Coquimbo, Chili, on the Coquimbo River, 6 miles from its mouth. It has a fine climate, and exports copper, gold, silver, &c. Pop. (1870) 7138. The port, at the river's mouth, is called Coquimbo.

Las Palmas, the chief town of the Canary Islands, is beautifully situated at the base of lofty hills on the N.E. coast of Gran Canaria. It is the seat of a bishop, and has a fine old cathedral, a supreme court, and industries in glass, leather, woollens, &c. Pop. 11,400.

Lass'a. See H'LASSA.

Lass'en, Christian, an eminent Orientalist, born at Bergen in Norway, 22d October 1800, after studying in Christiania, Heidelberg, Bonn, Paris, and London, settled at Bonn (1827), where he was Professor of Ancient Indian Languages and Literature from 1840 to his death, May 6, 1876. L. was first associated with A. W. Schlegel in his Sanskrit work, and afterwards with E. Burnouf in Pali. He has also thrown great light upon the cuneiform languages and the modern Iranian dialects. Among his numerous works, many of which were contributed to periodicals, the best-known is *Die Indische Alterthumskunde* (4 vols. Bonn, 1847–61; revised ed. of vols. i. and ii., 1861 and 1874), one of the best sources for early Indian history. Of his other important works the chief are his editions of the *Sānkhya-kārikā* (1832), *Gīta-govinda* (1836), also, in connection with A. W. Schlegel, of *Hitopadeśa* (1829–31), and, after Schlegel's death (1845), of *Bhagavad-gīta* anew (1846). With E. Burnouf he published *Essai sur le Pali* (1826), and in *Institutiones Linguæ Pracriticæ* (1837), he produced a work which is still the standard authority on the Prakrit of the dramas.

Lass'o (Sp. *lazo*), or **Lariat** (Sp. *la riata*), a long rope of plaited hide, having at one end a running noose, used by horsemen in the Pampas of S. America in catching wild animals. One extremity is attached to the saddle, and the noose-end is swung with marvellous precision over the head of the pursued animal.

Last Heir, in Scotch law, is the sovereign, who is entitled to the property, heritable and movable, of every one dying intestate without legal heir. See BASTARDY, DECLARATOR OF.

Laswa'ri, a village in the Rajput state of Alwar, Central India, 128 miles S. of Delhi, famous for the battle in which Lord Lake, in 1803, defeated the army of Scindia. This victory, in conjunction with that of Wellington at Assaye, broke the Mahratta power, and established the British in the N.W. of India. A commemorative medal was presented to the survivors in 1851. See *Wellesley Despatches* (ed. Oxon. 1877).

Lataki'a, or Ladikiy'eh, a seaport of Syria, 50 miles S. of Antioch. The small circular harbour of Scala or Marine, one mile distant, only admits vessels of 100 tons burden, and its entrance is contracted by the ruins of a fortress which was formerly connected with the mainland. 'L. tobacco' is largely cultivated in the neighbourhood, and the silk-culture and sponge-fisheries are also important industries. A triumphal arch of Septimius Severus and four Corinthian pillars are still standing. Pop. 6000, 1000 of whom are Christians. L. is the Phœnician *Ramantha*, the *Laodicea ad Mare* of Seleucus Nicator.

Lateen' Sail (Ital. *latina*, 'broad'), a triangular sail (chiefly used on Mediterranean small craft), with its upper edge fixed to a long spar at about an angle of 45° with the horizon.

Latent Fault. The rule of English law, extended to Scotland by 19 and 20 Vict. c. 60, is that in the contract of sale the buyer takes the risk of L. F.; that is, of defect unknown to the seller in the subject sold.

Lat'eran, Church of St. John (*S. Giovanni in Laterano*), the principal church in Rome, occupies the site of the palace of Plautius Lateranus, executed by Nero, A.D. 66. Constantine the Great granted this palace, in which he had fitted up a church, to Silvester I. It was overthrown by an earthquake (896), but rebuilt by Sergius III. (904–911); burned down (1308), but restored by Clement V., and decorated by Giotto; again destroyed by fire (1360), when the present edifice was erected by Urban IV. and Gregory XI. This has been altered or modernised by Martin V. (1430), Eugene V., Alexander VI., Pius IV. (1560), and the architects Borromini (1650) and Galilei (1734), the last of whom added the noble façade, from the central arcade of which the Pope, on Ascension Day, formerly blessed the entire world. Five œcumenical councils have been held in this church (see COUNCILS), which is known as

Lates [illegible]

Latex [illegible]

Latham, Robert Gordon [illegible] King's College, [illegible] was elected [illegible] medicine, [illegible] has attained [illegible] appeared in the [illegible] Norway and [illegible] works by him are [illegible] 1860); [illegible] (1847), *Descriptive Ethnology* [illegible] *Europe* 2 vols. [illegible] (1850), and *Johnson's Gazetteer* [illegible] L. is an able, if prejudiced, advocate of the [illegible] human race.

Lathe. See TURNING.

Laths are long, thin, [illegible] nailed to rafters of the walls of [illegible] also employed on roofs by slaters and tilers. [illegible] *at fair* denotes plasterers' work of two coats, the [illegible] smooth coat is applied to receive [illegible] called *lath priked up, floated, and set fair*.

Lathy'rus, a genus of climbing [illegible] *Leguminosæ*, commonly represented in countries of the northern hemisphere, and occurring also in S. America. The species number about 100, of which [illegible] Britain, the yellow vetchling *L. pratensis* and the tuberous [illegible] *macrorhizus* being the most frequent. The root of the last-named has been used for food in this country in the olden days of [illegible] scarcity, and so also has the seed of *L. tuberosus*. On the Continent *L. tuberosus* was formerly sought after, and indeed cultivated for its esculent tubers. *L. sativus* is extensively grown in S. Europe for its seed, which is prepared for food in the same way as the chick pea. Well-known garden plants belonging to the genus are the sweet pea (*L. odoratus*) and the everlasting pea (*L. latifolius*).



Lathyrus odoratus.

Lat'imer, Hugh, a notable English reformer, was born at Thurcastone in Leicestershire, about 1490. 'My father,' he says, 'was a yeoman, and had no lands of his own, only he had a farm of £3 or £4 by the year at the uttermost, and hereupon he tilled as much as kept half-a-dozen men.' L. studied at Padua and the University of Cambridge, and took holy orders, throwing himself with so much zest into the pursuit of the 'New Learning' as to seriously injure his health. Becoming alive to the errors in the doctrine and discipline of the Church of Rome, he entered into a vigorous crusade for reform. His plain speaking drew upon him the enmity of the Cambridge theologians, who induced the Bishop of Ely to

Latin Empire. See BYZANTINE EMPIRE.

Latin Language and Literature. [illegible] the [illegible] Italian [illegible] Latin existed [illegible] [illegible] [illegible]

which the digamma disappeared at an early date. In Latin, so, that agglutinative system which underlies all inflectional languages has often survived where it has disappeared from other Aryan languages, especially in the formation of its verbs, the inflections of which are based on the affixing of the verb of existence *fu-* to the crude verbal form. Thus *ama-bo* = *ama-fo* = 'I am coming into love' = 'I am about to love;' and *ama-vi* = *ama-fui* = 'I have come into love' = 'I have loved.' *Mecum* and *tecum* are as truly agglutinative in their character as the Turkish *benden*, 'me-from,' *senden*, 'thee-from,' and similar forms. The Latin tongue gradually spread from its original seat throughout the whole of Italy, and was carried by the victorious Romans into all the countries successively brought beneath their yoke. During this period, and increasingly as the language became more polished and refined, a marked difference subsisted between its spoken and its written forms, even in the mouths of highly-educated men, and necessarily in a much greater degree among the provincials and the country people. The L. L. reached its greatest perfection of structure, power, and genius in the Ciceronian and Augustan age. In the 6th c. B.C. it had become thoroughly corrupted by the admixture of foreign tongues, and exhibited the symptoms of disorganisation and decay. Classical Latin was the dialect of Latium, in Latium the dialect of Rome, at Rome the dialect of the Patricians. 'It was,' says Max Müller, 'the language of a restricted class, of a political party, of a literary set.' And we know that it must have changed greatly before their time, for Polybius says (iii. 22) that even highly-educated Romans could with difficulty interpret the ancient treaties with Carthage, and Quintilian (i. 6, 40) that the Salian priests could barely understand their sacred hymns. Once established as the language of literature and civilisation, the classical dialect became stationary and stagnant, brilliant and smooth, but, like an icebound river, cold and stiff. And as Hindustani is not the daughter of the Sanskrit of the Vedas—as, indeed, no literary dialect has ever been the mother of another language—so the sources of Italian and the other Romance languages must be sought for in the popular dialects of Italy, not in the classical literature of Rome (see ROMANCE LANGUAGES). That, as a living speech, was swept away in the convulsions of the falling empire, and in its stead arose the popular or vulgar dialects, which all along had formed a kind of undercurrent. *Cheval* from *caballus*, *feu* from *focus*, *fromage* from *formagium*, *malade* from *maleaptus*, these and dozens of the commonest words of every-day life in French, Italian, and the Rumanyo of Wallachia, bear living witness to the fact. See Burnouf, *Méthode pour étudier la Langue Latine* (Par. 1841); Donaldson, *Varronianus* (Lond. 1852); Bopp, *Vergleichende Grammatik* (2d ed. Berl. 1857–62); Max Müller, *Lectures on the Science of Language* 2 vols. Lond. 1862–64); Corssen, *Ueber Aussprache, Vocalismus, und Betonung der lateinischen Sprache* (2d ed. Leips. 1868–69); and Kegan Paul's translation of Baur's *Philological Introduction to Greek and Latin* (Lond. 1877).

Latin Literature.—That the art of writing was known at an early period at Rome, and that there were schools under the Tarquins for the instruction of the middle classes, we learn from the legend of Virginia (449 B.C.). But of a primeval literature we have but few existing specimens—some scanty fragments of the Fescennine Verses (q. v.), the Atellanæ (q. v.), the Litany of the Arval Brothers, of Salian and Saturnian verse, and ancient laws, chief among them the Twelve Tables (q. v.). In all of these the interest lies rather in the matter than in the form. The fathers of that L. L. that has come down to us were Greeks, and its commencement dates from the establishment at Rome of Livius Andronicus (q. v.), a Tarentine prisoner of war (272 B.C.). To his translation of the Odyssey succeeded the dramas of Nævius (q. v.), Plautus (q. v.), and Ennius (q. v.), all adaptations of Greek originals, in which the very scene was laid in Hellas. Pacuvius, Attius, Cæcilius Statius, and Terentius (q. v.) followed closely in the track of their foregoers; the first history of Rome was written in Greek by Fabius Pictor (*circa* 200 B.C.); and Cato (q. v.) alone can in any sense be called a truly national writer. The period from the death of Sulla to the end of the reign of Augustus (78 B.C. to 14 A.D.) forms the Golden or Augustan Age of L. L. The drama declines, and prose-writings, historical and philosophical, with epic and lyric poems, rivaling, sometimes almost transcending, their Hellenic models, take its place. The greatest names are, in prose, Varro (q. v.), Cicero (q. v.), Cæsar (q. v.), Sallust (q. v.), Cornelius Nepos (q. v.), Livy (q. v.), and Vitruvius (q. v.); in poetry, Lucretius (q. v.), Virgil (q. v.), Horace (q. v.), Tibullus (q. v.), Propertius (q. v.), and Ovid (q. v.). The Silver or Imperial Age (14–193 A.D.) is marked by epigrammatic histories, sparkling epigram, and loathing hopeless satires of vices before which the follies touched on by the earlier satirists are very purity. To it belong Velleius Paterculus (q. v.), Valerius Maximus, Seneca (q. v.), Columella (q. v.), Curtius (q. v.), the Elder and Younger Pliny (q. v.), Quintilian (q. v.), Frontinus (q. v.), Tacitus (q. v.), Suetonius (q. v.), Appuleius (q. v.), and Aulus Gellius (q. v.); and the poets Persius (q. v.), Lucan (q. v.), Silius Italicus, Valerius Flaccus (q. v.), Martial (q. v.), and Juvenal (q. v.). To these must be added the great jurists Gaius (q. v.), Papinian (q. v.), Paulus (q. v.), and Ulpian (q. v.), and the Latin Fathers (q. v.), partly belonging to the Silver, and partly to the Brazen Age (193–476 A.D.). The latter period also included Eutropius (q. v.), Ammianus Marcellinus (q. v.), and Macrobius (q. v.), with the poets Ausonius (q. v.), Prudentius (q. v.), and Claudian (q. v.), and closed with Cassiodorus (q. v.) and Boëthius (q. v.). Yet not even in the flood of barbaric invasion might the lamp of Roman learning be quenched. That lamp, snatched half-dying from Greece, fanned into fresh lustre, and handed on by seven centuries of writers, was still to illumine and be fed by unborn generations. Aquinas, Duns Scotus, and AKempis of Catholic, and Erasmus and Beza of Reformation times, stand forth among the ecclesiastical authors of post-classical Latinity, which numbers also historians from Beda to Camden, poets from St. Gregory to Milton, and scholars and commentators down to our own day. See Dunlop, *History of Roman Literature* (3 vols. Lond. 1824–28); Bähr, *Geschichte der röm. Literatur* (Karlsr. 1828); Munk, *Geschichte der röm. Lit.* (3 vols. Berl. 1858–61); Bernhardy, *Grundriss der röm. Lit.* (4th ed. Brunsw. 1865); Teuffel, *Geschichte der röm. Lit.* (Leips. 1870); Pierron, *Histoire de la Littérature romaine* (6th ed. Par. 1873); Professor Sellar, *The Roman Poets of the Republic* (Oxf. Clar. Press, 1863), and *The Roman Poets of the Augustan Age* (Oxf. 1877); and C. T. Crutwell, *History of Latin Literature* (Lond. 1878).

Lati'ni, the people of Latium, the name given by the Romans to a district of Central Italy, situated on the Tyrrhenian Sea, between Etruria and Campania. At first Latium included simply the southern part of the Tiber basin; but when the Hernicans, the Æquians, the Volscians, and the Aurnucans were merged with the Latins in the Roman Commonwealth, the name was extended to their territories. The L. were a mixed race, one branch being more closely related to the Greek or Pelasgic stock, and the other being akin to the Oscans, Sabines, and Umbrians. The L. first appear in history as a confederation of thirty cities, of which Alba was the head.

Lat'itude and Lon'gitude are the angular co-ordinates by which the position of a place upon the earth's surface is accurately determined. Assuming the earth to be a true sphere, it is obvious that the plane containing the poles and the given point passes through the centre of the earth, and intersects the surface in a great circle which cuts the equator at right angles in two points diametrically opposed to each other. This plane is called the *plane of the meridian*, and the great circle in which it intersects the surface the *meridian*. The angle at the centre, which is subtended by the portion of the meridian intercepted between the given point and the nearer point of intersection on the equator, is called the *latitude* of the point, so that the latitude is increased as the point is removed farther from the equator until it reaches either pole, where the latitude attains its maximum, 90°. According as the point is N. or S. of the equator the latitude is termed N. or S. latitude. The line which connects points having the same latitude is evidently a small circle on the sphere, lying in a plane parallel to the equatorial plane. Small circles drawn in this way are called *parallels* of latitude, or simply parallels. By knowing only the latitude we cannot thereby determine the position of the place, which may lie anywhere on the corresponding parallel: the other angular co-ordinate, the *longitude*, is necessary. The longitude may be defined as the angle which the meridian plane of the place makes with a fixed and arbitrarily chosen meridian plane, or, as the actual distance measured in degrees between the points where the equator cuts the meridian of the place and the zero meridian line. The meridian of Greenwich is the zero line used by the English and Americans, from which other longitudes

[illegible] of Prussian Silesia on the Queis [illegible] of Breslau in the last [illegible] Frederick the Great, besides [illegible] [illegible] [illegible]

rchbishop to the Tower, December 18, 1640. After lying ere three years, he was brought to trial, March 12, 1644, before ie House of Lords. The trial lasted twenty days, but the ommons, fearing to trust the issue to the verdict of the Peers r of a Middlesex jury, prepared a wholly unconstitutional bill f attainder, and he was beheaded on Tower Hill, January 10, 645. A 'ridiculous old bigot' is Macaulay's estimate of L., ut he was more than that. Waspish he was, harsh and violent speech and action, and childishly superstitious; but against iese defects must be set his personal unselfishness, munificence, nd encouragement of learning, his industry and marvellous apacity for administration. His very bigotry was an inheri- ance, for we must not forget that Whitgift, Bancroft, and bbot, had, under the Ecclesiastical Commission, founded in 583, wielded the self-same spiritual tyranny that brought their uccessor to the block. L.'s *Diary* was published in 1694, his *Works* during 1857–60, and the best life of him is that in vol. xi. f Hook's *Archbishops of Canterbury* (Lond. 1875).

Laud'anum. See OPIUM, MEDICINAL PREPARATIONS OF.

Lau'enburg, a former duchy in the N. of Germany, formally nnexed to Prussia by an Act of 28th June 1876. It is bounded y Holstein, Mecklenburg, Hanover, and Hamburg, has an area f 454 sq. miles, and a pop. (1871) of 49,651. Ratzeburg (pop. 4293) is the capital, and larger towns are Mölln and Lauenburg.

Laugh'ing Gas. See NITROGEN.

Launce, sometimes called 'sand-eel,' a *Teleostean* fish belonging to the *Malacopterygii* or 'soft-finned' section of the order. The *Ammodytes lancea*, the common species, inhabits the sand of the British coasts, and is dug in great quantities for food and bait. It attains a length of 6 or 7 inches. The colour is a delicate silvery white. The L. burrows swiftly in the sand by means of the projecting underjaw. No ventral fins are developed, and it is hence included in the section *Apoda*. The skin is thick and soft, the scales being rudimentary. No teeth exist, and both dorsal and anal fins are very long, the tail-fin being deeply forked. The 'sand-eel' proper or 'hornels' is the *A. tobianus*, of a brown colour, and attaining a length of 12 inches.

Launce'ston, a market-town of England, in the county of Cornwall, 18¾ miles N.W. of Tavistock by rail, on the Kensey, a tributary of the Tamar, has a fine 16th-c. church, a ruined Norman castle, two market-halls, a mechanics' institute, a grammar-school founded by Edward VI., &c. Its trade is chiefly agricultural. Pop. (1871) 2935. With Newport, L. returns one member to Parliament.

Launceston, the second town in Tasmania, is situated on the river Tamar, about 40 miles from its mouth. The streets are wide and straight, and are lighted with gas. The chief public buildings are the town hall and the Government offices. Several of its churches are fine edifices. L. carries on an active trade with Melbourne, with whose citizens it is in high favour as a place of summer resort. Pop. (1875) 11,000.

Launch, a strongly built boat, adapted for carrying heavy weights, and the largest attached to ships of war. Steam launches carrying one gun are found very serviceable in rivers and shallow waters.

Launch, the operation of sending a ship afloat. An inclined plane or 'launching way' of blocks and planking is laid down under each bilge, and is carried into the water sufficiently far to enable the stern of the ship to be water-borne before the stem leaves the 'ways.' A 'cradle,' consisting of 'bilge-ways,' 'poppets,' and other timbers, supports the ship after the removal of the keel-blocks and shores, and slides with her down the 'ways' into the water. The 'ways' have a gradient of about 1 foot in 11 feet. The day previous to the L. the sliding surfaces are well greased, and the keel blocks are removed, and when the moment of L. arrives the 'dogshores' are knocked away, the ship is christened, and with accelerating motion she glides into the water. The planks and 'cleats' bolted to the ship's bottom are subsequently removed in dock. Launching on the keel, that is with a sliding-way under the keel, is practised in the French navy.

Laura'ceæ, or the **Laurel Family,** is a large order of dicotyledonous trees, undershrubs, and herbs, principally natives of tropical Asia and America. Many are aromatic and fragrant, yielding volatile and fixed oils, others furnish camphor, and others have bitter and tonic barks. Some supply useful timber. The representative species is *Laurus nobilis*, and is the only one indigenous to Europe. (See LAUREL.) The most valuable plants of the order will be found mentioned under camphor, sassafras, cinnamon, cassia bark, green-heart, and avocado-pear. The cassytheæ or dodder laurels, which range under L., are curious leafless climbing parasitic plants.

Lau'reate, Poet, in England, an officer of the royal household. The name is derived from *laurus*, a 'bay,' from the ancient custom of crowning poets. The salary is £100, and an extra £27 in lieu of a tierce of canary, formerly allowed. The first P. L. on record is John Key, in the reign of Edward IV. Ben Jonson held the office under James I. Since Charles I. the succession of laureates has been John Dryden, Nahum Tate, Nicholas Rowe, Laurence Eusden, Colley Cibber, William Whitehead, Thomas Wharton, H. J. Pye, Robert Southey, William Wordsworth, and Alfred Tennyson.

Lau'rel. Under the name of L. several widely distinct plants are included by gardeners, *e.g.*, species of Cerasus, &c., but the noble, or victor's L., otherwise the sweet-bay (*Laurus nobilis*), is the only one to which the name rightly applies. It is a native of S. Europe, whence it has been long introduced into various more northern countries as a garden evergreen shrub. The leaves possess an agreeable, aromatic, slightly bitter taste, and are in consequence used in cookery for flavouring purposes. In ancient Greece the berry-bearing sprays of L. served to decorate the conquerors in battle and in the Olympic games.

Laurel-Water is prepared by distilling water over the bruised leaves of the cherry-laurel, *Cerasus laurocerasus*, and is occasionally employed in minute quantities as a flavouring agent in cooking instead of bay-leaf water. L.-W. contains hydrocyanic acid, and is a virulent poison.

Lauren'tian System, in Geology, is represented by the lowest recognisable sedimentary formation constituting the earth's crust. The name is derived from the river St. Lawrence in N. America, in the basin of which the rocks of this period, highly contorted and metamorphosed, attain their greatest development. There they have been worked out very fully by Logan and Dawson. They are anterior in time to the Cambrian rocks, and in this are comparable to the old gneiss which underlies the Lower Silurian in the Scottish Highlands. The Scottish gneiss has consequently been included by Murchison and Geikie in the Laurentian, even though contemporaneity is not, and cannot hope to be, established. In Scandinavia, Bohemia, and Bavaria, similar old gneiss formations have been referred to the Laurentian. Eozoön (q. v.) is the only known fossil.

Laurusti'nus, an evergreen shrub, a native of S. Europe, now common in several varieties in gardens, its permanent leaves and the early appearance of its corymbs of white or pinkish flowers rendering it a favourite. It is the *Viburnum Tinus* of botanists.

Laur'vik, a seaport town in Norway, 70 miles S.W. of Christiania, on a fjord of the same name at the mouth of the Numedalslaagen, which affords motive power to many manufactories. It has considerable trade, especially in timber, though much of its former importance has now been transferred to Horten, a seaport 37 miles N.N.E. In 1873, 694 vessels entered the harbour of L., which is large and deep. Pop. (1875) 6509.

Lausanne' (anc. *Lausonium*, or *Lovsana*), the chief town of the canton of Vaud in Switzerland, is very beautifully situated 1690 feet above the sea, on the slopes of Jura, about a mile from its port, Ouchy, formerly called Rive (Fr. 'shore'), on the N. shore of the Lac Léman, and 35 miles N.E. of Geneva by rail. The streets of the older portion are steep and narrow; but the extensive additions around this are well and regularly built. The quarters of St. François and St. Laurent are connected by a viaduct called the Grand Pont, or Pont Pichard. The Protestant cathedral, 353 feet long and 151 broad, completed in 1275, is a magnificent Gothic building, with a tower 250 feet high, and contains many fine monuments. L. has a scientific museum, a collection of paintings, a fine hospital, and an institution for the blind. The trade of L. is considerable. Its chief industries

are brewing, lithographing, and the spinning of cotton and wool. Its schools are numerous and good. At L., Gibbon composed the most of his great work. Pop. (1870) 26,520.

La'va (It. 'what *flows like water*'), includes all the products of a volcano which are or have been ejected in a molten condition. The L., as it issues from the crater or some lateral orifice, flows down the slope as a *coulée* or stream. The surface exposed to the air soon cools and hardens, while inside the mass may long remain glowing, in virtue of the bad conductivity of the rock for heat. Near the surface of cooled L., where the cooling has been rapid, the structure is vesicular; but this character soon disappears as we get below the surface, where gradual cooling has resulted in the formation of a hard, compact stone, often columnar and crystalline. All our traps, basalts, trachytes, &c., were no doubt at one time molten rock, precisely analogous to the lavas of Vesuvius, Etna, and Skaptar Jokull.

Laval', the chief town of the department of Mayenne, France, on the river Mayenne, 13 miles W. of Le Mans by rail. It is a quaint town, and with a château of the former dukes of L. and La Trémouille, now a prison, an old church of the Trinity, and another of St Vénérand, dating from the 15th c. The celebrated linen called *toiles de L.*, chiefly tablecloths and napkins, has been produced here for nearly 600 years, and is sold to the value of £20,000 at each of the monthly markets. Other industrial products are cottons, paper, leather, and pottery. Pop. (1872) 22,892. The Vendeans gained a great victory over the Republicans near L., 25th October 1793.

La Valett'a. See VALETTA, LA.

La Vallière, Françoise Louise de la Baume le Blanc, Duchesse de, born at Tours 1644, lost her father, the governor of Château d'Amboise, in early life, and was taken to court by her mother. Being appointed maid-of-honour to the sister-in-law of Louis XIV. she came much in contact with the king, whose mistress she was for several years. After 1662 she bore him four children, but his affection towards her cooled when the star of Mme. de Montespan had risen. It was in these years of royal neglect that she is supposed to have written *Réflexions sur la Miséricorde de Dieu, par une Dame Pénitente*, though they were not published until 1680 (new edit. by Cornut in 1854, with Bossuet's corrections on copy, dated 1688). Contemporary testimony, female as well as male, proves that, notwithstanding her relationship to the king, L. was a woman of genuine modesty. Indeed, her charms were rather those of grace, agreeableness, and sincerity, than remarkable beauty of person. In 1674 she bade adieu to the king, who had been indifferent to her, entered a Carmelite nunnery, where, having become 'the example and idol of the community,' she died, June 6, 1710. See Abbé Lequeux, *Vie de Madame de L.*; and Roissy, *Hist. de Madame de L., Duchesse et Carmélite.*

Lav'ater, Johann Kaspar, a Swiss divine and physiognomist, born November 15, 1741, at Zürich, early showed a taste for painting and enthusiasm for religion. Having taken orders in 1762, he became (1769) a pastor at Zürich, where he devoted much time to portrait-painting, and gradually came to believe the human face to be a perfect index of the character. To prove this, L. collected from all sides portraits of eminent persons, and afterwards published his famous *Physiognomische Fragmente* (4 vols. 1775-78). At the same time he attacked with great force the rationalism of his time, giving in *Pontius Pilatus* (1782-85) a confession of his faith that cost him many friends. Men wrapped in mystery, like Cagliostro or Mesmer, had a special attraction for L. When Switzerland was seized by the French Republic, he boldly rebuked the oppressors, and was imprisoned by them in 1799. In a few months he regained his liberty, but was shot at Zürich, 26th September 1799, when that town was taken by Masséna, and died of the wound January 2, 1801. L.'s other chief works were *Schweizerlieder* (1767), *Aussichten in die Ewigkeit* (1769-73), and *Tagebuch* (1772). He himself published 2 vols. of *Vermischte Schriften* (Winterthur, 1774-81), and, in 3 vols., *Sämmtliche Kleine Prosaische Schriften* (*Ib.* 1784-85); Gessner, *L.'s nachgelassene Schriften* (5 vols. Zür. 1801-2); and Orelli, *L.'s Ausgewählte Schriften* (8 vols. *Ib.* 1841-44). L.'s writings show true genius, but want art. In his own day he was greatly admired by some, but to others was as much an object of contempt and scorn. See Bodemann, *L. nach seinem Leben, Lehren, und Wirken dargestellt* (Gotha, 1856).

Lavaur', an old town of France in the department of Tarn on the river Agout, 20 miles N.E. of Toulouse. It has a cathedral of St. Cécile of Albi, and the river is here crossed by a grand stone bridge of the 18th c. Pop. (1872) 4485.

Lav'ender, the popular name for a species of *Lavandula*, a genus belonging to *Labiatæ*. The common L. (*L. vera*), a native of S. Europe, is frequently seen in old-fashioned gardens, and is further largely cultivated for the sake of its agreeable perfume, and for the oil on which this property depends. When the oil is dissolved in spirits of wine and mixed with other perfumes it forms the much appreciated L.-water. It is also sometimes administered medicinally as a stimulant and carminative, but is inferior to other preparations, such as peppermint. Broad-leaved L. (*L. spica*) yields oil-of-spike, an ingredient in the preparation of artists' varnishes, and used also by painters on porcelain. Other species are cultivated in greenhouses. The word L. is traced to the Latin *lavare*, 'to wash,' as being a plant used to scent newly-washed linen (whence the expression 'laid up in lavender'), or from its being employed to perfume the baths.

Medical Properties of L.—The oil of L. is an aromatic stimulant and carminative, useful in hysteria, hypochondriasis, and other nervous affections, but is principally used as an adjunct to other medicines. Spirit of L. is given in doses of from ½ to 60 minims, and the compound tincture of L. in doses of from ½ to 2 drachms.

La Ville'marqué. See VILLEMARQUÉ.

Lavois'ier, Antoine Laurent, a celebrated French chemist, was born at Paris, August 16, 1743. In order to obtain sufficient means to carry on his scientific experiments, he sought and obtained in 1768 the post of farmer-general. In 1779 he was chosen Director of the Royal Powder and Saltpetre Works, and in 1791 was appointed to the Commission for considering new weights and measures. His great fame rests upon his discoveries in chemistry, which completely overthrew the then universally accepted phlogiston theory, and established the modern theory (see CHEMISTRY). His pre-eminent merits as a scientist did not save him from the dangers of the Revolution, and he fell a victim to the guillotine on May 8, 1794. L.'s chief works are *Traité Élémentaire de Chimie* (2 vols. 1789; 3d ed. 1801); *Opuscules Physique et Chimiques* (1774, 2d ed. 1801), and *Mémoires de Chimie*, published by his widow in 1805. See Volhard's *Biographie de L.* (1870).

Law (Heb. *Thorah*, Gr. *nomos*, 'custom'), in the Scriptures uniformly means a manifestation of the will of God, which is represented as the ultimate foundation of moral obligation. L. is thus equivalent to a rule of conduct, however revealed, but is applied more particularly to the Scriptures, which contain the revealed will of God as a rule of faith and practice, and more especially still to the L. of Moses or the Pentateuch. As opposed to the Gospel, L. means all the positive precepts of revelation, and consists of two parts:—the Jewish ceremonial L., which Christian theologians regard as having been abrogated by the Gospel, and the moral L., which is of perpetual obligation. It is maintained by Protestant theologians that the moral L. contained in the Scriptures is perfect, inasmuch as (1) everything that the Bible pronounces to be wrong is wrong, and everything it declares to be right is right; (2) nothing is sinful which the Bible does not condemn, and nothing is obligatory on the conscience which it does not enjoin; and (3) the Scriptures are thus a complete rule of duty, so that there is and can be no higher standard of moral excellence. See Hodge's *Systemat. Theology* (Edinb. 1873).

Law, the term especially applied to the system of rules by which the inhabitants of a country are associated, by which their conduct to one another is regulated, and their rights and interests in property ascertained. The *L. of Nations* regulates the intercourse of one nation with another (see INTERNATIONAL LAW). It is a partly written and partly unwritten L.; the first depending on treaties, the second on reason and on the usages of the various civilised nations. By those, the rights of the respective nations in peace and in war are regulated. The Municipal L. of a country is divided into the *civil* and the *criminal*—the

former regulating the rights and interests of individuals in private property, the latter prescribing a rule of conduct to each individual in relation to others, with penalties for infringement of these rules. The term *Civil L.* is also specially applied to Roman L. (See CODE.) This L., which was at one time that of the Continent of Europe, has materially influenced the jurisprudence of every modern European state. England has adopted less from it than any other country. Scotland has followed it closely. In many respects that country has wholly adopted it. See COMMON L. EQUITY.

Law, John, a famous financier and speculator, the son of a goldsmith, was born in Edinburgh, 21st April 1671. In his youth he showed great arithmetical talent. Handsome and accomplished, he combined pleasure and study in an extraordinary way. Having to leave the country in 1694, after killing an opponent in a duel, he wandered about Italy, where he gained a livelihood by gambling, and planned gigantic financial schemes. He settled in Paris in 1714, when he was worth over £100,000. Two years later he started a private bank with great success. His monetary visions captivated the Regent, who established the 'Royal Bank of France' in 1718, with L. as Director-General. In 1719 he floated the great bubble Mississippi Scheme, and became Comptroller-General of France, and one of the greatest personages in Europe. On its failure next year he fled to Brussels. He died in indigence at Venice, March 21, 1729. See J. P. Wood's *Life of L.* (1824), and Thiers' *L. et son Système de Finances* (Par. 1826; new ed. 1858).

Law, William, an English divine, was born at Kingscliffe, Northamptonshire, in 1686, and educated at Emmanuel College, Cambridge. He forfeited a fellowship by a refusal to take new oaths on the accession of George I. He was for ten years tutor in the family of Mr. Gibbon, father of the historian, and afterwards lived with Mrs. Hutcheson and Miss Hester Gibbon, the three devoting their combined incomes to charitable purposes. His *Serious Call to a Devout and Holy Life*, and other writings, teach a severe and steadfast piety, and gave no small impetus to the Evangelical revival. He died April 9, 1761. His collected works were published in 9 vols. in 1762. See his *Life*, by R. Tighe (1813), and *Notes and Materials for his Life*, printed for the Theosophian Library, 1856.

Law'burrows, in Scotch law, are writings or letters, in the name of the sovereign, commanding a person to find security against using violence towards another. Any one taking out L. against another, incurs risk of an action for damage, which will be awarded if malice be proved. The corresponding term of English law is *Articles of the Peace.*

Law of Nations. See INTERNATIONAL LAW.

Law'rence, a city of Massachusetts, U.S., on the Merrimack River, 26 miles N.W. of Boston by rail. It has twenty-one churches, a city hall, a court house, a public library of 14,000 vols., two dailys, four weekly newspapers, and a fine common of 17 acres, enclosing a miniature lake. The chief works are the Pacific cotton-mills (capital £500,000), with 5000 employés, the Atlantic mills, with 1400, and the Washington, with 2900. There are also large duck, woollen, and paper mills, steam-engine works, &c. Water-power is supplied by a dam of solid granite, 900 feet long and 40 high, thrown across the rapids in 1845. A canal, 90 feet wide and 1¼ miles long, leads off the water; another canal on the opposite side of the river has been constructed recently. L. was incorporated as a town in 1847, and as a city in 1853. Pop. (1870), 28,921.

Lawrence, the second city in Kansas, U.S., on both sides of the Kansas river, 38 miles S.W. of Leavenworth by rail. It is a railway junction, and the seat of the State university, and has a great trade in pork, packing, iron-founding, flour-milling, and manufactures of woollens and machinery. Pop. (1870) 8320. It was burned in the Quantrell raid in 1863, but has since been rebuilt, and is one of the finest of western cities.

Lawrence, the name of a family sprung from the N. of Ireland, and illustrious in the annals of British administration in India. Four sons of Colonel L., who himself led a storming party at Seringapatam in 1799, entered the Indian army, and one the civil service.—**Sir Henry Montgomery L.** was born at Muturah in Ceylon, 28th June 1806, and after passing through Addiscombe, joined the Bengal Artillery in 1822. After working some years as Revenue Surveyor in Goruckpore, he commanded the Sikh Contingent during the second Afghan invasion of 1842. Afterwards he was resident at the Court of Nepaul, from which time date his frequent contributions to the newly-founded *Calcutta Review.* He took part, as chief political officer in the first Sikh war of 1846; and from henceforth till 1853 his name is intimately associated with the Punjaub, where he laid the foundations of a model government, first as Resident at Lahore, and afterwards as President of the Board. In 1853 he was removed to Rajputana, and in 1857 he was appointed chief commissioner in Oude. Here he was overtaken by the Mutiny, a catastrophe which he had himself anticipated, and which was stimulated by a policy towards native states and native gentlemen which he had always opposed. On 30th May 1857 the Sepoys at Lucknow mutinied, but the foresight of Sir H. L. had secured the residency quarter of the city. On 30th June he was induced to lead a disastrous reconnaissance to Chinhut. On the following day the residency was besieged, and Sir H. L. was mortally wounded by one of the first shells fired during the siege. He died on the 4th of July. He had been nominated as Governor-General of India, in provisional succession to Lord Canning, and than his death there could have been no greater loss. He has a monument in St. Paul's Cathedral, and a statue was unveiled at Calcutta in December 1875; but his grandest monument is the L. Asylums for children of European soldiers in the hill stations of India, which he founded at his own expense, and which were completed by public subscriptions, and have now been taken over by Government. See *Life of Sir H. L.*, by Sir H. Edwardes and H. Merivale (Lond. 1872).—**Sir John Laird-Mair L.** (now Lord L.) was born 4th March 1811, in Yorkshire, and went to India in the Bengal Civil Service in 1829. In 1849 he was selected as one of the three members of the Lahore Board of Administration for the Punjaub, of which his brother Henry was President; and in 1853 he became Chief Commissioner of that province, where he developed a unique system of administration. Here he successfully weathered the Mutiny, and was not only able to disarm the Sepoys, and maintain order in the Punjaub, but also to send down a succession of reinforcements, which determined the issue of the Delhi siege, and indirectly the fate of India. From 1863 to 1868 he was Governor-General of India, and received a peerage on his return to England. His term of office was marked by troubles with the Mohammedans on the N.W. frontier, the Bhutan war, and the terrible Orissa famine. Lord L. was the first Chairman of the London School Board.—**Sir George L.** was born in 1805, and entered the Bengal Cavalry. He also attached himself to the political department. He was for some years military secretary at Cabul, and afterwards Commissioner of Peshawur. In both capacities it was his misfortune to be taken prisoner, in 1842, and again in 1848. He succeeded his brother Henry as Political Agent in Rajputana in 1857, and has written a book on the events which occurred there during the Mutiny.

Lawrence, Sir Thomas, an English portrait painter, was born at Bristol, May 4, 1769, but spent his childhood at Devizes, where his father became a hotel-keeper. He only received two years' schooling, but early showed an extraordinary facility with his pencil. He was placed under an excellent master at Bath in 1782, in which year he won the silver plate of the Society of Arts for a copy in crayon of the 'Transfiguration.' In 1787 he removed to London, and exhibited at Somerset House. In 1791 he was elected an associate of the Royal Academy, and succeeded Sir J. Reynolds as principal painter to the king. He was knighted in 1815 by the Prince Regent, at whose request he visited foreign courts to paint the series of crowned heads, statesmen, and soldiers forming the Waterloo Gallery at Windsor. He became P.R.A. in 1820, and died January 7, 1830. L. was a fine colourist and skilful draughtsman. His pictures of beautiful women and children are instinct with grace and refinement. Those of the Kemble Family are historical. See his *Life and Correspondence*, by D. E. Williams (3 vols. Lond. 1831), and a *Collection of Engravings* of fifty of his pictures (Lond. 1845).

Lawrence, St., born at Rome in the early part of the 3d c., was one of the seven archdeacons of that city in the reign of Valerian (253–260) and the pontificate of Sixtus II. Summoned by the præfect to render up the treasures of the Church, L. collected all the sick and aged, the widows and orphans of his

[illegible], and presenting them, 'Behold,' he said, 'the treasures [illegible]!' For this act of defiance he was broiled [illegible] 258, and the church of St. Lorenzo [illegible] to make his burial-place. The Escorial [illegible], and other towns and structures dedicated to [illegible] are built in the form of a gridiron.

Lawrence, St., the great boundary river between the United States and Canada, and, together with the great lakes, the most important system of inland navigation in the world. It rises [illegible] W. of Lake Superior, under the name of the St. Louis. It has a course of 190 miles before entering the lake, from which it flows through the rapids of St. Marie. The [illegible] by the rapids has been overcome by the construction of a canal in the state of Michigan. Lake Huron, the second of the great series, after receiving Lake Michigan from the S.W., discharges its waters by the St. Clair into Lake Erie. The river Niagara (q. v.) connects Lake Erie with Lake Ontario, and has a descent of 230 feet at the famous falls. On the Canadian side the Welland Canal conducts the navigation interrupted by the falls and the rapids. From Lake Ontario the St. Lawrence proper flows almost directly N.E., gradually expanding into a wide estuary below Quebec, receiving the Ottawa above Montreal, containing many small islands, and entering the gulf of the same name after a course of 700 miles. Some 30 miles above the entrance of the Ottawa, the St. Lawrence becomes a purely Canadian river. Its chief tributaries beside the Ottawa, are from the N. the St. Maurice and the Saguenay, and from the S. the Sorel, which drains Champlain Lake. Beyond Montreal navigation is impeded by rapids and cataracts, but vessels can proceed by means of various canals and cuttings on the Canadian side. To the N. of Quebec the river is frozen over for about five months. The system of canals extends the navigation of the St. Lawrence and the lakes to a distance of over 2200 miles.—**Gulf of St. Lawrence**, an inlet of the Atlantic, is enclosed W. by New Brunswick, N. by the Canadian district of Labrador, and S. by Nova Scotia. It communicates with the Atlantic by a passage 120 miles wide between Newfoundland and Cape Breton, by the Strait of Belle Isle to the N. of Newfoundland, and by the Gut of Canso to the S. of Cape Breton. Within the gulf are Anticosti, Prince Edward's, St. Paul's, and many smaller islands, which are more or less dangerous to shipping on account of the dense fogs and shifting currents. The fisheries of the gulf are very productive.

Laws of England. See COMMON LAW; EQUITY; COLONIES, LAWS OF ENGLAND AFFECTING.

Laws of Probability. See PROBABILITY, LAWS OF.

Law Terms, in England are Hilary, 11th January to 31st January; Easter, 15th April to 8th May; Trinity, 22d May to 12th June; Michaelmas, 2d November to 25th November. These are the periods of sitting in full court. In Scotland the Court of Session sits from 15th October to 20th March, and from 12th May to 18th July. See under BILL, *Bill Chamber*.

Law'yer. English law, see BARRISTER, ATTORNEY; Scotch law, see ADVOCATE, WRITER TO THE SIGNET.

Lay'amon, or **Law'eman**, author of a poem called the *Brut*, was a priest of Ernely, now known as Arley Regis or Lower Arley, on the W. bank of the Severn in Worcestershire. From a passage towards the close of the work, it has been inferred that he wrote in the first decade of the 13th c. Absolutely nothing, however, is known of his character or life. English scholars had long been aware of the existence of the poem, but had strangely neglected to examine it. It is merely mentioned by Warton and Tyrwhitt. George Ellis in his *Specimens of the Early English Poets* (1790) first introduced it to the notice of the public, and hazarded the prediction that it would never be printed. Subsequently, Mr. Guest in his *History of English Rhythms* gave a longer extract, with a literal version and careful annotations, and in 1847 the whole work was edited by Sir Frederick Madden in 3 vols., containing two texts separated apparently by an interval of fifty years, a translation, and a glossary. The subject matter of the *Brut* was not new. It had been handled twice, if not thrice before;—by Geoffrey of Monmouth in his *Historia Brittonum* (professedly a translation into Latin of an Armoric original, the *Brut-y-Brenhyned*), and again by the French poet Wace in his *Brut d'Angleterre*, but L. was the first who presented the legend or myth of a Trojan conquest and colonisation of Britain in an English dress. While [illegible] founded on Wace, the native version has many additions [illegible] from other sources or invented by the author himself. Its literary merit is not inconsiderable, but its great value is linguistic. The *Brut* of L. is the most important specimen of the first stage of 'Transition English' that survives. In its pages we see our language, as it were, in the very act of casting off its [illegible] grammatical forms, and assuming those that are familiar to readers of Chaucer. Sir Frederick Madden notes as peculiarities of L. 'the use of *a* as an article; the change of the Anglo-Saxon terminations *a* and *an* into *e* and *en*, as well as the disregard of inflexions and genders; the masculine forms given to neuter nouns in the plural; the neglect of the feminine terminations of adjectives and pronouns, and confusion between the definite and indefinite declensions; the introduction of the preposition *to* before infinitives; . . . the constant occurrence of *for* for *on* in the plurals of verbs, and frequent elision of the final *n*. Though chiefly translated from the work of a French trouvère, the language hardly shows a trace of the influence of a French vocabulary. In 56,800 lines (including both texts) there are not more than ninety French words, an unanswerable argument in favour of the opinion that the Norman Conquest did not immediately, nor for a long time, produce any serious change in the speech of the English people.

Lay'ard, Austen Henry, an English traveller, statesman, and diplomatist, was born in Paris in 1817. He spent his youth in travel, and after mastering many European languages, acquired great proficiency in those of the East. In 1845-47 he conducted the celebrated excavations at Nimrud, a village on the Tigris, resulting in the discovery of the magnificent Assyrian remains now in the British Museum. Two years later he undertook a second journey of exploration to Asia Minor. He was attached to the Porte in 1849, and Under Secretary for Foreign Affairs for a few weeks in 1852, visited the Crimea in 1854, and on his return took a leading part in the investigation of the conduct of the war. He was elected Lord Rector of Aberdeen University in 1850, visited India in 1858, and was Under Foreign Secretary for a second time, 1861-66, President of the Board of Works 1868, and Ambassador at Madrid, 1869-77. Immediately before the outbreak of war between Russia and Turkey, April 1877, he was selected to succeed Sir Henry Elliot in the important post of Ambassador to the Porte. L. has published *Nineveh and its Remains* (1849), *The Monuments of Nineveh*, with Inscriptions (1849, 2d series, 1853), *Popular Account of Discoveries at Nineveh* (1851), *Discoveries in the Ruins of Nineveh and Babylon* (1853, abridgement, 1867), *Speeches on the Turkish Question* (1853-54), *Letters on Communication with India* (1859), *Speech on the Danish Question* (1864), &c.

Lay'ering, in gardening, a method of propagating plants from *layers*, or young shoots which have a tendency to send out roots. To facilitate this, an oblique slit is made just above the bud, and the shoot being covered slightly with mould, it is left for some weeks. When the roots have struck, the layer is cut off from the parent stem and transplanted.

Laz'ulite, a mineral composed essentially of phosphate of alumina, with traces of magnesia, silica, and ferrous oxide. It has a fine azure colour, with a vitreous lustre. L. occurs in veins of clay slate at Salzberg, in Styria, N. Carolina, and other places.

Lazzaro'ni, a nickname still often applied to the red-capped and barelegged boatmen, fishermen, porters, &c., of Naples, and which arose during the Spanish viceroyship, when an epidemic identified with the sickness of Lazarus in the parable, raged among the lower orders of that city. In the 17th and 18th centuries the L. really formed a distinct caste of idle, picturesque outcasts, caring for nothing beyond sunshine and maccaroni, and happy in their ignorance of higher wants. They had their recognised chief (*Capo Lazzaro*), and played an important part in many of the popular movements, notably in the rising of Masaniello (1647). No such days any longer exist, the modern Neapolitan populace being remarkable alike for industry and frugality.

Lead (symbol, Pb; atomic weight, 207) is a bluish-grey metal, characterised chiefly by its softness and fusibility. Though soft, it lacks tenacity, and can be drawn into thin wire only with difficulty. It melts at 325° C., and boils and volatilises at the

temperature of white heat. A freshly-cut surface speedily tarnishes, and, when melted, the metal is rapidly oxidised. At high temperatures, however, the oxide coating melts, and protects the molten metal from further oxidation. When slowly cooled, L. crystallises in octohedra. Its specific gravity is 11.4; and this high specific gravity, taken in conjunction with the softness and easy fusibility of the metal, peculiarly adapts L. for the manufacture of shot and bullets. The mineral Galena (q. v.) is the chief source of L.; but the native metal is itself occasionally met with in small quantity, while the carbonate of L., or *white lead ore*, forms an important ore in the United States and in Spain. Galena is essentially a sulphide, with the composition PbS, and is frequently associated with zinc sulphide (blende), copper pyrites, quartz, fluor spar, &c., and sometimes considerable quantities of the sulphides of silver, bismuth, and antimony are present. The metal is extracted from the ore by the following series of processes. The ore is purified mechanically as far as possible, and then spread over the hearth of a reverberatory furnace, being at the same time mixed with a small proportion of lime. Here it is roasted, with a full supply of air to render the necessary oxidation sure. Part of the sulphide is transformed into the sulphate; another portion loses sulphur, and absorbing oxygen becomes the oxide, sulphurous acid being at the same time evolved. When the roasting has sufficiently advanced, the temperature of the furnace is raised till the oxide and sulphate act each upon the unaltered sulphide which remains, furnishing the metal and giving off sulphurous acid. The metal flows into the hollow of the furnace, and is covered by the fused slag, which consists chiefly of the silicates of lime and L.-oxide. By the addition of a little more lime and a small quantity of coal, more L. is separated out, the proportion of silicate of lime in the slag is increased, and the slag thereby rendered less fusible. The melted L. is then allowed to run out into an iron basin, from which it is ladled into pig-moulds. L. prepared in this way frequently contains a considerable quantity of silver, which, if present in the proportion of three ounces or more to the ton, is readily separated by Pattinson's *desilverising process* or by the zinc process (see SILVER). L. forms four compounds with oxygen; the sub-oxide (Pb_2O), the oxide (PbO), the red oxide (Pb_3O_4), and the peroxide (PbO_2). The first is believed to be the compound formed when the bright surface of newly cut L. tarnishes in the air. The *oxide* is produced when the metal is heated in the air; but its appearance varies with the manner in which the metal is heated. Thus, at a moderate temperature it takes the form of a yellow amorphous powder known in commerce as *massicot;* but if the heat be sufficient to fuse the oxide, the compound on cooling assumes a brown scaly appearance, and is then known as *litharge*. When heated to dull redness and cooled, litharge becomes yellow. The oxide of L. is a powerful base, and tends to form basic salts. It dissolves readily in hot solutions of potash and soda, and is deposited as pink crystals on cooling. The *red oxide*, otherwise known as *red L.* or *minium*, is prepared by heating massicot in the air to about 320° C. It is largely used in the manufacture of flint-glass and lucifer matches, and is employed as a pigment. The *peroxide* occurs naturally as *heavy L. ore*. It may be prepared by boiling finely powdered red L. in diluted nitric acid. It parts readily with oxygen to other substances, is insoluble in dilute acids, and has no basic properties. It is sometimes called plumbic acid, and is believed to form plumbates with potash and soda.

The most important of all L. salts which have the oxide as their base is the well known *white L.* It is a basic carbonate, being a combination of the carbonate ($PbCO_3$) and the hydrated oxide (PbO,H_2O), and having a composition usually formulated as PbO,H_2O, $2(PbCO_4)$, though generally other basic carbonates are present. It is always formed when the metal corrodes under the influence of air and water, and its production is encouraged by the presence of decaying vegetable matter evolving carbonic acid. It may be manufactured on a large scale in two ways, the more modern of which consists in boiling acetic acid with litharge, and thus forming the tribasic acetate of L., ($Pb(C_2H_3O_2)_2,2PbO$), which is then subjected to a current of carbonic acid, and decomposed into the carbonate of L. and the neutral acetate. The acetate is now treated as the acetic acid was at first, with a similar production of the tribasic salt, and the carbonate again precipitated by carbonic acid. The carbonate carries down with it a variable quantity of the oxide, and the resulting compound is white L. The carbonic acid may be supplied by combustion or fermentation, or even by exhalation from the earth. The older or Dutch method consists in subjecting metallic lead to the action of acetic acid (obtained from common vinegar) in the presence of dung, spent tan, or such organic matter in a state of fermentation, and thus forming the oxide, which unites with the acid to produce the tribasic acetate. This compound is decomposed by the carbonic acid evolved from the fermentation, and white lead is obtained as a coating on the metal. White L. is largely used as a white paint, but it has the great disadvantage of being extremely poisonous, and those who work much with it invariably bear symptoms of poisoning. The pure carbonate is found usually associated with galena. Sulphate of L. occurs in nature as *anglesite*, or L.-vitriol, quantities of which are imported from Australia for smelting purposes. Chromate of L. ($PbCrO_4$), or chrome yellow, is prepared by mixing dilute solutions of acetate, or sugar of lead and chromate of potash. The rare *red L. ore* of Siberia consists principally of this compound. The basic chromate ($2PbO,CrO_3$), or orange chrome, is obtained by boiling the yellow chromate with lime. L. forms only one pure chloride ($PbCl_2$), corresponding to litharge in constitution. It is one of the few chlorides which are not readily soluble in water, and is precipitated from a solution of L. upon addition of hydrogen chloride (HCl), or other soluble chloride. The oxychloride ($PbCl_2,PbO$), formed by heating the chloride in air, is sometimes used as a substitute for white L. in painting. If litharge be heated with sal-ammoniac, *Turner's yellow*, another oxychloride, with composition $PbCl_27PbO$, results. Iodide of L. (PbI_2) is prepared by treating a solution of the nitrate or acetate of lead with iodide of potassium. It appears as a bright yellow precipitate, which may be dissolved in boiling water, and reprecipitated in golden scales. There are at least three sulphides of L.: the subsulphide (Pb_2S) produced during the smelting of galena, the sulphide (PbS), and the persulphide. The composition of the last, which is obtained as a red precipitate from the action of a sulphur saturated alkaline sulphide upon a solution of L., has not been ascertained, but it is probably PbS_5. The sulphide always results as a black precipitate when a solution of a L. salt is treated with sulphuretted hydrogen.

Medicinal Preparations and Properties of L.—The preparations of L. used in medicine are the acetate, the sub-acetate, the carbonate, the iodide, the nitrate, and the oxide. The *acetate* of L., or *sugar* of L., is sedative and astringent, diminishing morbid mucous discharges and hemorrhages. It is administered in phthisis to check expectoration; in bronchitis to abate profuse secretion, and in chronic diarrhœa and dysentery. Externally, *acetate* of L. is applied as a sedative, desiccant, and astringent, and also for injection in gonorrhœa. The preparations of *acetate* of L. are the L. and opium pill, the ointment, the lotion, the suppository and pessary. The *subacetate* of L., or *liquor plumbi diacetatis*, is a dense, clear, colourless liquid, with alkaline reaction and sweet astringent taste. It is used externally as an astringent and sedative in sprains, bruises, &c., and is applied by means of cloths kept wet. The *carbonate* of L. is applied externally in powder, or as an ointment, for ulcers and inflamed and excoriated surfaces. *Nitrate* of L. is used in the preparation of the *iodide*, which is applied externally as an alterative and discutient in the form of ointment and emplastrum. *Oxide* of L., or *lithargyrum*, is used for external application only, to allay inflammation, and chiefly in the form of emplastrum.

Lead-Poisoning may be caused by the long-continued and injudicious use of L. as a medicine; by the absorption of the salts of L. contained in solution in drinking water, or in various foods and drinks, from adulteration; or from their having been prepared in vessels of L.; by absorption through the integuments of those who are in the habit of handling the soluble salts of L.; or through the lungs of those exposed to vapours containing L. The L., being absorbed, is diffused through the entire body, and accumulates in the spleen, the liver, the lungs, the kidneys, the heart, and the intestines, producing a peculiarly painful affection of the alimentary canal, called Colic (q. v.), or *colica pictonum* and *painter's colic*, and very frequently affecting the muscles of the extremities, causing palsy or *wrist-drop;* and, finally, ulceration of the gums and alveolar processes, accompanied by a peculiar blue line along the free margin of the gums, but absent where a tooth or stump is wanting. The excitability of the muscles is always much diminished in para-

lysis from L.-P., while it is normal in spontaneous paralysis, so that the nature of the affection may be determined by the stimulus of Faradisation. *Treatment*:—The object to be attained is the elimination of the poison by the excretions, and for this purpose purgatives are to be administered in the first instance, followed by repeated doses of camphor mixture, sulphate of magnesia, and tincture of hyoscyamus. The hot bath and repeated enemata of hot water are also serviceable. In L.-P. *saline* the hot bath, containing from two to four ounces of the *sulphuret of potassium*, mixed with from twenty to thirty gallons of water, has been highly recommended, and the poison may be eliminated by the kidneys through the action of iodide of potassium. Galvanism, in the form of Faradisation, is of service as a local stimulant to the nerves; but severe shocks, especially at the commencement, should be avoided, and the treatment should not be commenced until the poison has been eliminated. Those exposed, from their occupation, to L.-P. should practise scrupulous cleanliness, and should never handle food with unwashed hands. The use of drinks acidulated with sulphuric or acetic acid is also a valuable preventive in such cases.

Leading a Witness. It is a rule of law that *leading* questions, that is, such as suggest to a witness the answers advantageous to the cause for which he appears, are not allowed, except in cross-examination.

Leaf-Cutter Bee (*Megachile*), a genus of *Hymenopterous* insects or bees, having a broad head, and thick, stout body, the jaws being large and scissor-like. Another genus is *Osmia*, also known as mason, carpenter, or upholsterer bees. These insects cut the leaves and wood of trees for the purpose of obtaining materials for their nests; *Osmia*, excavating nests in wood. *O. parietina* and *O. leucomelana* are well-known species. *Megachile centuncularis*, a familiar example of the first-named genus, cuts the leaves of roses, and joining the pieces thus obtained, forms cells for the reception of the eggs.

Leaf-Insect, a peculiar genus of *Orthopterous* insects, so named from the remarkable resemblance presented by the front wings to leaves. They belong to the family *Phasmida*, in which are also included the peculiar insects known as 'walking-sticks' or 'spectres,' from the peculiar twig-like form of their bodies. The leaf-insects form the genus Phyllium, the familiar species being the *P. siccifolium* of the E. Indies. The fore wings are exceedingly leaf-like, and are veined so as to mimic the exact appearance of leaves, while the legs are also broadened to assist, as it were, in the illusion. The males possess antennæ of 24 joints, the females of 9 joints.

Leaf-Rollers, the popular name of a family (*Tortricidæ*) of Moths or Lepidopterous insects, which obtain their name from the habit of their larvæ in rolling up leaves, to form protective cases for the chrysalides or pupæ. The coddling-moth (*Carpocapsa pomonella*) lays its eggs on apple and pear trees, its larvæ burrowing into the core of the fruit. The strawberry leaf-roller (*Anchylopera fragaria*), an American species, folds the leaves of that plant, and a third species is the *Lozotænia gossypiana*, or cotton leaf-roller, which operates on the leaves of cotton plants.

League, a measure of length, supposed to have been introduced into England by the Normans, and corresponding to the modern French *lieue* (Ital. *lega*, Sp. *legua*, Low Lat. *leuca*). The sea L., that in common use, is equal to three nautical miles, about 3·45 statute miles. In France two distinct leagues are in use—the *lieue de poste*, equal to 2·42 English miles, and the *lieue moyenne*, about 2·76 English miles, or the 25th part of a degree.

League (Fr. *ligue*, Low Lat. *liga*, from Lat. *ligo*, 'I bind'), a political confederacy of states-princes, or individuals for the purposes of mutual aid or defence. Of such, the most memorable are the Ætolian and Achaian Leagues; the Hanseatic L. (q. v.); the L. of Cambrai (q. v.); the L. of Schmalkald (q. v.); the Holy L., or *the* L., founded 13th February 1576 at Peronne by Henri de Guise (q. v.); the L. of Würzburg, founded 10th July 1609 at Munich under the leadership of Maximilian I. of Bavaria, which played so important a part in the Thirty Years' War (q. v.); the Solemn L. and Covenant (q. v.); and the Anti-Corn Law L. (q. v.).

Leake, William Martin, Lieut.-Col., LL.D., born at London in January 1777, entered Woolwich Academy, and obtaining a commission in the artillery (1794), served in the W. Indies. In 1799 he received the post of gunnery instructor to the Turkish army at Constantinople, and a year after proceeded to Egypt, by way of Asia Minor and Syria, to co-operate against the French. He made a survey of Upper Egypt and of the coasts and fortresses of European Turkey (1804), spent the next six years in two journeys in the Morea and Northern Greece, and in a lengthened residence in Athens. He returned to England in 1810, quitted the service in 1815, and died at Brighton, January 10, 1860. His works, which are still regarded as unrivalled, include *Researches in Greece* (1814), *Topography of Athens* (1821); *Journal of a Tour in Asia Minor* (1824); *Historical Outline of the Greek Revolution* (1829), warmly advocating Greek independence; *Travels in the Morea* (1830); *Travels in Northern Greece* (1835–41); and *Numismata Hellenica* (1854).

Leam'ington, a watering-place of England, in Warwickshire, on the Leam, a tributary of the Avon, 2 miles E. of Warwick, owes all its prosperity to its mineral springs—saline, sulphurous, and chalybeate—which, though noticed by Camden and Dugdale, and analysed in 1688, only began to attract patients towards the close of last century. The town is, therefore, almost wholly modern: among its principal buildings are the Royal Spa (erected at a cost of £25,000), the Victoria Baths, Warneford Hospital (1832), a Proprietary College (1847), a Hydropathic Establishment (1864), and a fine Roman Catholic church (1864). There are also a public library, museum, and philosophical institution, the arboretum, Jephson Gardens, a Brewing and the manufacture of kitchen-ranges are the chief industries. The watering-season is from May to October, but during the winter months L. is also a great hunting centre. Pop. (1811) 543; (1871) 20,910.

Leap-Year contains 366 days, and occurs every four years by which device the civil year is brought into practical agreement with the true astronomical year. To make the approximation still nearer the intercalary day (the 29th of February) is omitted in all the full centuries except those which are divisible by 400. Thus, 1892 and 1896 will be leap-years, but not 1900. The year 2000 will, however, be a L.-Y.

Lease, Contract of. (See, for English law, LANDLORD AND TENANT.) In Scotland, under a lease of land there is an implied reservation of mines and minerals and of the power of working them, on payment of surface damage. The landlord, independently of stipulation has a right of Hypothec (q. v.) for security of his rent. See also RENT, MAILLS AND DUTIES, EJECTION AND INTRUSION.

Lease and Release, in English law, was a form of conveyance of land. It was rendered obsolete by 4 Vict. c. 21, and now quite superseded by 8 and 9 Vict. c. 106, which substitutes a simple deed of grant.

Least Squares, Method of, is a method of calculation now universally employed in the reduction of astronomical observations, which aims at finding the most probable value of a quantity determined by a series of observations. According to the theory of probabilities, inaccuracies of observation are as likely to be in defect as in excess, and also more likely to be small than great. Hence, the probability of an error of magnitude x occurring must depend upon x^2, and must be some function of x^2, which diminishes very rapidly as x increases. It is the fundamental principle upon which the theory has been discussed by Legendre, Gauss, Laplace, Airy, and others. The most probable result of a number of observations is that which makes the sum of the squares of the errors the least possible, provided the observations are equally worthy of confidence. If the observations are not equally reliable, *weights* must be attributed to the several observations in proportion to their presumed exactness, and after that the value must be found which makes the sum of the squares of the errors an absolute minimum.

Leath'er (Old Eng. *lether*, perhaps from *klidan*, 'to cover') consists of the skins or hides of animals, especially of the larger mammalia, prepared by certain chemical processes which preserve them from putrefactive decay, give them the power of resisting moisture, and communicate a soft uniform tenacity to the whole substance. This is effected by several distinct processes, all of which depend on combining the gelatinous tissue of the hides or skins with astringent or with mucilaginous substances.

A great variety of hides and skins are available for the purpose of making L., and owing to the almost limitless useful applications of the substance, the skins of certain animals are usually devoted to distinct uses. The hides of oxen are the most valuable of all for L.-making, as they form the principal material for making the soles and uppers of boots, and for machinery belting, besides having innumerable other applications. The hides of wild cattle are much more valuable than those of domestic oxen, and the trade in dry and salted hides from S. America is consequently of the greatest importance to tanners. Horse hides are tanned principally for saddlery purposes, as also are pig skins and seal skins, but the latter are besides much used for boot uppers. Calf, sheep, lamb, goat, and kid skins are tanned or tawed for glove-making, bookbinding, morocco L., wash L., and many other purposes. Hippopotamus, elephant, and walrus hides, which are of enormous thickness, are tanned for use on polishing wheels for cutlery. The furs and skins of many animals are tanned or dressed with the hair on; but for ordinary L.-making the skin undergoes a preliminary operation called

Liming or Unhairing.—Hides as received at the tannery are first washed or thoroughly soaked in water to free them from blood, salt, and other extraneous substances adhering to or impregnating them. In this process they are rendered uniformly soft and supple, and thereafter the flesh side is dressed with a knife for clearing off all fleshy matter. The ears or other shreds are then cut off and handed over to the glue manufacturer, after which the hides are steeped for three or four weeks in pits among limewater. The action of the lime loosens the hairs, and at the same time it combines with the fatty matter of the skin, forming an insoluble lime soap which is subsequently removed. Instead of liming, a process called sweating is sometimes used for loosening the hair. It consists of piling the hides on each other in a warm place and leaving them till an ammoniacal odour proceeding from the pile betrays incipient putrefaction. The ammonia so generated acts in the same manner as the strong limewater. The hair is removed by stretching the hides on a sloping semi-cylindrical table—the 'beam' or 'tree'—and scraping them with a blunt dressing knife. The next operation consists in again macerating and washing the hides in water, and in dressing or shaving so as to bring the whole hide as nearly as possible to a uniform thickness. The operation of 'raising' follows, its object being to open the pores of the material and so enable it more quickly to imbibe and absorb the tanning solution. This is effected by immersing the hides in water acidulated with about one-thousandth part of sulphuric acid, and this bath at the same time frees the hides from the insoluble lime soap still adhering to them from the liming process. The hides are in this condition ready to undergo any of the ordinary processes for converting them into L.

Tanning.—The materials employed in this process will be found enumerated under TANNING SUBSTANCES (see also BARKS, TANNING). The operation consists in impregnating the fibres of hides with the tannin contained in any of the substances named under these heads, and the ordinary process is very slow in operation. It consists in first treating the hides with weak infusion of tan bark in large tanks or pits, moving them frequently from one tank to another, whilst constantly increasing the strength of the tan liquor in which they are immersed. After about six weeks' treatment in the *handlers*, as these tanks are called, the hides are transferred to tanks or pits called *layers*, in which they are spread out, a layer of coarsely ground bark being strewed between the separate hides. The pit is filled up with water to cover the pile of skins and so left for about three months, after which the skins are moved to another pit and similarly piled up, this time placing at the bottom the hides which were at the top in the previous layer. According to the thickness of the hides treated, they may require a third period in the layer pits. When the hides have a uniform brown colour throughout they are thoroughly tanned and ready for hanging in the drying loft, where the drying may be hastened by artificial heat. About 300 lbs. of English oak bark are required to tan 100 lbs. of hide, and the produce is 150 lbs. of L. Several processes for hastening the tanning of L. have been introduced, most of them being based on the pressure of tanning solutions into or through the hides operated upon. Others seek to facilitate the tanning by moving the hides alternately out of and into the tanning solutions. Not any one of these devices, however, has been completely successful.

Morocco L. is prepared from goat skins by a modified process of tanning called *sumaching*, the whole tanning operation in this case being finished in two or three days. The skins are tanned by being sewed up as bags and filled with water and pulverised sumach. Calf and sheep skins are similarly treated in England for making imitation morocco. The finished L. is variously dyed by the superficial application of strong solutions of dye-stuffs.

Currying is the process of dressing or finishing tanned L. For sole L., which requires to be firm and compact in texture, the only currying process consists in beating with hammers and passing the material between heavy rollers. Upper L. and other kinds which must be rendered soft and pliant, on the other hand, require elaborate currying processes, which vary according to the finish. The hide is first soaked with water and shaved to bring it to a uniform thickness throughout. It is again wetted and stretched out on a flat stone, after which it is *dubbed* or thoroughly impregnated with a mixture of cod oil and tallow. When the skin has imbibed the oleaginous mixture and become dry, it is *grained*, by rubbing on both sides with a grooved boxwood ball, and the flesh side is then scraped or whitened. The black colour is given to the grain side of upper L. by washing it over with a solution of tan bark upon which a solution of copperas is sponged. The L. is finally rubbed over with a paste of oil, tallow, glue, and lamp-black, and polished with a ball of glass, which completes the currying.

Tawing consists essentially in treating skins with a salt of alumina, oil and farinaceous matter being sometimes used in addition. It is by this process that glove L. and wash L. are prepared; and by a modification known as *Hungarian tawing* heavy hides are prepared for saddlery and machinery purposes, in which great strength is essential. Kid L. used for gloves and ladies boot uppers, &c., is prepared (1) from the skins of young goats (real kid being used only for gloves); (2) from lamb skins; and (3) from calf skins (calf kid). These skins are treated with a paste composed of flour, yolk of eggs, alum, salt, and water. After thorough kneading and impregnating with this compound, the skins are packed up in bundles for some time. They are then rapidly dried, soaked in water, placed singly between cloths, and worked to render them soft and uniformly supple. Next they are shaved, dried, and finished, by dressing with white of egg or gum, and dyed by brushing the dye-stuff over the surface of the L.

Shamoying, so called from having been originally applied to chamois skins, is a process of preparing a kind of very soft pliant L. by treating the skin with oil alone. Most chamois or shamoy L. is now made from the inner or flesh side of split sheep skin, the grain side being saved and tanned for hat linings, &c. The process consists in alternately saturating with oil and hanging in the air the skins operated on. The oil becomes oxidised by exposure, and the completion of the process is ascertained by the yellow colour which the L. assumes. After washing in a solution of potash to remove the uncombined oil, the L. is ready for use. Berlin and cordovan L., as well as the ordinary shamoy or wash L., are prepared by this process.

Leather, Vegetable. Several imitations of leather are now in extensive use for upholstery purposes. They all consist of a stout basis of linen cloth upon which a composition containing caoutchouc and other substances are spread. The composition used by different manufacturers varies much in constitution, each keeping his method as much as possible a trade secret. The cloth is grained in imitation of leather of different kinds, and as the composition adheres with remarkable tenacity, it forms a useful and cheap substitute for real leather in the numerous applications for which it is suitable.

Leath'erwood is an American shrub with extremely tough branches, whence the name is taken. In botanical nomenclature it is *Dirca palustris*, belonging to the natural order *Thymelaceæ;* the yellow flowers appear before the entire, ovate, alternate, leaves are developed. The bark has a sweetish taste, and, when chewed, excites a burning sensation in the fauces. The fruit is said to be poisonous. In geographical range it extends from Canada to Georgia.

Leave and Licence, a phrase of English law denoting that an act complained of was done by permission.

Leav'en (Fr. *levain*, from *lever*, 'to raise'), is dough kept till putrefaction has set in, in which state it is employed to induce

Lebanon, a town of
Creek and Union Canal, 5
hills, and 25 E. of Harrisb
one daily and seven (two
large furnaces, several ma
neighbourhood is rich in a
Pop. (1870) 6727.

Lebedjan', a town of R
the Don, has two great annua

Lebedjin', a town of Russ
Ol-hana, 90 miles N.W. of Kh
carries on manufactures of g
11,897.

Leblanc', Nicolas, a Frenc
(Indre) in 1753. He studied m
geon to the house of the Duc
chiefly with chemical researche
Sciences offered a premium for t
for the manufacture of carbonate
tion to the subject, and in 1789
use, by which the carbonate is pre
SODA). The importance of this
of chemistry is incalculable, but
from his labours. He was forced
Government, who published it; and
cessful endeavours to obtain an in
hand, January 16, 1806.

Lebrija, a town of Spain, provi
of the Guadalquivir, 40 miles N.N.E
a large Arabesque church, and its ind
and brickmaking. There is a conside
and fruits of the vicinity. Pop. 10,33

Lebrun', Charles, a French paint
March 1619, took lessons in design in
ace and Venice, and attracted the att
the chancellor of France by his 'Lou
three years' apprenticeship to his art.
cession of Cardinal Richelieu resulted in
In 1642 he went to Rome, and upon h
Académie de Saint Andrée. Many

'Moïse frappant le Rocher,' won him the highest reputation. Fouquet gave him orders, Mazarin presented him to Louis XIV., Colbert appointed him *premier peintre*, and placed him at the head of the Gobelin manufactory. He died 12th February 1690. L.'s great decorative paintings at Versailles and the Louvre show his power of mingling the picturesque and dramatic details of fable with history.

Lec'ce, the capital of a province of the same name, in the heel of the Italian boot, 8 miles E. of the Adriatic coast, and 25 S. by E. of Brindisi by rail. It is the see of a bishop, and has many beautiful buildings, among which are a cathedral and castle. A triumphal arch at the gate of St. Biagio commemorates the entrance of Charles V. There is a public library of 10,000 vols. The trade in the finest table-oil and cotton is important, and the government factory, which has been recently provided with the best modern machinery, produces tobacco equal to the finest of Seville. Pop. (1874) 23,247. The *Lupiæ* of the ancient Salentines, it is first called *Lycium* or *Lycia* (of which L. is obviously a corruption), in documents of the middle ages, when it was converted into a Norman countship. Count Tancred of L. became King of Sicily in 1189.

Lecc'o, an old town of N. Italy, in the province of Como, on the Adda, near where it leaves the S.E. arm of Lake Como, 20 miles N.W. of Bergamo by rail. It has thriving iron and silk industries, and was for some time the residence of Manzoni. Pop. (1874) 7040.

Leck'y, William Edward Hartpole, was born near Dublin, March 26, 1838, educated at Trinity College, and graduated B.A. (1859). In 1861 appeared his *Leaders of Public Opinions in Ireland* (new ed. 1871–72). Four years later his *History of the Rise and Influence of the Spirit of Rationalism in Europe* (2 vols. 5th. ed. 1872), gained for him the respectful attention of the philosophical world. In 1869 the *History of European Morals from Augustus to Charlemagne* established his reputation for brilliant and scholarly generalisation. His three works have been translated into German by Dr. H. Jolowicz.

Lect'ern (Eccles. Lat. *lectorium*) is a reading-desk or stand, on which lies the Bible from which the lessons in the church-service are read. See AMBO.

Lec'tionary (late Lat. *lectionarium*) was a Calendar of Lessons (q. v.), by which the reading of Scripture was methodised. The passages appropriate to the times and seasons of festivals were chosen, and for the rest were either read in order as they come in the Bible, or were arbitrarily fixed by the bishops. The first L., according to some, was the Canon Paschalis of Hippolytus (q. v.). The Comes or L. of Jerome is reckoned by some to be a forgery by a later writer. The oldest extant L. is the Gallican L., which perhaps dates from the end of the 6th c.

Lec'tures, Copyright in. See COPYRIGHT.

Lecythida'ceæ, a tribe of tropical dicotyledonous plants—often gigantic trees, natives of the western hemisphere, belonging to the natural order *Myrtaceæ*, and distinguished by their large almond-like seeds, alternate undotted leaves, and arrangement of the stamens. The fruit is a wooded multilocular capsule, often opening by a lid, and sufficiently large to be utilised as cups and bowls. See BRAZIL NUT, COMMON BALL TREE, and MONKEY POTS.

Le'da, daughter of Thestius, and wife of Tyndareus, king of Sparta, was, as the old legend runs, visited by Jupiter in the form of a swan, and bore by him two eggs, from one of which came Helen, and from the other Castor and Pollux. The visit of the swan to L. was a frequent subject of ancient art. After her death, L. was deified as Nemesis.

Led'bury, a market-town of England, in Herefordshire, on the Hereford and Gloucester Canal, 15 miles E.S.E. of Hereford by rail. It has malt-kilns and tanneries, and a trade in corn, hops, cider, &c. Pop. (1870) 2967.

Le'dru-Rollin, Alexandre Auguste, a French politician, born at Paris, 2d February 1808, educated for the bar, became advocate in 1830, obtained popularity by defending many journals prosecuted by Government, in 1837 took the direction of the *Journal du Palais*, in 1839 became a republican member of Assembly, incurred prosecution and fine for expressing seditious opinions, and thereafter developed his political creed in *La Réforme*, a violent Radical journal. At the crisis of 1848 he was elected Minister of Interior to the Provisional Government; and it was then, while marching in procession to the Hotel de Ville, he cried to Lamartine, 'We are mounting Calvary.' The tide of revolution soon swept him from office, and in 1849 he fled to England, where he busied himself in writing and laying plans with Kossuth, Mazzini, and others for a 'European democracy.' In this country he wrote his only considerable works, *De la Décadence de l'Angleterre* and *La Loi Anglaise*. After an absence of twenty years he returned to Paris, was re-elected to the Assembly, and delivered one speech; but his eloquence was gone, and with it his popularity. He died at Fontenay-aux-Roses, January 1, 1875. A work of his on Atheism is still in MS.

Le'dum, a genus of small shrubs of the heath family (*Ericaceæ*), natives of the colder parts of the northern hemisphere. The leaves are of hard texture, usually bearing a rust-coloured pubescence on their lower surface. One species, the *L. palustre* of botanists, has received the name of Labrador tea, on account of its use as a makeshift for tea. Sir John Franklin reported it to yield a refreshing beverage.

Lee, or **Lee'ward** (Old Eng. *hléo*, 'shelter'), a sea term for the quarter defended from the wind, towards which it blows, as opposed to that from which it blows—the *windward* or *weather* side.

Lee, a Virginian family, prolific of distinguished men, was founded by **Richard L.**, who settled in Virginia in the reign of Charles I. His grandson **Thomas** (died 1750) was president of the Council of Virginia, but is better known as the father of six sons, who all were celebrated leaders of the American Revolution —(1) **Philip Ludwell**, a member of the Council of State; (2) **Thomas Ludwell**, a judge of the Supreme Court; (3) **Francis Lightfoot**, a signatory to the Declaration of Independence; (4) **Richard Henry**, orator and statesman, born at Stratford in Virginia, January 20, 1732, and educated at Wakefield, England. He prepared the address of the colonists to the king, and the memorial to the House of Lords, was a member of the first American Congress in 1774, was author of the masterly second address of Congress to the people of Great Britain, and in a grand outburst of eloquence proposed in Congress, on 7th June 1776, the Declaration of Independence. He was President of Congress in 1784. In 1792 he retired from active life. He died June 19, 1794. His *Life and Correspondence* was published in 2 vols. by his great-grandson, R. H. L., in 1825. (5) **William**, born about 1737, Minister at the Hague, Vienna, and Berlin, died June 27, 1795. (6) **Arthur**, diplomatist and statesman, born December 20, 1740, and educated at Eton and Edinburgh. He obtained the degree of M.D. in 1765, but subsequently studied law. While in England he made the friendship of Johnson and Burke, and vindicated colonial rights by letters in the public journals. His *Appeal to the People of Great Britain* (1774), was at one time ascribed to Lord Chatham. From 1775 to 1789 he visited the capitals of Western Europe in the interest of the struggling republic. He sat in Congress 1782–85, and was a member of the Treasury Board, 1785–89. He died 12th December 1792. His *Life and Correspondence* (3 vols. Bost. 1829), was published by Robert H. Lee.—**Henry L.**, a daring soldier, son of a first cousin of the six famous brothers, was born January 29, 1756, at Stratford, Virginia. He obtained a captaincy in 1776, and ere long the command of a body of cavalry—the renowned 'L.'s legion.' He fought at Guildford and Eutaw, and reduced Forts Watson, Motte, Granby, and Galphin. (See the *Campaign in* 1781 *in the Carolinas*, by his son, Henry L., 1824.) In 1786 he was elected to Congress. He quelled the Whisky Insurrection in 1794. His *Memoirs of the War in the Southern Department of the United States*, appeared in 1809. He died at Cumberland Island, Georgia, March 25, 1816. His brother **Charles** was Attorney-General of the United States, 1795–1801.—**Robert Edward L.**, the ablest general in the Confederate army, son of General H. L., was born at Stratford, Virginia, 19th January 1807. He graduated at West Point in 1829, and be-

came captain in 1838. He served as chief-engineer in the Mexican War, 1846-48, when he was brevetted colonel, was superintendent at West Point 1852-55, and resigned his command in the United States army in April 1861 to head the Confederate forces in Virginia. In May 1862 he received the command at Richmond, and after seven days' hard fighting completely routed the Federal army. He invaded Maryland in August 1862, but received a check at Antietam on 17th September. He defeated Burnside at Fredericksburg in December 1862, and Hooker at Chancellorsville in May 1863; but on entering Maryland in July was repulsed by Meade at Gettysburg. His campaigns in 1864-65 were heroic struggles against the overwhelming forces of General Grant. With splendid strategy and indomitable bravery he disputed every inch of ground, but step by step his little army was beaten back, and after terrible slaughter Richmond fell on April 2, 1865. L.'s surrender at Appomattox a week later was the virtual conclusion of the civil war. He became President of Washington College, Lexington, in October 1865. In 1866 he edited his father's *Memoirs*. He died October 12, 1870. See *Life of R. E. Lee*, by J. E. Cooke (New York, 1872); *Le Général L.*, by E. L. Childe (Par. 1874); *Personal Reminiscences of General R. E. L.*, by J. W. Jones (New York, 1874); *Un Vainen, Souvenirs du Général L.*, by Mme. Boissonnas (Par. 1875), and *Life and Campaigns of General L.*, by his nephew E. L. Childe (Lond. 1875).

Lee, Frederick Richard, R.A., landscape painter, was born at Barnstaple, June 1798. He served as a cornet at Waterloo. Some landscapes exhibited by him at the British Institution first attracted attention. He exhibited at the Royal Academy in 1824, becoming an associate in 1834, and a member in 1838. Among his most successful pictures are 'The Silver Pool,' 'Fisherman's Haunt,' 'The Bay of Biscay,' 'Harvest Field,' 'A Village Green,' and 'Plymouth Breakwater.'

Lee, Nathaniel, an English dramatist, was born in 1650. Upon leaving Cambridge he took to the stage, but proved a bad actor, though a good reader. At the age of twenty-five he produced his first play, *Nero*. The best known of his productions are *The Rival Queens, or Alexander the Great* (1677); *Theodosius, or The Force of Love* (1680); *The Princess of Cleve* (1689); and *The Massacre of Paris* (1690). L. also joined Dryden in writing *Œdipus* (1679) and *The Duke of Guise* (1685). In these are to be found passages marked by wonderful delicacy of fancy and intense dramatic passion, but the style frequently degenerates into mere bombast. L., who was subject to fits of insanity and dissipation, died in 1692.

Lee, Robert, D.D., a leader of the liberal section of the Church of Scotland, was born at Tweedmouth, in Northumberland, 11th November 1804. He studied at St. Andrew's University, was ordained in 1832, was called to Arbroath in 1833, to Campsie in 1830, and, on the Disruption (1843) was made minister of Grey Friars', Edinburgh. In 1846 he became Regius Professor of Biblical Criticism in the University of Edinburgh, and the valuable results of his study of the Bible text appeared in *The Holy Bible, with about 60,000 Marginal References and Various Readings* (1854). His *Prayers for Public Worship* appeared in 1857, and for their use in Grey Friars' he was arraigned before the Presbytery of Edinburgh (1859), and later before the General Assembly, when he won a favourable verdict by a singularly eloquent defence. His *Reform of the Church of Scotland in Worship, Government, and Doctrine* (1860) discussed the liturgy, postures in worship, instrumental music, festivals and feasts, &c., with the view of bringing the Church into greater harmony with the age, and the opinions it contained were reported favourably on by the General Assembly in 1864. The first organ used in the service of the national church was introduced into Grey Friars' in April 1865. The General Assembly subsequently reversed the decision of 1864, and Dr. L. was preparing a case for the civil courts when he died at Torquay 12th March 1868. See the *Life of Dr. R. L.* by the Rev. R. H. Story (2 vols. 1870).

Lee, Samuel, D.D., an eminent linguist, was born at Longnor in Shropshire, May 14, 1783, educated at the village school, and apprenticed to a carpenter at Shrewsbury (1795). While working at his craft he taught himself Latin, Greek, Hebrew, Chaldee, Syriac, and Samaritan, until in 1810, having married and turned schoolmaster, he found a patron in Archdeacon Corbett, through whom he formed a connection with the Church Missionary Society, and was enabled to proceed to Queen's College, Cambridge (1813). He graduated in 1817, took orders (1818), and having by this time mastered eighteen languages, became successively Professor of Arabic (1819), chaplain of Cambridge Gaol (1823), rector of Bilton in Yorkshire (1825), Regius Professor of Hebrew (1834), and rector of Hadleigh in Hertfordshire, where he died, December 16, 1852. Of his works, which include a host of translations from and into English, the most important are his *Hebrew Grammar* (1827; 2nd ed. 1844); *Hebrew, Chaldaic, and English Lexicon* (1844); *The Study of the Holy Scriptures* (1830); and *Inquiry into the Nature of Prophecy* (1849).

Leech, John, artist and caricaturist, was born in London in 1817, and educated at the Charterhouse. In 1841 he joined the *Punch* staff, and for more than twenty years his initials appeared in almost every number. In broad, easy, spirited sketches of hunting, sporting, and fireside subjects, he satirised social follies and foibles with genial humour. Five volumes of his sketches, *Pictures of Life and Character*, have been published (1854-69), and two volumes of his *Pencillings from Punch* (chiefly political, 1864-65. He illustrated Dickens' Christmas Stories, Albert Smith's novels, Blaine's *Encyclopædia of Rural Sports*, and many other works. He died October 29, 1864. See Brown's *Memoirs of J. L.* (1866).

Leech, the name applied to various genera of *Annelid* worms, belonging to the order *Hirudinea* = (*Suctoria* or *Discophora*). The animals included in this section are distinguished by aquatic habits, and by a sucking-disc at one or both extremities. The hinder sucker is invariably present, but in cases where the anterior sucker is absent, its functions are discharged by the mouth. The skin is smooth, and bristles or *setæ* are for the most part wanting. The integument is, however, highly muscular, and consists of at least three layers of circular, radiating, and longitudinal fibres. A body-cavity (*perivisceral space*) is wanting in these worms. The nervous system, as in all Annelosa, lies ventrally or on the floor of the body. It consists of the common L. of twenty-three ganglia, and pigment-spots or rudimentary eyes may be found to exist on the head-segments. The mouth opens below the front sucker. The pharynx is muscular, and provided with two or three horny teeth having serrated or saw-like edges. The stomach is very large, and in the common L. has nine lateral dilatations or cæca. The intestine is short, the anus opening above the hinder sucker. There is no very distinct circulatory system, but the *lateral segmental organs* (or excretory organs) consist of seventeen tubes, with glandular walls arranged along each side of the body. In these forms, male and female generative organs exist in each animal, but the contact of two such hermaphrodite individuals is necessary for the fertilisation of the eggs. The eggs are enclosed in *cocoons* or *capsules*. The common leeches belong to the family *Hirudinidæ*, in which the individuals are hermaphrodite. The body is narrowed in front and behind. Of the medicinal leeches two well-marked species exist—the *Hirudo medicinalis*, the 'German L.,' possessing a body of dark-green colour, spotted below with black, and *H. officinalis*, the 'Hungarian L.,' of olive-green colour, and without spots. Each of the three jaws or teeth in the latter species has from seventy to ninety tooth-like serrations on its surface; each tooth when moved by appropriate muscles acting as a finely-toothed saw in dividing the skin. The bodies of the leeches number from 80 to 100 rings or segments. The cocoons containing the eggs are laid in summer and in winter, and in from four to six weeks the young are developed. The young take three years to become sexually mature, and leeches may live from eighteen to twenty years. The horse-leeches form the genus *Aulacostomum*, and possess cylindrical bodies. The hinder lip of the sucker is wanting, and the body possesses few or no lateral dilatations. The genus *Hæmopis* also includes species familiarly named horse-leeches, and which inhabit freshwater pools. In their young state, species of *Hæmopis* may be swallowed by cattle in drinking water, and may attach themselves to the throat or enter the windpipe of these animals. Many other genera are included in the L. order. The land leeches (*Hæmadipsa Ceylonica*) are peculiar forms occurring in Ceylon, India, and other parts of Asia. They infest swampy grounds, and affix them-

selves to the legs of travellers and of horses, causing much irritation by their numerous bites. Commercially regarded, the L. is a subject of great interest. Vast quantities are imported from the Continent—Germany, Hungary, and Russia contributing the chief supplies. Hamburg is the chief exporting port; leeches being sent thither from the lakes of Pomerania and Brandenburg, and from Posen in Prussia. Leeches are captured by men who wade into their native waters and allow the annelids to fasten themselves to their limbs, the leeches being quickly detached by an exercise of dexterity. They are exported commonly in tubs, packed amongst damp mud, each tub containing about 2000 leeches. Pereira mentions that four dealers in leeches some years ago imported 600,000 monthly into London alone. The annual consumpt of Paris is at least 3,000,000 leeches.

Leech'ing, or the application of Leeches (q. v.), is in many cases preferable to venesection or cupping for the abstraction of blood. General blood-letting by venesection is now practised only in rare cases, and local depletion by means of Cupping (q. v.) is, in many cases, inadmissible. The part to which the leeches are to be applied should be thoroughly cleansed, and may be moistened with milk or blood, and the leeches should be dried by rubbing them in a clean linen cloth. They may be caused to adhere to a particular spot by placing them in an open pill-box, a wine-glass, or a narrow tube, called a leech-glass. A single leech will abstract from a drachm and a half to three or four drachms, and it may be caused to disgorge the blood by the application of salt to its body. Profuse hæmorrhage sometimes follows L., and this may be arrested by the application of a bit of cobweb, some fluff of lint, or by matico leaf, nitrate of silver point, solution of perchloride of iron, or saturated solution of alum.

Leeds, the largest town in Yorkshire, and the greatest centre of the woollen cloth industry in England, is situated in the valley of the Aire, 42½ miles N.E. of Manchester, and 186½ N.N.E. of London by rail. The city proper lies on the N. bank of the Aire, and is connected by two stone and four iron bridges with its suburbs of Hunslet and Holbeck. Of late years it has been greatly improved, and the western part in particular has many fine streets. The most notable buildings are the large cruciform church of St. Peter, rebuilt in 1838, at a cost of £29,770, with a tower 139 feet high, a peal of thirteen bells, stained windows, and several statues; the 'Laudian' church of St. John, consecrated in 1634, containing the tomb of John Harrison, the founder; the town-hall (1858, cost upwards of £140,000) covering an area of 5600 sq. yards, and having many fine statues, and a large, ornate hall, in which there is one of the grandest organs in Europe; a corn exchange, in form of a Roman theatre, built in 1863; the castellated jail at Armley; the Royal Infirmary, one of the principal works of Sir G. G. Scott, erected at a cost of £100,000 in 1864-69, in the First Pointed style, and near it, the L. School of Medicine, a handsome Gothic structure; the Grammar School (cost £13,000) designed in decorated Gothic by E. M. Barry; and the new Royal Exchange founded in 1873, opened in 1876. L. has also a stock exchange, 'mixed' and 'white' cloth halls, a philosophical hall with a museum (rebuilt 1863), a free library of 30,000 vols., established in 1870, a public subscription library of 30,000 vols., founded by Priestley in 1768, a mechanics' institute, a Wesleyan training college, a school of art, with some 600 students, a working-men's institute, an industrial school, a reformatory (at Adel), a large general market, a cattle market, five railway stations, eleven banks (Beckett's, a fine structure by Sir G. G. Scott), many handsome hotels (especially the Queen's, opened by the Midland Railway Company in 1861), a theatre (another being built, 1877), four daily and five weekly newspapers, &c. Three miles N.E. of L. is the beautiful Roundhay Park, 733 acres in extent, with a lake of 33 acres, bought by the corporation for £140,000 in 1872. Near L. are the noble ruins of Kirkstall Abbey, which dates from between 1147 and 1153, and Adel church, built in 1140, in the vicinity of which was a Roman station where have been found various antiquities. The textile industries of L. were extensive even in the 16th c. Formerly, however, it was only the coarser woollens that were made here, while now the superior cloths of L. are unrivalled for fineness and elegance. Besides cloths for all kinds of wearing apparel, superfine broad and coarse narrow cloths, the goods are chiefly shawls, blankets, and Scotch camlets. In 1871 there were 1198 cloth factories, with 26,134 hands. Of late years the iron industry has greatly increased, and now it employs over 15,000 persons, and machinery is produced annually to the value of £2,000,000. There are also extensive manufactures of leather (2194 *employés* in 1871), flax, silk, and worsted goods, earthenware (1472), paper, tobacco, glass, oil, and chemicals. Pop. in 1841, 151,850; in 1851, 171,805; in 1861, 207,153; in 1871, 259,212; now (1877) 298,000. L. returns three members to Parliament. It is the ancient British *Loidis*. Its first charter was received from Charles I. in 1626. It contributed to the ship-money in 1638, and suffered a fearful visitation of plague in 1644-45. Although it sent a representative to Cromwell's Parliament, it was only created a parliamentary borough by the Reform Bill of 1832.

Leek (*Allium Porrum*) is a perennial culinary vegetable that has been in cultivation in Britain from an unknown period, and was grown by the Egyptians in the days of Pharaoh. The flavour is milder than that of onions, or other species of Allium, which recommendation, combined with the esteem in which it is held as a wholesome vegetable, has caused it to be largely used for soups, stews, &c. At present it is very generally cultivated, more especially in Scotland and Wales. If planted in a rich deep soil with a dry bottom, it grows to a very large size. The L. from time immemorial has been regarded as the badge of Welshmen, who still make a show of it on St. David's Day.

Leek, a market-town of England, in Staffordshire, on the Churnet, 13½ miles S.E. of Macclesfield by rail, has a town-hall (1806), mechanics' institute (1862), public baths, &c. The manufacture of silks is the staple industry, but there are also dyeworks, a factory for farm implements, &c. Pop. (1871) 15,544.

Leer, a town of Prussia, province of Hanover, on the Leda, near its junction with the Ems, and 16 miles S.E. of Emden by rail. It has considerable shipping, and manufactures sugar, chicory, tobacco, beer, and brandy. Pop. (1875) 9339.

Leeu'warden (Frisian, *Lieuwert* or *Liouwerd*), a pretty market-town of Holland, capital of the province of Friesland, 72 miles N.E. of Amsterdam, 16 miles E. by N. of Haarlingen by rail, and on the canal between that town and Gröningen, has twelve churches, an old palace of the House of Orange, a fine town-house, and manufactures of carriages and musical instruments. Pop. (1876) 27,108.

Leeu'wenhoek, Anton van, a Dutch microscopist and naturalist, was born October 24, 1632, at Delft, where he died August 26, 1723. He was the greatest microscopist of his time, and by means of his fine instruments, constructed by his own hand, made many important discoveries in natural history. He discovered the *Rotifera* (q. v.) or wheel-animalcules, and was probably the first to *observe* the circulation of the blood in living animals. L.'s works were collected and published in 1724 under the title *Opera Omnia Arcana Naturæ*.

Leeuwin, Cape, the S.W. extremity of Australia, is situated in 34° 19′ S. lat., 115° 8′ E. long. It consists of a bluff of granite, against which the sea beats with tremendous force.

Lee'ward Islands. See ANTILLES.

Lee'way is the angle between a vessel's course and the direction in which her keel points, or the deviation of the course run from the course steered upon. This deviation is necessarily caused when the vessel is steered obliquely with reference to the current or wind, but its amount varies for different vessels.

Lefebvre, François Joseph, Duc de Danzig, a French marshal, was born at Ruffach, Alsace, 25th October 1755. Like most of Napoleon's generals he rose from the ranks, entering the Guards as a private in 1773, and in twenty years working his way to the post of general of brigade. At the siege of Fort Vauban, at Mannheim, at Apach, Sainte-Croix, and Nadelange, he led a division to victory. In the following years he distinguished himself at the battles of Marmont, Nivelles, Florinal, Frimont, Epte, Ochtrup, Roer, Welp, Eichelkamp, Spick, Henef, Anilschorn, Nidda, and Oberdiefenbach. Wounded at Stockach, where he vigorously resisted the attack of 36,000 Austrians with 8000 men, he returned to Paris, and in 1800 entered the senate, but soon returned to active service. In 1806 he led his division against the Prussians, and in the follow-

ing year laid siege to Danzig in conjunction with the Polish army. On the capture of that city he was created Duc de Danzig. After the Restoration he was named a peer of France. L. died 14th September 1820.

Lefkosi'a, the ancient *Leucosia*, capital of Cyprus, near the N. coast, on the Pidius, on a plain between two mountain ranges. It is walled, and its chief buildings are the mosque of St. Sophia, and the governor's palace. The industries are in silk, cotton, and leather. Pop. 18,000. L. was the residence of the Lusignan kings of Cyprus.

Lefort, François, was born in Geneva (1656), served in France among the Swiss Guards, obtained a captaincy in the Russian army, and under Romadanofski fought with bravery against the Turks. He was an active promoter of the *coup d'état* which raised to the sovereignty Peter the Great, who rewarded his services by making him his chief favourite. Into his hands was confided the care of army and navy; in 1697 he headed an embassy to the principal European courts, Peter following in his suite *incognito;* during the revolt of the Strelitzes in 1697, it is said his humane intervention saved thousands from massacre; and in the course of his long ministry he procured many important reforms, especially in favour of religious toleration and free-trade. He died at Moscow 20th March 1699. See Voltaire's *Pierre le Grand.*

Leg, the name specially given to the hinder extremity, whole or part, of vertebrate animals, and applied indiscriminately to indicate the locomotive appendages of lower animals, such as insects, crustaceans, &c. In man and vertebrates, the L. consists (1) of a *pelvic arch or girdle* supporting the bones of the L. proper; (2) of a *femur* or thigh; (3) of a *tibia;* and (4) *fibula*—the former being popularly known as the shin-bone; (5) of seven bones forming the *tarsus* or *ankle;* (6) of a *metatarsus* or instep composed of five bones; and (7) of the *phalanges* or bones of the toes, numbering three in each toe, with the exception of the great toe, which is composed of two phalanges only. The term L. is more properly limited to the portion of the hinder or lower limb, lying between the knee and the tarsus or ankle, and supported by the *tibia and fibula.* The tibia is, with the exception of the femur, the largest and longest bone in the body. It is expanded to form a flat head above, for the reception of the *condyles* of the thigh. Its shaft is of triangular and prismoid form, and narrows as it approaches the ankle. The anterior border forms the *shin* or *crest*, and the lower extremity presents five surfaces; the lower surface being smooth for articulation with the *astragalus* of the ankle. The *fibula* lies to the outer side of the L. It is a very slender bone, its upper extremity lying parallel with the knee joint; whilst its lower end forms the outer prominence of the ankle. The chief *muscles* of the L. comprise the *tibialis anticus*, the *extensors* (*pollicis* and *longus digitorum*) and *peroneus tertius*, in front; the muscles of the *calf* or back of the L. being the *gastrocnemius, soleus*, and *plantaris;* the *tendo Achillis*, or great tendon of the heel, being formed by the united tendons of the gastrocnemius and soleus. The muscles of the front of the L. bend the ankle on the L.; those of the calf raising the heel, and assisting in the actions of walking, dancing, leaping, and also in standing. The *arteries* of the L. are the *anterior tibial*, which is accompanied by two veins, and the *posterior tibial* artery, also possessing two *venæ comites*. The chief nerves are the *posterior tibial nerve*—a large branch of the *internal popliteal* and the *external popliteal*. The most frequent seat of *fracture* of the tibia is its lower fourth; whilst the fibula most commonly gives way just above its lower extremity.

Leg'acy. The bequest of a L. confers only a contingent property on the legatee, which does not become complete till the assent of the executor or administrator has been given; but before assent, the bequest is transmissible to the personal representative of the legatee, and will pass by his will. If executors omit to pay legacies at the expiry of one year after the death of the testator, legatees are entitled to interest from that period. In the event of deficiency of assets to pay the debts, all the general legacies must be proportionally abated; and if the legatees have been paid, and debts in excess of the residue appear, they must refund rateably.* If a legatee die in the lifetime of the testator, the L. falls into the residue of the personal estate, unless the terms of the bequest clearly show that the testator meant it to go to the representatives of the legatee. This rule of law is, however, modified by the Wills Act in favour of the issue of the legatee living at the testator's death. If a L. be left to any one conditionally, as *if* he attain the age of twenty-one, and he die before that time, it is a *lapsed* L. But a L. *to be paid* when he attains the age of twenty-one is a vested L.; and if the legatee die, his representative is entitled to it. A frivolous or immoral condition imposed on a legatee is void, and the legatee is entitled to his L. without fulfilling it. The duty on a L. to a child or parent, or to any lineal descendant or ancestor of the deceased, is £1 per cent.; to a brother or sister or their descendants, £3 per cent.; to a stranger in blood, £10 per cent. A L. to husband or wife is exempt from duty.

Lega'ti (Lat. 'sent with a message') were among the Romans originally ambassadors or commissioners chosen by the senators from their own number, but especially, in the time of the republic, the chief officers of the generals in command, who appointed them, with the sanction of the Senate, and for whom the L. acted during their absence. Pompey, when in Asia, had fifteen L., and three is the smallest number ever mentioned as employed. During the Empire, *legatus* chiefly meant a governor sent into a province by the Emperor. It is now a title given in the Roman Curia not only to its ambassadors, but also to many archbishops. There must, therefore, be distinguished two classes of L.—*L. nati*, and *L. dati*, or *missi*. L. nati ('by birth') are those who hold certain archbishoprics to which the legateship is permanently attached. These had originally the same power as papal legates generally, but from the 16th c. this has been so diminished that they properly retain only the bare title. To L. dati or missi ('sent') belong:—(1) Delegates, invested with full powers for a special mission; (2) Apostolic Nuncios, who are bound to execute the orders of the Pope according to his mandate, and who possess jurisdiction in the provinces assigned to them, having authority to decide the ordinary cases *reservati* ('reserved cases'), and to grant indulgences for more than one hundred days, but less than one year; (3) *L. a latere* ('from the side'), cardinals delegated by the Pope, who appear as his actual representatives, and possess many of the highest prerogatives. From the *L. a latere ordinarii* are distinguished the *extraordinarii*, who are commissioned to act in individual cases of importance, as in calling a council, or on an embassy to a sovereign.

Lega'to (Ital.). A musical term for a smooth, connected manner of singing or playing an instrument; it is opposed to *Staccato*.

Le'gend (Lat. *legenda*, 'to be read'), a term applied originally to portions of Scripture, later to other writings of religious instruction, appointed to be read in the public services of the Church or to the monks in their refectories. Theoretically, at least, the term was one of the widest comprehensiveness, and might be expected to cover every variety of composition and every shade of merit—good, bad, and indifferent. Written by monks for monks, it was natural, however, that legends should deal mainly with matters ecclesiastical, with hagiology, as the *Liber Lectionarii;* with martyrdoms, as the *Libri Passionales;* or with the 'clean' or monastic life, as the Old English *Ancren Riwle*, composed in the 12th or 13th c. for the edification of the nuns of Tarente in Dorsetshire. The *Vita S. Antonii* of Athanasius, and the *Vitæ Patrum* of Gregory of Tours, are among the earliest productions of the kind, and these let forth a flood of less genuine imitations. From Greece were imported into France and Italy legends, the authors of which, familiar with the fictions and fables of the East, composed their works in the spirit of a romance, and which acted powerfully on the more sober narratives of the Western Church. But another and a stronger influence was at work. Legends, guarded by no canon, could scarcely escape that mingling of paganism with Christianity which prompted Redwald, King of the E. Angles, to establish in the self-same church one altar to Christ and another to devils, which perpetuated the Saturnalia in the sports of Christmas, and has retained the obscene phallic and fire worships in a hundred observances that, though grown harmless and meaningless, still linger on amongst us. As in popular folklore the hammer of Thor and the trident of Siva both came to be identified with the cross of Christianity, so in L.

* A specific legacy, as of a piece of plate, must be paid in full: but it is postponed to the claims of the legatee's creditors.

the Slavs have transferred the attributes of Perun, the god of thunder, to the prophet Ilya (Elijah), and of his mother Percunatele, or of Lada, the counterpart of Freyja to the Blessed Virgin; the god of *Beowulf* is simply Woden under a different title; and the *dramatis personæ* of Grimm's *Brother Frolick's Adventures* reappear in the Alsatian version as Christ and St. Peter. A more innocent cause of that blending of truth and fiction which presents itself in legends was the fondness of the pious monks for fastening on saints, real or created for the occasion, every story of antiquity or chivalry that could, they fancied, either 'point a moral or adorn a tale,' much as we attribute a *bon-mot* to Sydney Smith or Theodore Hook. Of this tendency *Barlaam and Josaphat* (q. v.) presents a striking instance, as through it the founder of Buddhism has actually won his way into the calendars of the Eastern and Western Churches. From these combined causes many legends, originally intended for historical, gradually became the very reverse of history; legends in general fell into disrepute; and the terms *L.* and *legendary* came to hold their present significations of 'falsehood' and 'untrustworthy.' True, many legends enshrined unquestioned facts; others, like those of Christopher, or of Augustine and the Child by the seashore, were beautiful allegories; but then it was so easy for assailants of that Church which had adopted these legends to point out that this was false, or that was only true of another than him of whom it was told, that such and such stories were monstrous or obscene; so convenient to confound the Church's literature with her dogmas, that legends, and especially or exclusively corrupt legends, were brought by those assailants into a prominence, and represented as possessing a coherent unity which the Church herself had never intended or appointed they should hold. Here it is impossible to mention more than a very few of the principal collections of legends, such being the *Legenda Aurea*, or Golden Legend (q. v.), the *Gesta Romanorum* (q. v.), the *Flos Sanctorum* of Ribadineira (2 vols. Madr. 1599–1610), the *Acta Sanctorum* (q. v.), and the *Lives of the Saints*, by Baring-Gould (15 vols. 1872–77).

Legen'dre, Adrien Marie, a French mathematician, was born at Toulouse, September 18, 1752. Through the influence of D'Alembert, he early obtained the chair of mathematics in the military school at Paris, and in 1783 became a member of the Academy. In 1787 he was engaged, along with Cassini and Méchain, in calculating the true longitudinal distance between Paris and Greenwich, the results of which were published in the *Exposé des Operations, faites en France, &c.* (1792). He was a member of the *Bureau des Longitudes*, and held important positions as a director of the University, and Examiner in l'École Polytechnique. He died at Paris, January 10, 1833. His chief works are *Eléments de Géométrie* (1794), *Exercises de Calcul Intégral sur divers Ordres de Transcendantes et de Quadratures* (3 vols. 1807), supplemented by his *Traité des Fonctions Elliptiques* (2 vols. 1827), *La Théorie des Nombres* (2 vols. 1830), besides some twenty more or less valuable memoirs upon various questions in pure and applied mathematics, such as double integrals, the theory of parallels, method of least squares, and attractions of spheroids and ellipsoids.

Leger-Lines (Fr. *léger*, 'light') are small lines above or below the staves in music, being a continuation of the latter.

Le'ghorn (It. *Livorno*), one of the chief ports of Italy, and capital of a province of the same name, at the mouth of the Calambrone, 62 miles W.S.W. of Florence, and 12 S.S.W. of Pisa by rail. It is connected by a canal with the Arno, which enters the sea 7 miles farther N., and is itself intersected by several smaller canals. The city is regularly and handsomely built, but the houses are high, and the streets narrow and gloomy. There are many fine churches and other public edifices, including three hospitals, an observatory, a free library, &c., and the suburbs have been greatly extended and embellished of late years. The Jewish synagogue, in point of size and richness, is the second in Europe. The aqueduct and great reservoir are remarkable structures. Near the port is a monument to Ferdinand I. L. has an old and new harbour; the latter, the more southerly, is capable of receiving vessels of the heaviest tonnage, and is overlooked by a lighthouse. On a little island stands the lazaretto. In 1873 some 11,000 ships of all sizes entered the port, the export and import trade amounting in value to £7,200,000. The imports are mainly coal, iron, cutlery, petroleum, sugar, codfish, pilchards, and herrings; the exports, straw hats, straw-plaiting, silks, borax, marble, sulphur, fruits, and anchovies. Besides the straw-plaiting industries, there are manufactures of oil, soap, tobacco, salt, *Rosolio* liqueur, &c. The port of L. was free, and enjoyed many privileges till 1867. Many visitors are attracted hither by the baths and mineral springs. Pop. (1874) 97,096, of whom some 8000 are Jews. The earliest notices of L. are of the 9th c., and relate to the building of a church, but the place only began to grow in importance after the destruction of the port of Pisa, at the end of the 13th c. In the 14th c. it came under the protection of France, and was sold to Genoa for 26,000 gold ducats in 1407, to be sold by its new owners to Florence for 100,000 gold florins in 1421. The Medici improved its harbour, strengthened its fortifications, and conferred on its inhabitants exceptional privileges. Religious toleration was established, and merchants of all nations flocked hither. It was held by the French in 1796–99, retaken by them in 1800, and greatly impoverished by forced loans. An Italian and British force recovered it in December 1813. The Austrians took L. in May 1859, and quelled a slight rising there in 1857.

Le'gio (from Lat. *lego*, 'I choose') was the name applied in the Roman army to a large body of troops, comprising infantry, cavalry, and in later times, artillery also. At first, the L. was composed exclusively of Roman citizens, but the privilege was subsequently extended, till in the third c. A.D., even barbarians were admitted. From its institution by Romulus till its extinction under the empire, the L. passed through important changes of constitution. These have been referred to five periods, of which we may usefully select the third—from B.C. 300 to B.C. 107—for fuller representation. Four L. were levied yearly, two being assigned to each consul, and each L. usually contained from four to five thousand men. Polybius thus marshalled in three lines a L. 4000 strong: Hastati, 1200 in number, youths in the first bloom of manhood, formed the first line; Principes, also 1200 in number, men in the full vigour of life, formed the second line; and Triarii, 600 in number, experienced veterans, formed the third line. These three bodies were each divided into ten maniples or companies. There were also 1000 Velites, who acted as light-armed skirmishers, and were distributed equally among the Hastati, Principes, and Triarii. The cavalry, 300 in number, were divided into ten *turmæ*, or squadrons of thirty men each, and each *turma* into three *decuriæ* of ten men each. The chief officers of the L. were the military tribunes, of whom at this time there were six, and under them were sixty centurions, and sixty *optiones*, or lieutenants. The Hastati, Principes, and Triarii wore armour, consisting of shield, helmet, breastplate, and greave, and their offensive weapons consisted of a sword, and heavy javelins. In place of the latter, however, the Triarii carried pikes. Two of the bravest men in each maniple were appointed standard bearers, and each L. had its silver eagle. The L. were originally numbered in the order in which they were raised; and some derived titles from the deities, under whose patronage they were placed, the countries where they had been levied, the scene of their most brilliant achievements, &c.

Le'gion, The Thundering (Lat. *legio fulminatrix*), was a name supposed to have been given to a Roman legion in connection with a well-known legend. In the war with the Marcomanni A.D. 174, the Emperor Marcus Aurelius and his army were on the eve of perishing from thirst, when a sudden outburst of thunder and lightning accompanied with rain relieved the Romans, and terrified their foes. Christian writers represented that the deliverance had been miraculously vouchsafed to the prayers of the Christian soldiers in the imperial army, and the incident became the subject of a famous historical controversy. See Lardner's *Jewish and Heathen Testimonies*, chap. xv.

Legion of Honour, a French order, founded under the Consulate by a law of May 19, 1802, as a recompense for all services rendered to the state. With the First Consul for its *ex officio* Grand Master, it consisted of a Grand Council of seven members, presided over by a Grand Chancellor, and of sixteen territorial cohorts, each of which had its centre, master, revenues, and council of administration, and was composed of 7 grand officers, 20 commandants, 30 officers, and 350 legionaries—in all 6512. This number was subsequently augmented; the title legionary was replaced by chevalier; a fifth and

superior grade was established, that of the Grand Cross; and two great schools for the daughters of members of the legion were founded March 29, 1809. The decoration consisted of a five-rayed star, bearing the imperial effigy and eagle, and surmounted by the imperial crown. At the Restoration the title of commandant was changed to commander, and of grand cordon to grand cross, while the effigy of Henri IV. was substituted for Napoleon's, and the fleurs-de-lis replaced the eagle, to make way themselves for the tricolor in 1830. By a law of January 22, 1852, the decoration was restored to its original form, except that it bore the head of Napoleon III., and the legion itself was reconstituted on a fresh basis. In 1843 there had been 49,417 members, but this number was now diminished by the creation of but one fresh chevalier for every two deceased. The grand crosses were limited to 80, grand officers to 160, commanders to 400, and officers to 2000—exclusive of the imperial family and of foreigners, the latter being merely 'admitted,' not 'received,' and consequently taking no oath. Pensions of from 250 to 5000 francs, conferred on disabled members, are defrayed out of the revenues of the order, which were greatly augmented by Louis-Philippe. The Palace of the Legion, erected in 1786 for the Prince de Salm, was burnt by the Communists, 23 May 1871.

Legitim, or **Bairns' Part of Gear**, a Scotch law term, denoting the share of the Goods in Commun (*q. v.*) legally falling to the children on the death of their father. The claim of L. may be excluded by giving the children a provision in an antenuptial contract of marriage, under the name of L. A provision in a contract of marriage excluding the claim, without making any other provision for the children, would be inoperative against them. A father may, however, frustrate the claim by a conversion of his moveable estate into heritage. A child claiming L. must collate (see COLLATION) any separate provision received from the father, and all considerable sums of money advanced to the child must also be collated, unless on account of education. See JUS RELICTÆ, DEAD'S PART.

Legit'imacy. See BASTARD AND BASTARDY; for Scotch law, also BASTARDY, DECLARATOR OF, and BASTARDY, GIFT OF.

Legitima'tion. The doctrine of the law of England is that 'once a bastard always a bastard.' Scotch and foreign law allow L. by the subsequent marriage of the parents. If, however, there was a legal obstacle to the marriage of the parents at the date of the child's birth, their subsequent marriage will not make the child legitimate. When, again, another marriage has intervened between the date of the birth and the marriage of the parent, it was doubted whether L. took place; but it has been decided that it does. The rights, however, of children born legitimate cannot be set aside by the L. of a bastard. A child born illegitimate in England of parents domiciled there at the time of its birth, would be legitimated by the subsequent marriage of its parents in England, if at the date of the marriage they were domiciled in Scotland, or in any other country in which the principle of L. *per subsequens matrimonium* is recognised. If, however, the parents were domiciled in England at the date of the marriage, the fact that the marriage was constituted in Scotland would not have the effect of L. A child legitimated *per subsequens matrimonium*, cannot succeed to real estate in England.

Legit'imists sprung into existence as a French political party after the revolutionary events of July 1830. They were opposed to the claims of Louis-Philippe, son of the Duc d'Orleans, who traced his descent through a branch of the Bourbon family in a direct line from the second son of Louis XIII., and they advocated the cause of Henri, Duc de Bordeaux, Comte de Chambord, grandson of Charles X. In the French Assembly the *côté droit* has continued with unwearying faithfulness, under every vicissitude, to scheme for the recognition of Henri V., as they term the representative of the elder branch of the Bourbon family. After the fall of the second empire (see CHAMBORD), there seemed some likelihood that the L. would be successful in restoring the Comte to his throne, no fewer than 280 deputies having presented him with a programme of constitutional government, to which they asked his signature. His claim to 'divine right' gave his party no practical chance for recommending him to the country. In the Assemblies of the Republic the L. are not numerically important, but they exercise considerable power by combining at times with the Bonapartists and Orleanists to thwart the democratic aims of the *côté gauche* and *centre gauche*.

Legna'no, a town of N. Italy, province of Verona, 25 miles S.S.E. of Verona by rail. It lies in a swampy rice district, is of some strategic importance, and has leather and straw-hat industries. Pop. (1874) 13,355.—Another Italian town of the same name, 17 miles N.W. of Milan, has several interesting churches, containing rare pictures. It was the scene of a great victory won by the Milanese over Friedrich Barbarossa, 29th May 1176. Pop. (1874) 6085.

Legs, Human, are often used as heraldic charges, and may be naked, booted, or in armour, and couped (cut off smooth) or erased (with a ragged edge) at the thigh. The leg *gules* or *argent* of an animal is a common crest.

Legume, the fruit of a leguminous plant—*e.g.*, the pod of the pea. It consists of a single carpel which splits into two valves, not only along the ventral suture (as is the case in the allied fruit called a follicle), but also along the dorsal suture, the seeds are attached to the ventral suture. A variety called a Loment is constricted above and below each seed, breaking into separate pieces when ripe at these several constrictions.

Legu'min, or **Vegetable Casein**, is an azotised proximate essential part of the seeds of leguminous and some other plants. It may be procured in solution from kidney-beans and peas, by bruising them in a mortar with cold water and straining.

Legumino'sæ, a very extensive and important natural order of Dicotyledonous plants dispersed through all parts of the world, but more especially abundant in tropical countries, ranging from lowly annual weeds to gigantic trees. It is divided into three large sub-orders, viz., *Papilionaceæ*, of which the pea and the pea are examples; *Cæsalpineæ*, represented by cassia, bauhinia and cenattonia; and *Mimoseæ*, including the acacias, mimosas, &c. The order embraces many valuable medicinal plants, such as those yielding senna, kino, copaiva, balsams of Peru and Tolu, tamarind gums arabic and tragacanth, &c.; important dyes, as indigo and logwood; many valuable timbers, as rosewood; numerous staples of human and cattle food, as peas, beans, haricots, vetches, clovers, &c. The properties of the order are in general wholesome, although it contains some poisonous species—*e.g.*, laburnum. The leaves of various species of the sub-order *Mimoseæ* display a peculiar irritability when touched; this is particularly instanced in the case of *M. casta* and *pudica*, commonly called 'sensitive plants.'

Leh, the chief town of the province of Ladakh or Middle Tibet, which now forms part of the State of Cashmere, in feudatory connection with the British Government of India. It is situated on the right bank of the Indus, hidden amid the ranges of the W. Himalayas, 11,278 feet above the sea, and 210 miles due N. of Simla. A British Commissioner resides here, to administer justice, &c., conjointly with a Cashmere official. L. has great commercial importance, as the centre where trade caravans from Yarkund and Thibet meet to separate again on their way towards different parts of Cashmere and the Punjaub. In 1873 the trade was registered to the value of £177,000. The imports from the N. are gold, salt, drug called *chamar*, and *pashmina* or shawl wool; from India cotton-piece goods, tea, brocades, spices and sugar. Pop. 9000.—An European trading company now (1877) goes direct to Yarkund, under the enterprising direction of Mr. Russel.

Leib'nitz, properly **Leibniz, Gottfried Wilhelm, Freiherr von**, one of the greatest of German thinkers, was born July 6, 1646, at Leipzig, where his father was professor in the university. After studying here for two years, he removed to Jena in 1663, and the same year published his first printed treatise, *De Principio Individui*, which was followed three years later by his *Dissertatio de Arte Combinatoria*, a work containing philosophical speculations upon mathematics and a universal language. In 1666 he applied at Leipzig for his doctor's degree, which was refused him on account of his youth. This induced him to leave his native place and go to Altdorf, where he presented his thesis (*De Casibus perplexis in Jure*) and graduated. He then visited Nuremberg, where he applied himself to chemistry, or rather alchemy. In 1667, on the invitation of Baron von Boyne-

burg, the prime minister of the Elector of Mainz, he took up his residence at Frankfurt, where he was much engaged in legal and diplomatic business. In 1672 he was sent on a diplomatic errand to Paris, and here he spent the greater part of the next four years, acting in the capacity of a councillor of the court of Mainz. In 1673 he visited England, made the acquaintance of Newton, Wallis, Boyle, Oldenburg, and other celebrities, and was elected a member of the Royal Society of London. His connection with Mainz terminated with the life of the elector in 1676; and he left Paris, accepting the invitation of the Duke of Hanover to fix his residence in the Hanoverian capital. On his way he made a detour through England and Holland, visiting Spinoza at the Hague. Henceforward he made Hanover his home, filling numerous political and literary offices under Dukes Johann Friedrich, Ernst August, and Georg Ludwig (afterwards George I. of England). He was employed by the first to write the History of the House of Brunswick, a task which he never completed, but which directed his attention into many collateral enquiries in politics and philology. Nor did he content himself with historical records; but speculated upon the origin of the globe and the evidences of Geology (q. v.). These speculations are given in his posthumous work *Protogæa* (Gött. 1749). For three years (1687–90) he travelled through Germany and Italy, visiting the principal libraries in search of material for his projected work. After his return he was busily engaged in arranging his varied treasures; but much of his time was taken up in diplomatic and ecclesiastical business. Thus in 1700 he went to Berlin with a view of more closely uniting Hanover and Brandenburg, and while there powerfully aided in establishing the Academy of Sciences. He was elected perpetual president; and in the first volume of the transactions (*Miscellanea Berolinensia*, 1710) appear papers by him upon a vast variety of subjects—mathematics, physics, chemistry, poetry, archæology, &c. L. took a lively interest in everything relating to education; and promoted a plan for the union of the Romish and Lutheran churches, entering into negotiations, which, though encouraged by the courts of Hanover and Berlin, proved abortive. It was after his settlement in Hanover that his philosophy was gradually matured and systematised. His *Meditationes de Cognitione, Veritate, et Ideis* appeared in 1684, and in 1696 he published a short and able criticism of Locke's famous essay on the Human Understanding. A fuller and more formal reply he compiled later, but did not publish at the time on account of Locke's death in 1704. It is contained in his most important philosophical work, *Nouveaux Essais sur l'Entendement Humain*, published by Raspe in 1767. The second in importance of his works is the *Théodicée* (1710), which was written avowedly to refute Bayle's sceptical views, and still occupies a foremost place in the literature of theology. His speculations drew him into a controversial correspondence with Samuel Clark, in the midst of which he died, November 14, 1716. As a mathematician, L. is celebrated as the independent discoverer of the methods of the differential calculus; and in this connection was embroiled in a discussion with Newton, or rather Newton's friends, regarding the claims of each to priority. The main features of his philosophical system are given under the articles MONAD and OPTIMISM. His works were published by Dutens in 6 vols. in 1768; and in 1840, his philosophical works, published originally by Raspe, were re-published by Erdmann. A collected edition was begun by Pertz (11 vols. 1843–62); another, by Klopp (5 vols. 1864–66). See Guhrauer, *G. W. Freiherr von L. Eine Biographie* (Bresl. 2 vols. 1846; translated into English by Mackie, Boston, 1845).

Leices'ter (Lat. *Legionis castra*), the county town of Leicestershire, England, on the Soar, 29 miles N.N.W. of Northampton by rail. It has many fine churches, of which Sir G. G. Scott restored St. Mary's (1860), and erected St. Andrew's (1862) and St. Matthew's (1867). Other edifices are the Guildhall, Corn Exchange, Museum, Alderman Newton's School (1865), Wigston's Hospital (rebuilt 1866), and the Trinity Hospital. L. has made rapid commercial progress during the last twenty years. The staple industry, the manufacture of hosiery, employed, in 1874, 4707 weavers; and bootmaking, worsted and cotton spinning, brewing, tanning, lacemaking, ironfounding, the manufacture of farm implements, &c., are largely carried on. Pop. (1871) 95,220. L. returns two members to Parliament. It is a place of great antiquity—the capital of the Coritani, and the Roman *Ratæ*; was the scene of three parliaments; and sustained sieges by the Danes (886), William Rufus (1088), and Prince Rupert and Fairfax (1645). Richard III. slept here, at the Blue Boar Inn, the night before Bosworth Field (1485); and Cardinal Wolsey died at the now ruined abbey of St. Mary de Pratis (1530).

Leicester, Robert Dudley, Earl of, fifth son of John Dudley, Duke of Northumberland, was born in 1531. On Elizabeth's accession in 1558 he became her prime favourite. She showered honours, offices, and gifts upon him. His wife, Amy Robsart, died in 1560 under suspicious circumstances, L. being thought to aspire, not without encouragement, to the hand of the queen. To allay suspicion, Elizabeth proposed L. as the husband for Mary Queen of Scots, who did not approve the choice. In 1575 he entertained Elizabeth at Kenilworth for seventeen days, at a cost of £60,000. In 1576 he privately married the Countess of Essex. On the news reaching the queen, he incurred, but only temporarily, her displeasure. He was military commander in the Netherlands 1585–87, and at Tilbury 1588. A successful intriguer and clever courtier, he was devoid of solid ability and of principle, and was an incapable soldier. He died at Cornbury in Oxfordshire, 4th September 1588. See Froude's *History of England*.

Leices'tershire, an inland county of England, is bounded N. by Nottinghamshire, N.E. by Lincolnshire, E. by Rutland, S.E. by Northamptonshire, S.W. by Warwickshire, and N.W. by Derbyshire. Area, 799 sq. miles: pop. (1871) 269,311. The surface is almost wholly occupied by undulating hills, the highest of which is Bardon Hill (853 feet) in the N.W. portion of the county, which, though now bare of trees, still retains the name of Charnwood Forest. The formation is New Red Sandstone, with the exception of the Great Oolite and Lias in the E., the coalfields of Ashby-de-la-Zouch, and some isolated hills of mountain limestone. L. is watered by the Soar, a tributary of the Trent, has a mild, dry climate, and a loamy soil. In 1876 there were 103,415 acres under corn crops; 24,667 under green crops: 34,010 under clover, sanfoin. and grasses in rotation; and 293,247 in permanent pasture, exclusive of health or mountain land; also 17,917 horses, 128,088 cattle, 428,155 sheep, and 25,438 swine. The chief crops were barley, wheat, oats, beans, turnips, mangold, potatoes, and hay. Most of the cheese known as Stilton is made at the dairy farms round Melton Mowbray. The county returns four members to Parliament. The chief towns are Leicester (q. v.), Ashby-de-la-Zouch, Bosworth, Market Harborough, Lutterworth, and Melton Mowbray. L. is rich in Roman remains—roads, stations, and tumuli—and has besides the ruins of three castles and five abbeys and nunneries.

Leigh, a manufacturing town of England, in Lancashire, 7½ miles S.W. of Bolton by rail. The staple industry is the silk manufacture, but it also possesses extensive iron-foundries, cotton-factories, breweries, and flour-mills. There are large collieries in the vicinity. Pop. of parish (1851) 5206; (1871) 33,592.

Leigh'ton, Alexander, born in Edinburgh in 1568, studied at Leyden, where he obtained a medical diploma, and at Edinburgh, where he became Professor of Moral Philosophy (1603), came to London (1613), and, having failed to obtain the licence of the College of Physicians to practise as a doctor, accepted the lectureship of a Calvinist meeting-house. In 1629 he had printed in Holland *An Appeal to the Parliament, or Zion's Plea against the Prelacie*, in which the prelates were denounced as men of blood, episcopacy as antichrist, and the queen as a daughter of Heth. For this he was arrested, February 29, 1630, brought to trial, June 4, and sentenced to be degraded from the ministry, whipped, pilloried, and branded with a double S.S. ('sower of sedition'), to have his ears cut off, and his nose slit, to pay a fine of £10,000, and to be imprisoned for life. He escaped, but was recaptured, and, after undergoing this barbarous punishment, lay in the Fleet Prison until released by the Long Parliament (1640), which also voted, but never paid him, £6000, and made him keeper (1642) of Laud's palace at Lambeth, at that time a State prison. He is said to have died insane, either in 1644 or 1649.—**Robert L.,** 'the saintly archbishop,' son of the above, is variously stated to have been born at Edinburgh or London, in 1611 or 1613. He certainly entered the university of the former city in 1627, took his M.A.

in 1631, resided for some years with relatives at Douai in France, whose daily intercourse with Catholics widened his views and sympathies, and returning to Scotland, was ordained to the ministry of Newbattle, near Edinburgh, in December 1641. L.'s dislike to the Covenant, his non-attendance at the meetings of his presbytery, and his request to be allowed to preach not 'to the times' but 'for eternity,' are recorded in the records of the Presbytery of Dalkeith and of the Newbattle kirk-session (published in vol. iv. of the *Proceedings of the Society of Antiquaries in Scotland*). He joined the 'Engagement Party' for the king in 1648, corresponded actively with English episcopalians, and in February 1653 finally resigned his cure, but was notwithstanding elected in the same year Principal of the University of Edinburgh. In this post, and this only, L. seems to have found rest. He preached the truths of Christianity, leaving others to settle its disputes; by a visit to Cromwell he procured a grant of increased funds to his university; and won the respect of the most different parties. But at the Restoration he was called on through his brother, Sir Elisha L., a secret convert to Catholicism, to accept a mitre, and choosing Dunblane, the poorest and smallest see of Scotland, was consecrated December 15, 1661. Too liberal for the narrow, too yielding for the hard times on which he was thrown, L. spent the next eleven years in fruitless endeavours to counteract or undo the work of Sharp and Lauderdale, to heal divisions, and to restore within his diocese more frequent services and celebrations. Twice he repaired to the court of Charles, in 1665 and 1669, the second time to tender his resignation, but in place of its acceptance he found himself translated to the archiepiscopate of Glasgow. Two years more of heartsick struggles with the intolerance of evil times, and he retired from the unequal contest, first to Edinburgh, then in 1674 to Broadhurst in Sussex, the residence of his sister, Mrs. Lightwater. Here he lived, busied only with study, prayer, and meditation, until his death, which took place during a visit to London in an inn in Warwick Street, June 26, 1684. L.'s influence, unfortunately so small on his own times, has been great on posterity. His 'golden' *Commentary on the First Epistle of St. Peter* is marked by a thorough Scottish metaphysical faculty, lit up by pleasant humour, and has won the admiration of men of all shades of opinion, from Doddridge to Coleridge, forming as it does the basis of the latter's *Aids to Reflection*. And his *Sermons* and *Prælectiones Theologicæ* are only less valuable. Editions of his works have been published in 1808, 1819, 1825, 1828, and by the L. Club, the last volume of their series appearing in 1875. See the account of L. in Bishop Burnet's *History of his Own Times*.

Leighton, Frederick, A.R.A., an English artist, was born at Scarborough, 3d December 1830, studied at Rome, Berlin, and Frankfurt, and produced his first finished picture, 'Cimabue Finding Giotto Drawing in the Fields,' at Brussels in 1848. After further study at Paris, Frankfurt, and Rome, he sent to the Royal Academy in 1855 the large picture 'Cimabue,' representing the triumphal procession in Florence of the master's picture 'Madonna,' a work that produced a great impression in England, and was at once purchased by the Queen. This was followed in rapid succession by a brilliant series of classical, scriptural, and dramatic works, which have earned for him an honourable place in the first rank of English painters. Among the chief of these are 'The Triumph of Music' (1856), 'Scene from Romeo and Juliet' (1858), 'Capri — Sunrise' (1860), 'Michael Angelo Nursing his Dying Servant' (1862), 'Dante in Exile' (1864), 'Syracusan Bride leading Wild Beast to the Temple of Diana' (1866), 'Actæa' (1868), 'St. Jerome' (his diploma work, 1869), 'Hercules Wrestling with Death for the Body of Alcestis' (1871), 'Weaving the Wreath' (1873), 'Moorish Garden; a Dream of Granada' (1874), 'Daphnephoria' (1876), and 'the Music Lesson' (1877). In 1877 he produced his remarkable essay in sculpture, 'An Athlete Wrestling with a Python,' which was purchased by the Academy from the Chantrey Fund for £3000. As a painter L. is distinguished by strong individual character, and staunch adherence to the traditions of the schools, especially that of Venice.

Leighton-Buzzard ('Buzzard' is a corruption of the Fr. *beau desert*, and 'Leighton' of the old *Legean-buhr*, 'the fortress of the legion'), a market-town of England, Bedfordshire, 40½ miles N.N.W. of London by the North-Western Railway. It has an old church dating from the 13th c., a new one, St. Andrew's, erected in 1866, a market-house, and a restored Gothic cross. There is some industry in straw-plaiting. Seven fairs are held here during the year. Pop. (1871) 4696.

Lein'ingen, a mediatised German house, of which the male line became extinct as early as 1220, but was renewed by Friedrich of Saarbrück, grandson of the previous Count, and in 1317 split into two. In 1799 the head of the chief branch was made a Prince. The possessions of the L. family now lie in parts of Baden, Bayern, and Hessen. Queen Victoria's late brother, Prince Karl (1804–56), was father of the present Prince Ernst of L. (born 9th November 1830), captain of the royal yacht 'Alberta.'

Leinster (Irish Gael. *Laighen*, 'a broad-pointed spear,' used by the original settlers, according to the legend of the annalists; the *ster*, 'station,' is a later Scandinavian addition), the most south-easterly of the provinces of Ireland, is bounded N. by Ulster, W. by Connaught and Munster, S. and S.E. by St. George's Channel, and E. by the Irish Sea. Its greatest length from N. to S. is 137 miles, and from E. to W. 83 miles; area, 7619 sq. miles; pop. (1871) 1,339,451. L. is mountainous in the E., especially in Wicklow. With the exception of isolated peaks and hilly tracts, the rest forms a plain intersected by numerous rivers, and in the N. diversified with lakes. The chief rivers are the Dee, Boyne, Liffey, Slaney, and Barrow (with its affluents the Nore and Suir). The Shannon separates it from Connaught. The main industries are tillage, cattle-breeding, and linen manufacture. From 1841 to 1871 the pop. of L. decreased on the average 1⅕ per cent. per annum. L. comprises twelve counties. See IRELAND.

Lei'pa, or **Böhmisch Leipa**, an old town of Bohemia, Austria, on the Pulsnitz, 46 miles S.E. of Dresden by rail, has cotton, linen, and woollen manufactures. Pop. (1869) 8514.

Leipoa, the aboriginal name of a bird belonging to the family *Megapodiidæ*, peculiar to Australia and New Guinea, and called by the colonists the native pheasant. The only species known is *L. ocellata*, which very much resembles a pheasant, except that it lacks the long tail of the latter. The L. inhabits sandy plains, where it builds a curious mound-like nest, about 3 feet high and 8 feet in diameter. The lower part of the nest is very hard, and this, added to the fact that ants are always numerous near it, gives the nest very much the appearance of an ant-hill. The L. lays about a dozen eggs, and if these are removed, it will continue, like the common domestic hen, to lay fresh ones.

Leip'zig, after Dresden the largest city in the kingdom of Saxony, is situated in an extensive plain, near the confluence of the small rivers Elster, Pleisse, and Parthe, by which it is in part intersected, 65 miles W.N.W. of Dresden by rail. It is, after Hamburg, the most important commercial town in Germany, is the imperial centre of the book trade, and the seat of the supreme commercial tribunal for the Empire, and of one of the oldest and most renowned universities in Europe. The interior of the city is somewhat irregular and dingy, dating mainly from the 17th and 18th centuries. It is girt by five handsome modern suburbs, now forming a continuous belt, from which it is separated by the Promenades, a chain of fine gardens and shady walks, occupying the place of the old fortifications. Along the line of the Promenades are several fine squares, as the Augusta Platz (on which are many of the finest buildings), Fleischer Platz, and Ross Platz, while the suburbs are ornamented by the Lohrs Garten, Rosenthal, Johannesthal, Johanna Park, &c. The finest buildings are the Augusteum, the seat of the University, built by Gentebrück, after Schinkel's designs, in 1830; the new theatre, an ornate imposing edifice in Renaissance style, designed by Langhaus, and opened in 1868; the museum, a handsome work by Lange (1858), containing rich collections of plaster casts, engravings, and pictures, and among the latter four celebrated landscapes by Calame; the large Pleissenburg, originally a citadel, in which took place Luther's disputation in 1519, but now used as a barrack; and the *rathhaus*, of date 1556, occupying one side of the Markt Platz, near the centre of the city. Of the few good churches, the most notable are the Nicolaikirche, a Gothic structure, dating from 1525, and Thomaskirche, consecrated in 1496, and containing a beautiful marble altar. L. has a municipal hospital (1811), a physiological institute, a botanic garden, and a conservatory of music, now ranked among the first in Europe. The university (Protestant) is the

most important in Germany in respect of attendance, having, in 1876, 156 professors and teachers, and 2925 students, of whom 1171 were studying jurisprudence, 989 philosophy, 428 medicine, and 337 theology. It was founded in 1409, and has a library of 150,000 vols. and 2000 MSS., while the city has another of 100,000 vols. and 2000 MSS. As a centre of bookselling and publishing, L. ranks next to London and Paris. In 1871 there were 249 book firms, 21 book-commission merchants, and 114 publishers, most of whom had their own printing establishments. Publishers throughout Germany have book depôts here, and packages of new works pour daily into the city, to be at once circulated again. The German booksellers congregate in great number at the Easter or 'Jubilate' Fair, and transact business at their own Börse. L. has an extensive typefounding industry and manufacture of chemicals, waxcloth, ether, oils, perfumes, musical and scientific instruments, cigars, hats, &c. Three celebrated annual fairs are held, at Easter, Michaelmas, and New Year, and the first two are still attended by a vast concourse (some 40,000) of merchants and traders, comprising Jews, Greeks, Bulgarians, Armenians, Turks, Persians, and even Chinese. The staple commodities are furs (£1,000,000 worth yearly), leather, cloth, woollen wares, linens, and glass; and transactions are valued annually at £10,000,000. A wool market is also held for three days in June. Pop. (1875) 127,387. L. is said to have been originally a Slavic settlement, its name, *Lipzk*, meaning 'town of the lindens,' from *lip* or *lapi*, 'a linden.' It clustered round a castle built by King Heinrich I., and is first mentioned in history as a town in 1015. It was fortified in the 11th c., received various privileges from Otto the Rich, Markgraf of Meissen, about 1170, and thereafter increased rapidly. As early as 1180 biennial markets, at Easter and Michaelmas, were held, and attained great importance in the 15th c. In 1458 a New-Year's fair was added, and subsequently the privileges of the town were extended by the Emperor Maximilian. The *L. Conference* between Luther, Eck, and Karlstadt (1517) connects L. with the advance of the Reformation. The town was five times besieged and taken during the Thirty Years' War. Tilly took it in 1631, and later the Swedes and the Imperialists held it alternately. Its growing commerce was again checked by the Seven Years' War. In and about it took place the great battle of L., or 'battle of nations,' between Napoleon with 180,000 men, and an allied force of 300,000, commanded by Prince Schwarzenberg, Blücher, and Bernadotte. After a terrible conflict of three days the French were forced to evacuate L., with the loss of 38,000 killed and wounded, and 30,000 prisoners, on the 18th October 1813. See Gretschel, *Beiträge zur Geschichte L.'s* (Leips. 1836); Grosse, *Geschichte der Stadt L.* (Leips. 2 vols. 1840-42); Sparfeld, *Chronik der Stadt L.* (Leips. 2d ed. 1851); and Zarncke, *Die Urkundlichen Quellen zur Geschichte der Universität L.* (Leips. 1857).

Leith, after Glasgow and Greenock the chief port of Scotland, is situated on the S. side of the Firth of Forth, at the mouth of the Water of Leith, distant 2 miles N.N.E. from the centre of Edinburgh, with which city it is connected by the continuous line of houses in Leith Walk; and by direct railway and tramway lines. It lies on low ground, and is divided by the Water of Leith into two parts, called North L. and South L. (now more correctly West and East L.). The older portions of the town are squalid and straggling, although considerable improvement has been effected in recent years. The Water of Leith is here crossed by four bridges, and the harbour opposite the docks is spanned by an iron bridge worked by hydraulic power, and swinging in a single leaf over a waterway 120 feet in width. This bridge was recently erected by the Dock Commissioners at a cost exceeding £32,000, chiefly to carry the railway traffic across the harbour. In South L. are extensive links, formerly much used for golfing, and containing several mounds raised by Cromwell's soldiers in 1560. The more notable buildings are the parish church of St. Mary, built in 1450, with a modern front and tower; the elegant Anglican church of St. James, with a spire and peal of bells, designed by Sir G. G. Scott; North L. parish church, with a spire 184 feet high, erected in 1814 at a cost of £14,000; Trinity House, founded in 1555, and rebuilt in 1817; the town-hall (built 1827); the Royal Exchange buildings (cost £16,000), the High School, the Corn Exchange, now partly used as a reading room, custom house, and various banks, and other offices. Facing the shore, to the W., is L. Fort, the head-quarters for the Royal Artillery in Scotland, with accommodation for 400 men and 150 horses, and the Caledonian Railway Station, of recent construction, lies between the Fort and the Shore. The industries of L. are mainly distilling, brewing, sugar-refining, the building and repairing of ships, flour-milling, engineering, and the making of sail-cloth, ropes, soap, chemicals, bottles, &c. It is now the second port in Scotland for the export of coal. But the principal feature of L. is its splendid harbour and extensive docks. There are (1877) four wet docks, with a total water area of 26 acres; the last constructed, the Albert Dock, alone covers 10¾ acres. To the E. of the Albert Dock, and on the shore of South L., a new wet dock with a centre quay and a water area of 16¾ acres is (1877) in course of construction. The reclamation work for this dock and for railway accommodation adjoining, encloses 110 acres of the seashore, and ample provision is made for the public in the way of roads and accesses to the shore, &c. There are also several graving docks, of which the largest (the Prince of Wales) is 450 feet long, 73 wide at the entrance, and 24 deep on sill at spring-tide. Two magnificent piers, the E. 3530 feet, the W. 3123 feet long, stretch out into the Forth, forming delightful promenades, and affording beautiful views of Edinburgh and the Fife hills. The trade of L., mainly foreign and colonial, and to a large extent transit, is steadily increasing. In the year ending 15th May 1877, there entered the port 4279 vessels of 919,655 tons (2130 steamers, of 576,031); and cleared, 4275 of 916,506 tons (2136 steamers of 577,418). In the same year the tonnage dues on vessels amounted to £28,721, and shore dues on goods (inward and outward) to £39,820; the total revenue of the port was £82,570, and expenditure (including cost of new wet docks) £124,603. Eleven years ago (1865) the total revenue was only £42,176. The chief imports are grain, timber, flour, guano, bones (for manure), tobacco, fruits, wine, cattle, and oil-cake; the exports are coal, iron, paper, ale, spirits, &c. The quantity of coal exported in the two years ending 15th May 1877 was 667,509 tons. With Portobello and Musselburgh, L. returns one member to Parliament. Pop. (1871) 44,277. L. is a place of considerable antiquity, reference being made to it in documents of the 12th c. It was the chief port in Scotland for several centuries, and was under the control of the municipality of Edinburgh till 1833, but since then the town has had its own provost and council, while the harbour and docks have been vested in a corporation of commissioners elected by various public bodies of Edinburgh and L.

Leit'meritz (Czech *Litomerice*), a town of Bohemia, on the right bank of the Elbe, which is here spanned by an iron bridge 597 yards long, 35 miles N.N.W. of Prag, has a fine cathedral (founded 1054), six churches, five educational institutions, &c. Brewing, salmon fishing, straw plaiting, and agriculture are the principal industries, and large quantities of fruit are annually exported to Berlin and St. Petersburg. Pop. (1869) 10,023.

Leit'omischl, a town of Bohemia, on the Lantschna, an affluent of the Elbe, 88 miles E.S.E. of Prag, has fine churches and the noble *schloss* of the ducal branch of the house of Walstein. The staple industries are the cultivation, spinning, and weaving of flax. Pop. (1869) 6789.

Lei'trim (Irish Gael. *Liath-dhruim*, 'the grey ridge'), a county of Ireland, province of Connaught, surrounded, except in the N.W., where it borders on the Bay of Donegal, by Sligo, Roscommon, Longford, Cavan, Fermanagh, and Donegal. The area is 597 sq. miles, 25 of which are under the larger rivers and lakes; the pop. (155,297 in 1841) was, in 1871, 95,562, of whom 85,974 were Roman Catholics. The S. portion of L. is a plain, bordered on the W. by the Shannon, studded with small loughs and intersected with affluents of that river and the Erne, but the rest (two-thirds of the county) is very mountainous. The chief peaks are Truskmore (2072 feet) in the N., Slieve-an-Ierin (1922 feet), and Slieve-na-Killa (1711 feet) in the E. L., at its narrowest part, is nearly cut in two by Lough Allen. The prevailing rock in the S. of L. is limestone, and in the N. sandstone; the soil is fertile only in the S. The main crops are oats, potatoes, and hay. In 1871, 86,738 acres were under tillage; 212,632 in pasture, 3265 plantation, and 66,580 waste, bog, mountain, &c. Some of the inhabitants are employed in making frieze, coarse woollens, and linen, and in working limestone and

coal. Iron and lead ores are also found in L. There are three market-towns, Carrick-on-Shannon (which is also the assize town), pop. (1871) 1431; Mohill, pop. (1871) 1062; and Manor-Hamilton, pop. (1871) 977. The county has two members of Parliament. L. was conquered by the English in the reign of Elizabeth. Brian O'Rourk rebelled in 1588, and in 1596 his son, Teague O'Rourk, who was not reduced till 1603.

Lel'and, Charles Godfrey, a versatile American writer, born at Philadelphia, August 15, 1824, graduated at Princeton College (1846), travelled in Europe, and studied at Heidelberg, Munich, and Paris, and returning to America in 1848, was called to the bar (1851). Relinquishing law for literature, he wrote for periodicals, and was editor of several American magazines, but shortly after the close of the Civil War, in which he saw some service, settled in England, where he has since continued to reside. L.'s fame rests chiefly on his *Hans Breitmann's Ballads* (5 parts, 1867–70; complete ed. 1872), written in the broken English of a Pennsylvanian German; somewhat similar to which is his *Pidgin English Sing-Song* (1876). He is also author of two works on the English gypsies, various translations from the German, the *Egyptian Sketch-Book* (1873); *Johnnykin and the Goblins* (1876), &c.

Leland, or **Laylonde, John,** the first English antiquary, born in London about 1506, passed from St. Paul's School to Christ's College, Cambridge, where he graduated in 1521; afterwards, at Oxford and Paris, studied, besides Greek and Latin, Anglo-Saxon, Welsh, French, Spanish, and Italian; and having taken orders, received the living of Popeling in Calais Marches (1530), the posts of chaplain and librarian to Henry VIII., and the title of King's Antiquary (1533), with a commission to examine all the libraries of the kingdom. For six years he travelled through England and Wales, compiling notices of the towns, castles, and religious houses, catalogues of libraries and extracts from the books they contained, with miscellaneous topographical and historical memoranda. Six more years he spent in the task of arranging the mass of material he had thus accumulated, receiving the rectory of Haseley, Oxfordshire (1542), and a canonry of King's College, Oxford (1543), but his reason gave way; he became perfectly insane in 1550, and died at London, 18th April 1552. Of his invaluable collections, which were dispersed at his death, some have perished, others were deposited (1632) in the Bodleian Library at Oxford. Of the latter the *Commentarii de Scriptoribus Britannicis*, was edited by Anthony Hall (2 vols. Oxf. 1709); and the *Itinerary* (9 vols. Oxf. 1710–12; 3d ed. 1770); and *De Rebus Britannicis Collectanea*, by Thomas Heaure (6 vols. Oxf. 1715; 2d ed. 1770).

Leland, John, D.D., a Presbyterian divine, born at Wigan, in Lancashire, 18th October 1691, was educated at Dublin, and receiving the pastorate of a congregation in New Row in that city (1716), continued to labour there until his death, 16th January 1766. He was the author of an answer to Tindal's *Christianity as Old as the Creation* (1733); to Morgan's *Moral Philosopher* (1739), for which Aberdeen University conferred on him its doctor's degree; to Dodwell's *Christianity not Founded on Argument* (1742); and to Bolingbroke's *Letters on History* (1752). He also wrote *A View of the Principal Deistical Writers in England* (1754); and *The Advantage and Necessity of the Christian Revelation* (1762). See the life, by Isaac Weld, prefixed to his posthumous *Discourses on Various Subjects* (4 vols. 1769).

Lely, Sir Peter (Peter van der Faes), was born at Soest, Westphalia, in 1618. He was a pupil of the painter Peter Grebber. In 1641, the year following that of Van Dyck's death, he visited England, where he soon fell to portrait-painting, following Van Dyck's popular style. Undisturbed by political changes around him, he pursued his profession with equal success under Charles I., Cromwell, and Charles II., by whom he was knighted. Being court-painter to Charles II., he was chiefly occupied, as might be expected, in executing female portraits, and his array of 'Windsor Beauties' remains to testify to the king's taste and the painter's skill. His portraits of men are, as a rule, wanting in vigour; but his ladies, for easy attitude, graceful drapery, and depth of expression, equal those of Van Dyck. Of his historical subjects, the best known are 'Susanna and the Elders,' 'Jupiter and Europa,' 'Cimon and Iphigenia.' L. died in 1680.

Lemaître, Frédéric, one of the greatest of French actors, was born at Havre, in July 1798, and studied for two years under Lafon at the *Conservatoire*. He played at the 'Odéon' and 'Comédie,' but found his proper sphere at the 'Porte Saint-Martin,' where his brilliant versatile powers gained him the name of the *Talma du Boulevard*. The ease with which he passed from the tragic through the airiest comedy to all the phases of the eccentric and grotesque, made him the great actor of the new romantic school of art and poetry. He embodied the finest conceptions of Dumas and Victor Hugo, and among his many striking parts were 'Ruy Blas,' 'Lucrèce Borgia,' 'Kean,' and 'Robert Macaire.' L. died 1st February 1876.

Léman, Lake. See GENEVA.

Lem'berg (Polish, *Lwow;* Lat. *Leopolis:* Fr. *Léopol*), the capital of Galicia, Austria, on the Poltew, 368 miles N.E. of Vienna, and 190 miles E. of Cracow by rail. The older part of L. is uninteresting, but its seven suburbs make it one of the finest towns in Austria. It is the seat of a Catholic, a Greek and an Armenian archbishop, and has twelve monasteries and thirty-one churches, chief of which are the Roman Catholic cathedral (1344), in the Gothic style, the Dominican church, the Greek Cathedral of St. George, with the archiepiscopal palace. The Rathhaus is modern, and has a tower 262 feet high. There are many educational institutions, and a university, founded in 1784, which has 1000 students, and a library of 50,000 volumes. The National Institute, founded by Count Ossolinski in 1817, possesses 100,000 volumes, and a rich museum of paintings and antiquities. L. has a great commission trade, and manufactures attar of roses, wax-lights, lucifer-matches, naphtha, paper, and machinery. During three weeks following the 6th of January there is annually held a great fair and money-market. L., formerly called Lowenburg, had its founder Lew or Leo Danielwicz, Prince of Halicz, dating from 1259. It was taken by Kazimierz III. in 1348, and was besieged by the Tartars in 1525, the Russians and Cossacks in 1556, Radoczy in 1657, the Turks in 1672, and the Swedes under Karl XII., in 1704. In the first division of Poland it fell (1772) to Austria. Pop. (1876) 87,109.

Lemm'a (Gr. 'something assumed') in geometry, is a preliminary proposition, established with a view to facilitate the demonstration of a theorem, or the construction of a problem.

Lemm'ing (*Myodes Lemmus*), a genus of *Rodentia* (q.v.) inhabiting N. Europe, and included in the *Muridæ* or Rat family. The ears are very small. The feet have hairy soles, and the structure of the fore-feet is eminently adapted for digging in the ground. The tail is extremely short and hairy. The teeth number sixteen, and include two incisors, two premolars, and four molars in each jaw. The average size of the L. is about 6 inches. The colour is dark-brown above, the under parts being yellowish-white. The chief interest attaching to the L. arises from its periodical migration in immense hordes from the interior to the sea, travelling invariably in a straight line. If rivers or lakes of considerable breadth intervene, the animals swim across; and so destructive are they, that the Roman Catholic clergy are accustomed to use a form of exorcism wherever they appear in any district.

Lem'nian Earth, a mineral substance of a clayey consistency, found in the island of Stalimene (ancient *Lemnos*), and used by the Turks as a medicine. Formerly it was dug up annually with considerable ceremony, and stamped with an official seal.

Lem'nos (still so-called, and also by its modern name *Stalimene*), is an island in the Ægean Sea, about halfway between Mt. Athos and the Hellespont. It is 147 sq. miles in area, and its rocks exhibit manifest signs of volcanic action. L. was the fabled residence of Vulcan, who is said to have fallen upon it when hurled by 'angry Jove' from heaven. It had a famous labyrinth, and its chief production is a species of red earth. See LEMNIAN EARTH.

Lem'on (Fr. *limon*, from the Turkish *limum*, and that from the Arab. *laimun*), a fruit which is the produce of *Citrus Limonium*, one of the varieties of Linnæus' *C. medica*, of which other varieties are the Citron, the Lime, the Sweet L., and, in the opinion of some authorities, the Orange also. According to Alph. de Candolle, the L. was unknown to the ancient Greeks

and Romans, its culture only extending into the W. with the conquests of the Arabs. It is now largely grown as an article of commerce in various countries bordering on the Mediterranean, the fruit being used extensively in the preparation of *L.-juice*, which is largely employed in the manufacture of lemonade and by calico-printers. *Oil of L.*, expressed or distilled from the fresh peel, serves for flavouring, &c., and from it citric acid is prepared. *L.-peel* is the outer rind of the fruit, and used either in a fresh or dried state, for various domestic and medicinal purposes. The L. has become naturalised in parts of S. America, and in some of the W. India islands. *L. coloured* expresses the purest yellow without any brightness.

Medicinal Properties of the L.—L.-juice is administered in febrile and inflammatory affections, and in acute rheumatism, but its chief use is as an antiscorbutic, its properties as such having been ascertained in 1609. It was not, however, till 1795 that the Admiralty gave a general order for the supply of L.-juice to the crews of the navy.

Lemonade', a cooling pleasant antiscorbutic beverage prepared by adding sliced lemons and a sufficiency of sugar to boiling water, leaving the mixture till it cools, and then straining off the liquor. The name is also commonly given to an aerated beverage (see ÆRATED WATER) to which a proportion of syrup of lemons is added.

Lemon Grass (*Andropogon Schananthus*) is a native of the deserts of Arabia, &c., frequent in British gardens as a stove-conservatory plant. The fresh leaves when bruised emit a delightful lemon-like scent, and a fragrant oil known medicinally as Siri-oil is obtained by distillation. A similar species occurs in arid places of the interior of N. Australia.

Lempriere, John, D.D., was born in Jersey about 1755, and studied at Pembroke College, Oxford. In 1788 he published the *Classical Dictionary*, which for many years was familiar in the hands of English classical students, but which has long been displaced by works more equal to the demands of modern scholarship. L. published a *Universal Biography* in 1808, and died 1st February 1824.

Le'mur, the name given to various genera of *Strepsirhine* or lower monkeys, chiefly inhabiting Madagascar, but also occurring in the E. Archipelago. They have, as a rule, fox-like heads. All the feet are provided with five toes, and the hinder feet are usually larger than the fore feet. The nail of the second finger is long and curved. The most familiar forms are the ring-tailed L. (*L. catta*), the red L. (*L. ruber*), the diadem L. (*Propithecus diadema*). The Flying Lemurs (q. v.) or *Galeopithecidæ* have relations rather with the Insectivora than with the true L.



Lemur.

Lem'ures were the spirits of the departed, believed by the Romans to wander about at night in frightful forms, and terrify the living. Their festival, called Lemuria, was held on the 9th, 11th, and 13th of May, when certain ceremonies were performed with the view of propitiating them.

Le'na, one of the principal rivers of Siberia, rises near Irkutsk, in the mountains that line the N. shore of Lake Baikal, flows N.E. for about half its course, and then almost due N., entering the Arctic Ocean by two main and six minor channels. It is 2540 miles long, and its chief affluents are, on the left, the Viljui and Nun, and on the right, the Aldan, Vitim and Olekma. The chief towns upon it are Kirensk, Vitimsk, Olekminsk, Jakutsk and Schigansk. The L. is by far the greatest trading river of E. Siberia, and is open from May till November.

Len'clos, Ninon de, the French Aspasia of the 17th c., was born of good family at Paris, 13th May 1616. Her mother endeavoured to train her piously; but her father cultivated with more success her taste for pleasure. She was singularly beautiful, spoke several languages with ease, excelled in other accomplishments, and enjoyed a yearly income of £10,000. When seventeen she left the maternal roof, some say under the protection of Richelieu, others, under that of the Duc de Coligny. It matters not which was first; her intrigues continued for fifty years, and with more than fifty lovers. In one instance, indeed, she remained with an amorous gentleman in the country for three entire years; but such a breach of her own rules was not to be tolerated, and her mob of admirers recalled her to Paris. In the case of one family—the Sevignés—she was mistress successively to father, son, and grandson. She closed her list of successful adorers with Chateauneuf at seventy, but was considered beautiful when nearly ninety. Of her two sons, one, ignorant of his parentage, made love to her, and shot himself on learning the truth. Despite her character, the best of society visited her; authors and authoresses were proud to correspond with her; and anxious mothers brought their children to her home to study society—for manners then took the place of morals. Ninon was no worse than many ladies of her time—only more beautiful and more distinguished in her connections. She died in 1705. There are some genuine letters of hers in the works of St. Evremond, but those under her name addressed to the Marquis de Sevigné are spurious. See Sardière's *Vie de N. de L.*; Bret's *Mémoire sur N. de L.*; and Voltaire's *Lettre sur Mlle. de L.*

Lenkoran', a Russian port on the Caspian, at the mouth of a small stream of the same name, 133 miles S.S.W. of Baku, and 20 miles from the Persian frontier, is an important station for trade between Russia and Persia. Pop. 6000.

Lennep'. See WUPPERTHAL.

Lennep, Jacob van, a great Dutch novelist, born at Amsterdam, 24th March 1802, was the son of David Jacob van L., the philologist, who died in 1853. L. chose the profession of law and acquired a large practice. After publishing at Amsterdam *Vaderlandsche Legenden*, a collection of heroic legends, he produced two successful political comedies, *Het dorp aan die Grenzen*, and *Het dorp over die Grenzen* (Amst. 1830), inspired by the revolution in Belgium at that time. Of his subsequent dramatic pieces, which number about thirty, *De Vrouwe van Waardenburg* (1859) is the most popular. The list of his novels contains more than fifty, of which the best known are *De Roos van Dekama* (Amst. 1837); *Ferdinand Huyck*, and *De lotgewallen van Klaasje Zevenster* (5 vols. ib. 1866). Among his other works were an *edition de luxe* (12 vols. 1857–66) of the poet Vondel (q. v.); *Geschiedenis van Noord-Neederland* (1865 *et seq.*), and *Nêrlands Roem* (1856 *et seq.*). L. died August 26, 1868. The elegant and interesting style of L., and his animated pictures of scenes from the national history, have led his countrymen to call him the 'Walter Scott of Holland.'

Lenn'oxtown, a post-village of Scotland, in Stirlingshire, on the Glazert Water, near the Lennox hills, 11 miles N.N.E. of Glasgow by rail. It has calico printworks, lime and alum works, and, in the vicinity, extensive collieries. Pop. (1871) 3917.

Lenocin'ium, a term of English and of Scotch law, more commonly used in the latter than in the former, denoting a husband's connivance at his wife's adultery. It affords the wife a valid defence against an action for divorce on the ground of adultery.

Lens (Lat. *lens*, 'a lentil') is a thin, usually circular, segment of glass, or other transparent material, bounded by two surfaces, one of which at least must be curved. If parallel rays of light be transmitted through such a structure, they in general suffer refraction, so as to converge to a point on the other side of the L., or to diverge as if radiating from a source of light placed at a point on the same side of the L. from which the incident rays approach. This optical property divides lenses into two great classes, to the first of which the varieties known as the double convex, plano-convex, and concavo-convex or meniscus, a diametral section of which is crescent-shaped. These make parallel rays converge, while the double concave, plano-concave, and convexo-concave make them diverge. Assuming the L. to be circular, the straight line drawn through the centre perpendicular to the opposing surfaces is the *axis* of the lens. Now, in accordance with the known laws of Optics (q. v.), a ray of light falling upon the curved surface of a denser medium, at any angle within certain

limits is bent in *nearer* the normal at the point of incidence. Consequently, rays passing through a glass L. will be refracted towards the normal at the point of incidence, and away from the normal at the point of emergence. If the L. be double convex both normals drawn inwards approach the axis, and hence any incident ray will be refracted towards the axis. A pencil of rays parallel to the axis will be made to converge, and those which are near the axis, should the bounding surfaces be portions of spheres, will approximately converge in one point on the axis which is termed the principal focus. If a source of light, therefore, be placed at the focus, the diverging rays which fall upon the L. are refracted so as to become nearly parallel. The rays from a source of light at a greater distance than the focus converge at a point, whose distance from the L. is also greater than the focal distance, while rays from a source nearer than the focus still diverge after passing through the L. It is for this reason that an object within the focal distance appears magnified to an eye placed close on the other side of the L. The great importance of lenses lies in their application to the construction of optical instruments, such as the microscope, telescope, spectacles, &c., and to these reference must be made for a fuller discussion of the purely optical properties, as well as the phenomena attending the combination of lenses in various ways.

Lens, a town of France, department of Pas-de-Calais, on the Souchez, 12 miles N. of Arras by rail. It is the ancient *Elena* or *Lenense*, and has sugar refineries, distilleries, &c. Pop. (1872) 7298.

Lent (Old Eng. *lencten*, 'spring') is a fast of forty days (hence its Greek and Latin names, *tessarakoste* and *quadragesima*) previous to the celebration of Easter. At first the observance only lasted forty hours—from the afternoon of the Crucifixion-day to the morning of the Resurrection-day. It was then extended to three, four, or six days in the week before Easter, according to the option of different churches, and afterwards to three and six weeks, always excepting the Sundays, which were celebrated as a festival in honour of Christ's Resurrection, and in some churches, especially in the East, also the Saturdays or Sabbaths. To this period of thirty-six days Ash-Wednesday and the three following days were authoritatively added in the 6th c., probably by Gregory the Great, from the idea that it was meet to follow the example of Moses, Elias, and Christ, who fasted forty days. St. Gregory's rule that L. begins on the Wednesday of the seventh week before Easter, is universally followed in the West, but in the Eastern Church L. begins on the Monday after Quinquagesima.

Lent'hall, William, Speaker of the Long Parliament, was born at Henley-on-Thames, Oxfordshire, in June 1591; educated at Thame School and St. Alban Hall, Oxford, and called to the bar at Lincoln's Inn in 1616. Elected M.P. for Woodstock, he was chosen Speaker of the House of Commons (1640), and as such was desired by Charles I. to point out to him the five members whom he had come down to arrest, January 4, 1642. 'May it please your Majesty,' said L., falling on his knees, 'I have neither eyes to see, nor tongue to speak, but as the House directs me.' He was rewarded for his conduct on this occasion by the posts of Master of the Rolls, Commissioner of the Great Seal, and Chancellor of Lancaster, but shared in the expulsion of the Rump, and retired from public life until 1654, when he sat for Oxfordshire, as again in 1656. At the Restoration his name was exempted from the Act of Indemnity, but he obtained a pardon, and retired to Burford Priory, Oxfordshire, where he died, September 3, 1662, having on his deathbed recanted his 'puritanical errors' to the Bishop of Chichester.

Lentibularia'ceæ is an order of plants, chiefly aquatic, or growing on marshy ground. The two principal genera are *Pinguicula* and *Utricularia*, both having several representatives in British flora. (See BUTTERWORT and BLADDERWORT.) The total number of species of the order is about 150, for the most part indigenous in the temperate and cold regions of the globe.

Len'til (*Ervum* or *Vicia Lens*, or *Lens esculenta*) is a leguminous plant belonging to the same genus as the Tares, consequently closely related to the Vetches. It is a slight growing annual, of about eighteen inches high, having racemes of a few pale blue flowers, succeeded by short, smooth pods, each containing two seeds. From these seeds a palatable and nutritious food is obtained—one of the important 'pulses' of various Eastern countries, thus rendering the L. a staple item of cultivation in Egypt, Syria, Bengal, &c. In Britain the consumption is limited, principally to the preparation of so-called patent invalid food, such as Revalenta, of which L.-meal is nearly an equivalent. The necessary supply is usually imported from Egypt, though home-cultivation has been advocated, not only for the seed produce, but for the sake of the fodder remaining after its removal. The L. is spoken of as an article of food in Genesis xxv.

Lenti'ni, a town of Sicily, province of Syracuse, 25 miles N. by E. of the city of that name by rail, and on the E. side of Lago di L. Its chief industries are gunpowder-making and the lake fisheries. There are many interesting antiquities. Pop. (1874) 10,578. L. was one of the earliest (B.C. 730) of the Greek settlements in Sicily.

Lento (It.). A musical term for a slow rate of movement. **Lentando** means *becoming slower*.

Le'o, the name of twelve popes, of whom the following are the most important:—**L. I.** ('the Great'), born towards the close of the 4th c. either at Rome or in Tuscany, was sent by Boniface I. on a mission to Carthage (418), and by the Emperor Valentinian III. to Gaul, to settle the dissension between Aetius and Albinus, in the course of which negotiation Sixtus III. died, and L. was unanimously chosen his successor (440). Favoured by circumstances, he strove successfully to extend the power of the papacy. He crushed the Pelagian, Manichæan, Eutychian, and Priscillian heresies, brought the church of Africa to acknowledge the supremacy of Rome, and retained that of Illyria in obedience. Hilary of Arles (q. v.) succumbed before his claims, and four of his legates presided at the Council of Chalcedon (451), where his epistle to Flavianus, Bishop of Constantinople, was admitted as the rule of faith for the Church Catholic. It was L. who induced Attila to evacuate Italy (452); but he could only prevail upon Genseric (q. v.) to refrain from murder and conflagration, and to spare three of his churches from the general sack (455). He died November 10, 461. Of his writings, which comprise 96 *Sermones* and 173 *Epistolæ*, the best editions are by Quesnel (Par. 1675) and the brothers Ballerini (3 vols. Venice, 1755–57).—**L. X.** (**Giovanni de' Medici**), second son of Lorenzo de' Medici, born at Florence, 11th December 1475, received the tonsure in his seventh year, along with the abbacies of Fontendolce and Passignano; became cardinal *in petto* (1488), and full cardinal-deacon (1492); shared in the expulsion of the Medici family (1494); in 1499 visited Venice, Germany, and France; and returning to Rome, led a life of pleasure, busied only with music and letters. In 1505, however, Julius II. made him governor of Perugia, and in 1511 Legate of Bologna and head of the Papal contingent to the Holy League, commanding which at the battle of Ravenna (1512), he was taken prisoner by the French. On his release he lived successively at Bologna and Florence, working for the restoration of the Medicis, till in 1513 he succeeded Julius on the throne of Peter, at the early age of thirty-eight. L. had a mighty part to play. On the eve of the Reformation, and in the full flush of the Renaissance, Christendom demanded for its head a saintly and learned politician, a liberal ecclesiastic, one who should know how to forward reformation from within, and advance the New Learning from without. Partly, but only partly, L. answered to the call. Aided by his secretaries Bembo (q. v.) and Sadoleto, he founded a Greek college and press, under the direction of Andreas Lascaris (q. v.); he re-endowed the University of Rome, gathering scholars and manuscripts from all parts of Europe; and was besides a splendid patron of painting, sculpture, and architecture. But his very merits in this direction engendered his gravest fault. To find funds for the rebuilding of St. Peter's he issued those Indulgences (q. v.) which called forth the theses of Luther, and in these L. could only see the 'quarrel of friars.' Politically, L. followed in the track of his predecessors, his object, like theirs, being to attain the independence of Italy from foreign supremacy by pitting the rival powers against each other. By Sforza's victory at Novara he effected the expulsion of the French; and he brought Louis XII. (1514) to recognise the Fifth Council of Lateran, and Francis I. (1515) to substitute the Concordat for the Pragmatic Sanction of 1438. He joined Urbino to the Papal States, and purchased Modena of Maximilian I., with whom he shared in the defeat of Marignano (14th September 1515). In 1518 he proclaimed

a five years' truce among all Christian princes, to leave them free to act against the Turks, but broke it himself by the conclusion of a secret treaty with Karl V. (8th July 1521). L. died at Rome, December 1, 1521. See Roscoe, *Life and Pontificate of Leo X.* (4 vols. Liverpool, 1805); Ranke, *Die Röm. Päpste* (Berl. 1834); and Symonds, *History of the Renaissance* (1877).

Leo, surnamed **The Isaurian**. See BYZANTINE EMPIRE.

Leo, a constellation of the N. hemisphere, the principal stars of which form a well-marked sickle. It has one star of the first magnitude, Regulus. L. is the fifth sign of the Zodiac (q. v.).

Leobschütz', a town of Prussia, in Silesia, on the Zinna, 35 miles S. by W. of Oppeln, with which it is connected by rail. It has a trade in wool, flax, corn, &c. Pop. (1875) 11,425.

Leominster, a town of England, in Herefordshire, on the river Lug, 12 miles N. of Hereford and 127 of London by rail. It has an old parish church (restored by Sir G. G. Scott), a town-hall, market-house, and corn-exchange. The district is famed for the breeding of cattle, sending to the shows most of the prize 'Herefords.' Besides the weekly Friday markets there are seven fairs held here in the course of the year. Pop. (1871) 5863. L. sends one member to Parliament.

Le'on, a former kingdom and province in the N.W. of Spain, bounded N. by Asturias, S. by Estremadura, E. by Old Castile, and W. by Portugal and Galicia, now divided into the lesser provinces of L., Zamora, and Salamanca. The country is only flat in the centre and S., where it is watered by the Douro and its tributaries, and where are produced large quantities of flax, hay, garden fruit, drugs (especially Icelandic moss), walnuts, &c. There is also much sheep (merino) and cattle rearing. The N. is a romantic region of high mountains, upland heaths and vast forests. In the N.W. the amphitheatre of El Vierzo (the Roman *Bergidum*, the *Interamnium Flavium* of Ptolemy), girt with snowy peaks, is known as the Spanish Switzerland. The Leonese boast of being the 'old Christians,' free from admixture of Moorish blood, and are high-spirited though indolent and illiterate. After passing through the hands of the Romans, Goths, and Arabs, the land was conquered by Alfonso the Catholic (A.D. 739–757). The Christian kingdom of L. and Oviedo was permanently united to Castile by Fernando III. in 1230. See SPAIN.

Leon, the capital of a province of the same name, Spain, on the left bank of the Bernesga, and above its confluence with the Torio, 90 miles N.W. of Valladolid by rail. It is the *Legio septima gemina* of the Romans. The seat of a bishop and a celebrated school, it has a richly-sculptured Gothic cathedral, fourteen churches, eleven convents, a fine town-house (1585), and many palaces of the dukes of Uceda, the counts of Luna, the Guzmans, &c. It is the centre of the Spanish flax and linen trade, now greatly diminished, and has an important yearly horse market. There are remains of the old Roman wall, 20 feet thick. Pop. 9603.

Leon, a city of Nicaragua, and capital of a department of the same name, 10 miles inland from the Pacific. It adjoins the Indian town of Subtiaba, and has a cathedral (1746–74), some twelve other churches, a new episcopal palace (unfinished in 1873), an old one of 1678, and connected with it the College of San Ramon, the University of Nicaragua. The central streets are paved and lighted. The vicinity is very picturesque, and there are many mineral springs at the foot of the neighbouring Sierra de los Marrabios. L. has almost no industries, but carries on some trade through the port of Corinto. Pop. 24,000. The town was founded originally on the W. side of Lake Managua in 1523, but was removed hither in 1610. It was formerly the capital of Nicaragua.

Leon, the second largest city of Mexico, state of Guanajuato, on a tributary of the S. Iago, 200 miles N.W. of Mexico city. It was founded in 1576, but its modern growth dates from the middle of the present century. The great emporium for the teaming plains or *bajis* of Guanajuato, it has large manufactures of cottons, woollens, leather, saddlery, &c., and a few miles to the N. are the iron mines of Comanja. In 1875 contracts were concluded for the construction of railways between L. and Mexico, and L. and Rio Grande. Pop. 100,000.

Leonfor'te, a walled town of Sicily, province of Catania, on a mountain slope, overlooking the river Dithaino, 33 miles W. of Catania by rail. Its churches contain some good pictures, and there is a trade in grain, oil, almonds, sulphur, and wine. Pop. (1874) 12,010.

Leon'idas I. became king of Sparta about B.C. 491. When the Greeks made a stand against Xerxes at the pass of Thermopylæ, L., at the head of only 300 Spartans and about 5000 auxiliaries, repeatedly drove back the hosts of the Persian king. Ephialtes, a Malian, having betrayed to the enemy a pass over the Anopæa which enabled them to attack the Greeks in the rear, L. and his noble band refused to retreat, and fell in battle, bravely charging the advancing foe.

Le'onine Verses, in Latin poetry, are verses whose closing syllable rhymes with the cæsura in the third foot. They occur occasionally in Virgil, more frequently in the elegiacs of Ovid, and were generally adopted by the Latin hymn-writers and versifiers of the middle ages. Their name is derived from Leonius, or Leoninus, who in the 12th c. was canon of the churches of SS. Benedict and Victor in Paris, and dedicated several poems in this metre to Pope Alexander III., or from one of the Popes Leo. An example is

'Si Trojæ *fatis* aliquid restare *putatis*.'—*Ovid.*

Leop'ard (*Felis leopardus*), a well-known species of carnivorous mammals, inhabiting Africa and Asia, and allied to the American Puma (q. v.) and Jaguar (q. v.). The average length of the L. is about 7 feet, and its colour is a golden yellow, on which black spots of rosette shape are disposed. A variety named the black L. (*Leopardus*, or *Felis melus*), is also known; and it may be remarked that by many authorities the distinctions between the L. and the nearly-allied panther (*F. pardus*) are not regarded as of stable or clearly specific nature. The L. has great strength and activity, and commits much havoc among cattle and sheep.



Leopard.

Leopard, The, in Heraldry, was a common charge on the arms of abbots and abbesses, as it was thought to be a cross between the pard and lioness, and therefore unproductive of issue. *Leopard* was the ancient blazon for the lion *passant*, or *passant guardant*, and it is a moot-point whether the three animals in the English royal arms were originally lions or leopards. Of the L. English heraldry has retained only the face and head.

Leopar'di, Giacomo, Count, was born at Recanati, 29th June 1798, and educated under his father's roof. Before his sixteenth year he had read through a vast proportion of the literature of Rome and Greece, and had taught himself French, English, Spanish, German, and Hebrew. His life, after 1814, has been divided with some accuracy into three periods, during which he devoted himself respectively to philology, poetry, and philosophy. During the philological epoch he wrote many dissertations and translations. In 1822 he went to Rome and took a subordinate position as librarian, continuing his critical labours, whilst he developed the somewhat sorrowful views of poetry which he had exhibited four years previously in two canzoni addressed to Monti. In 1823 he returned to his father's house, and composed *Bruto minore;* in 1825 and 1826 he lived between Milan and Bologna, in 1827–29 at Florence. L. died at Naples, 18th June 1837. A collected edition of his works, entitled *Versi e Prose de Giacomo L.*, was published at Florence in 1849. Since his death his fame has increased in his native land, and some critics have not hesitated to rank him as the greatest of Italian poets after Dante.

Le'opold I., Georg Christian Friedrich, son of the Duke of Sachsen-Koburg, was born 16th December 1790, entered as a youth the Russian army with the rank of general, saw a good deal of service, accompanied the Emperor Alexander to the Congress of Erfurt, and the army to Paris. In 1814 he visited England with the allied sovereigns, returned again in 1815, married the Princess Charlotte, heiress to the throne, receiving the title of Duke of Kendal with an annual pension of £50,000. L. refused the throne of Greece in 1830. On June 4, 1831, he was elected King of the Belgians. He married, August 3, 1832, Louise-Isabelle, eldest daughter of the French king. During

the French Revolution of 1848 L. stemmed the excitement in Belgium by frankly offering to lay down his crown, if the nation thought they would be happier under a republic. The simplicity of the King's life, his interest in art, science, and industry, and his earnest but unambitious desire for the prosperity of his kingdom, raised Belgium to a high pitch of contentment. He died 10th December 1865. See La Guéronnière, *Études et Portraits Politiques*.—His son, **L. II.**, born at Brussels, 9th April 1835, is following in his father's footsteps.

Lepan'to (anc. *Naupaktos*, mod. Gr. *Epacto*. Turk. *Alnabachti*), a decayed town of Greece, in the nomarchy of Akarnania-Ætolia, on the W. side of the Gulf of L. It is girt by an old Venetian wall, and has numerous mosques and a good harbour. Pop. 900. The Venetians, who received it from the Greek emperors of the East, strongly fortified L., and held it for four months against 30,000 Turks. It was, however, taken by Bajazet II. in 1499. Don Juan of Austria gained a great naval victory near L. over the Turks, 7th October 1571.

Lepidodendron' (Gr. *lepis*, 'a scale,' and *dendron*, 'a tree') is a genus of fossil plants frequent through the greater part of the coal formation. Compared with existing vegetation, they appear to occupy a position between cone-bearing trees and the club-mosses, having fruit that assimilates to the former, while in essentials their stem agrees with the lycopods. The remains of L. are met with in the form of dichotomous trunks up to nearly 50 feet in length, bifurcating branches beset with linear or lanceolate leaves, and the cone-like fruit which bears the name of *Lepidostrobus*. 'The stems consist of a thin cuticle, a double cellular zone, a vascular cylinder, and a pith; they are marked with rhomboidal or orbicular scale-like scars' (*Balfour*). Fifty-nine species are recorded by the palæontologist, Dr. Schimper.

Lepidop'tera (Gr. 'scale-winged'), a well-known order of Holometabolic insects, including the butterflies and moths. They have four wings covered with minute overlapping scales, which in the commoner forms appear to the unassisted sight as fine dust. The mouth is *suctorial*, the chief organ being formed of the long, confluent *maxillæ* or lesser jaws, which constitute a *proboscis* or *antlia*—a spiral tube used in sucking up the flower-juices upon which the insects subsist. The upper lip and mandibles are rudimentary, and the *labium* or lower lip is of modified nature. The *palpi* of the lower lip form cushion-like organs adapted for the protection of the proboscis when at rest. The antennæ are many-jointed, and may be club-shaped, filiform, or of comb-like shape. The compound eyes are large, and the simple eyes or ocelli number two; but these latter may be altogether wanting. The pro-thorax, or first segment of the chest, is small, and the wings have veins arranged in a radial fashion. A 'sucking-stomach' is developed, the intestine is long and convoluted, and the ovaria exist in the form of four tubes provided with a *seminal receptacle*. The *larvæ* appear as caterpillars, provided with five or six ocelli on each side, and possessing fleshy *prolegs* behind the six true legs in front. The *chrysalides* or *pupæ* are *obtected*, and are inclosed in pupæ-cases or cocoons, usually formed by the larvæ from the secretion of special glands or *spinnerets*. The *classification* of these insects has yet to be scientifically modelled. One mode of arrangement divides the L. into the Nocturnal L. (Moths), *Crepuscular* or twilight-flying forms, and Diurnal L. or butterflies. A second system of classification is that which divides them into *Micro-L.* and *Macro-L.*, and a third sysetm divides the L. into *Rhopalocera* (those with club-shaped antennæ), and *Heterocera* (those with variable antennæ).

Lepidosi'ren, or **Mud-Fish**, a peculiar genus of fishes, usually considered to form the sole example of the order Dipnoi (q. v.), but by Günther regarded as more properly united with the genus *Ceratodus* (or the Australian 'Barramunda') to form a sub-order of the *Ganoid* (q. v.) fishes. Two distinct species are known—the L. or *Protopterus annectens* from the Gambia, and the *L. paradoxa* from the Amazon. The former has thirty-six, the latter no less than fifty-five pairs of ribs. The L. differs from all other fishes not only in having a three-chambered heart, but a more lung-like air-bladder, and nostrils which open backwards into the mouth—this latter character being, however, represented in the Hag-fishes (q. v.). Occasionally, also, outside gills have been met with, all these characters evincing a close approach to the amphibian or frog-like vertebrata. The pectoral and ventral fins are filamentous structures, the latter being abdominal in position. The body is covered with scales and a distinct skull, cranial bones, and lower jaw exist, although the spine is represented by a *Notochord* (q. v.). There is, then, every reason to conclude that in the L. we meet with a genus of transitional nature, connecting the fishes with the Amphibians (q. v.). In habits the Lepidosirens are very peculiar. They appear to exist in their native rivers during the wet season, but on the approach of the dry season burrow in the mud, and thus become enclosed through the drying of the mud in a kind of nest—breathing air during this stage of their existence by means of the lung-like air-bladder.

Lep'idus was the name of a distinguished family of the Aemilia gens, which occupied a prominent position in the Roman state from the beginning of the 3d c. B.C. to the close of the 1st c. A.D. **Marcus Aemilius L.** was praetor B.C. 49, and when the civil war broke out between Pompey and Cæsar he joined the latter. On Cæsar's assassination, however, L. espoused the cause of Antony, and when Octavian deserted from the senate, the three formed a triumvirate. Though included in this body on its renewal (B.C. 37) for a second five years, L. occupied an entirely subordinate position. In B.C. 39 he made an effort to assert himself by independent action in an attack upon Sicily, but his troops eventually deserted to Octavian, to whom he was compelled to surrender. He was deprived of his rank, though not of his wealth, and was commanded to live in retirement at Circeii. L. died B.C. 13.

Lepis'ma, a familiar genus of *Thysanourous* insects familiarly known by the name of 'spring-tails,' from the possession of several long abdominal appendages, by means of which they are able to take leaps of considerable extent. The abdominal bristles in L. are short, and number five, three being much longer than the others. The eyes are minute, and consist of two simple eyes or ocelli. *L. saccharina* is a familiar species, inhabiting houses and destroying tapestry and silken fabrics. *L. domestica* is of a white colour, spotted with black. *Machilis* is an allied genus. No wings exist in these insects. The body is covered with minute scales resembling those found in *Lepidoptera* (q. v.), and from the presence of delicate markings on these scales they become available as test objects for the microscope.

Leporidæ. See HARE.

Lep'ra, Tett'er, or **Europe'an Lep'rosy**, is a non-contagious and chronic inflammation of the skin terminating in an eruption of raised, circular patches, which become covered by thin, semi-transparent scales of white and morbid epidermis. It is most frequently situated in the vicinity of the knee and elbow joints, and often recurs at particular periods for several years, lasting for several months at each time. During the progress of L. the scales are often thrown off, and replaced by successive formations. There are various forms of the disease, as *L. diffusa*, *L. inveterata*; *L. nigricans*; *L. syphilitica*; *L. capitis*; and *L. unguium*. Treatment:—The most potent specific remedy is the *Liquor potassæ arsenitis*, or *Fowler's Solution*, in from five to ten minim doses, thrice daily, after meals. In very chronic cases the *Liquor hydriodatis hydrargyri et arsenici*, or *Donovan's Solution* may be given. Baths are also advantageous, and when the skin is cracked and fissured, oxide of zinc ointment or glycerine should be applied.

Lep'rosy, or **Lep'ra Tuberculo'sa**, is identical with the *elephantiasis of the Greeks*, and the *lepra of the Arabians*, but different from the *elephantiasis of the Arabians*, and the *lepra of the Greeks*. It has existed from the earliest times, and its distribution throughout the world has been almost universal. In some countries where it raged with intense severity it has entirely disappeared, and in others it has continued with all its original severity till the present time. L. is a constitutional disease, showing itself by the deposition of a peculiar albuminous substance in the skin, mucous membrane, and other surface tissues of the body—*L. tuberculosa*: or by affecting chiefly the nervous centres and the nerves—*L. anæsthetica*. Both forms are chronic in their course, generally incurable, and most frequently terminate in death. The earliest symptom is the development of erythematous patches of a dull-red or purplish hue, generally in the superciliary region, succeeded by thickening of the skin in the form of tubercles, which form a heavy mass along the eyebrows, and gradually extend over the whole face. The ears

also are early affected, the helix being much enlarged, and the lobule elongated. The brown patches are early developed on the backs of the hands and fingers, and there is usually a considerable degree of numbness and insensibility; but the defective sensation is less marked than in the anæsthetic form. When the disease attacks the mucous membrane or internal organs, there may be loss of vision, smell, and taste; and when the larynx and air-tubes are affected, there is hoarseness or loss of voice, dyspnœa, and bronchitis. In the anæsthetic form there is great depression, desire for solitude, pale shrunken skin, insensibility and atrophy, terminating in ulceration, and the dropping off of the extremities. In this form the chief seat of the morbid deposit is the spinal cord, the ganglia, and the sheaths of the nerves. The average duration of life in the tubercular form is nine years and a half, and in the anæsthetic form, eighteen years and a half. L. is common in India, Norway, Crete, Syria, and many other parts of the world. In Norway there is 1 leper to 833 persons, and within historic times, L. seems always to have infested the same maritime area as at present, the limitation being partly due to the intervention of an elevated and thinly populated mountain chain. L. is most common among the lower and poor classes, and males are more frequently attacked than females. There is no distinct evidence that L. is contagious, but it is generally considered to be hereditary. One or other of these influences is a stern reality, and they may coexist. There is no special condition, mode of life, kind of food, locality of residence, or climate *known* which accounts for the maintenance or spread of L. See *Om Spedalskhed Som Endemisk Sygdom i Norge*, by Dr. Bikenkap (Christ. 1860), and *Modern Indian L.*, by Dr. H. V. Carter (Bom. 1876).

Lep'sius, Karl Richard, was born at Naumburg, 23d December 1813, studied at Leipzig, Göttingen, Berlin, and at Paris; he received the Volney prize (1834) for his treatise *Palæographie als Mittel der Sprachforschung*. Through Humboldt's influence L. was appointed chief of a scientific expedition to Egypt (1842). Upon his return to Berlin (1846), he received the Professorship of Egyptian Archæology, again went to Egypt (1866), discovered a bilingual inscription of the time of Ptolemy Euergetes at Tanis, returned to Berlin, and was placed over the Prussian State Library in 1874. L. has devoted himself to the elucidation of every aspect of Egyptian life, and among his chief works are *Das Todtenbuch der Ægypter* (1842), *Die Chronologie der Ægypter* (1849), *Denkmäler aus Ægypten und Æthiopien* (1849–59), *Briefe aus Ægypten* (1852), *Die Ægyptische Elle* (1865), *Ueber einige Ægyptische Kunstformen*, &c. (1872).

Leptosper'mum, a large genus of *Myrtaceæ*, consisting of evergreen shrubs or small trees, common to New Zealand, temperate and sub-tropical Australia, and some of the islands of the Indian Archipelago. In the early days of British colonisation of Australasia, the leaves of *L. scoparium* were much used in bush journeys to yield by infusion a substitute for tea, thereby fixing the settlers' name of 'tea-tree' to this and perhaps some other species of the genus. *L. lævigatum* has received the cognomen of the 'sandstay' in Australia, from its efficacy in arresting the progress of drift sand.

Ler'ici, a seaport of Italy, province of Genoa, on the Gulf of Spezzia. It is walled, and is guarded by a castle in which Garibaldi was confined in 1862. There are English lead-works here, importing ore from Sardinia. Pop. (1874) 5940.

Ler'ida (the *Ilerda* of the Romans), a strongly fortified town of Spain, and capital of the province of L., on the right bank of the Segre, a N. branch of the Ebro, 120 miles W. by N. of Barcelona by rail. It is the military key of Aragon and Catalonia, and has a castle, two cathedrals, one of the 13th c., a lyceum, and manufactures of gunpowder, leather, woollens, cottons, glass, &c. Its university, founded in 1300, was suppressed by Philip V. The river is here crossed by a stone bridge of seven arches. To the S.W. are the forts of Garden, Hornabeque, and S. Fernando. Pop. 19,581. The adjoining plain (*El Fontanat*) was the scene of the victory of Scipio Africanus over Hanno. In the first year of the civil war (B.C. 49) Cæsar, in a brilliant siege of *Ilerda*, forced the legates of Pompey to capitulate with five legions.

Lernæ'a, a genus of lower *Crustaceans*, belonging to the order *Ichthyophthira*, the species of which are found parasitic on fishes of various kinds. One species infests the gills of the cod; *L. gobina* is found on the gobies; and *L. radiata* is a third species. A nearly-allied genus is *Lernæopoda*, in which the body is of worm-like conformation, and the males exist as mere specks attached to the females. The body consists chiefly of the united head and chest, and the jaws are modified to form organs adapted for adhesion to the bodies of their hosts.

Leroy' de Saint-Arnaud, Jacques, a French marshal, was born at Paris, August 20, 1801, entered the army in 1816, withdrew for some years, and in 1831 re-entered his profession. In the African wars he distinguished himself so highly that in 1847 he had reached the grade of field-marshal, and two years later was conducting operations against the Kabyles as commander-in-chief. His reputation as a prompt and inexorable warrior pointed him out to Louis Napoleon, who used him in the *coup-d'état* of December 2, 1851, and afterwards created him War Minister. In this office he proved himself as efficient in administration as in war. During the Crimean War he distinguished himself at Varna and Gallipoli, and co-operated with Lord Raglan in the battle of the Alma, 24th September 1854, but died of an incurable disease, nine days after, on board the frigate *Berthollet*. A volume of *Lettres* was published in 1855 (2d ed. 1864), which, if they show little literary skill, are full of keen insight into the tendency of many contemporary events.

Ler'wick, the chief town of the Shetland Islands, on the E. coast of the Mainland, about the centre of Bressay Sound, 21 miles N.E. of Sumbrugh Head, and 100 N.E. of Kirkwall. It is a straggling place, rising up from the shore, with some fishing industry and sale of Shetland hosiery. There are several churches, and the walls of Fort Charlotte, which was built originally in Cromwell's time, and re-built in that of George III., after whose consort it was named. In 1875 there entered and cleared the port 458 vessels of 76,721 tons. Pop. (1871) 3516. L. was founded by Dutch smugglers in 1670.

Le Sage', Alain René, a famous French writer, was born May 8th, 1668, at Sarzeau, near Vannes in Brittany, became heir to a small fortune at his father's death (1682), which his uncle squandered, studied under the Jesuits at Vannes, and then disappeared from historical view for several years. In 1694 he married Marie-Elizabeth Huyard in Paris, and began to devote himself to literature. Failing in his first effort, which was a translation from a Greek sophist, L. tried the bar with equal want of success. In 1702 he invaded the theatre with *Le Point d'Honneur*, and prosecuted studies and translations in Spanish, writing all the time under strong pressure of necessity. *Le Diable Boiteux* (1707) was the first romance which fairly established his reputation, and though it is based upon the Spanish of Guevara, its whole atmosphere and the characters are French. *Turcaret*, his greatest drama, was represented in 1709, and whilst it satirically lashed some of the prominent vices of the period, it gave bitter expression to the sense of injustice in things with which the difficulties of his early life had inspired him. L. published in 1715 *Histoire de Gil Blas de Santillane*, a romance which was not only his masterpiece, but which, next to *Don Quixote*, has perhaps achieved the widest celebrity of any European book. There are few Aryan languages into which it has not been translated. L. continued to write translations and plays, most of which bear the mark of the haste with which they were composed. Towards the close of his life he retired to Boulogne, where he died 17th November 1747. His *Œuvres Complètes* appeared at Paris in 12 vols. 1828. See Sainte Beuve's *Causeries du Lundi*, vol. ii.; Ticknor's *History of Spanish Literature* (Lond. 1849); and Audiffret's *Notice Historique sur A. R. Le S.* (Par. 1822).

Les'bos, called by the modern Greeks *Mitylen* or *Metelino*, and by the Turks *Medilli* or *Medellu-Adassi*, is the largest and most important island off the coast of Asia Minor, from which it is 10 miles distant. Area, 600 sq. miles; pop. 40,000, of whom 15,000 are Turks. The surface is mountainous, and the climate healthy. In ancient times it produced excellent wine, but its chief exports now are figs, oil, and gall nuts. The six Æolian cities of L. were Mytilene, Methymna, Arisba, Pyrrha, Antissa, and Eressus. The intellectual fame of L. is attested by the names of Alcæus, Sappho, Terpander, and Arion, in poetry and music; of Hellanicus and Theophanes, in history; and in philosophy and science, of Theophrastus, Pittacus, and Cratippus. The chief town is Castro.

Lesley, Leslie, or **Lesly,** an illustrious Scottish family, the founder of which, Malcolm, son of Bardulf, received a grant from David, Earl of Huntingdon, of Lesslem or L., in Aberdeenshire, towards the close of the 12th c. During the next two hundred years the family grew and prospered, its members by marriages, and split into several branches, the chief of which were the Rothes and Balquhain lines. The former was ennobled in 1457, with the title Earl of Rothes, and of it belong John and Norman L., the assassins of Cardinal Beaton (q. v.), and David L., grandson of the 6th Earl, and son of the first Baron Lindores (title created 1600, extinct 1775), who, after serving under the 'immortal' Gustavus, raised Prince Rupert at Marston Moor (1644), and Montrose at Philiphaugh (1645), was defeated by Cromwell at Dunbar (1650), fought at Worcester (1651), and was for nine years a prisoner in the Tower. Created Lord Newark (title extinct 1791) in 1661, he died in 1682. The earldom of Rothes is now (1877) held by Henrietta Wallegrave, sixteenth in descent. To the Balquhain branch belong John L. (q. v.), Bishop of Ross; Alexander L. of Auchintoul, a Muscovite general, and governor of Smolensko (died 1673); John L., Bishop of Clogher (died 1671; and his son, Charles L., born 1650, died 13th April 1722), a celebrated nonjuror; and Walter L., a soldier of fortune in the Austrian service, in 1637 created Count (title extinct 1844) in reward for his part in the murder of Wallenstein; and lastly Alexander L., who, having won a high reputation in the Dutch and Swedish services, especially by his successful defence of Stralsund (1628), was recalled home (1639), and appointed commander-in-chief of the forces of the Covenant. As such he entered England, took Newcastle, crossed the Tyne, successes which led to the Treaty of Ripon (1641), and to the elevation of L. to the Earldom of Leven. He fought against the king at Marston Moor, but for him at Dunbar; was imprisoned by Cromwell in the Tower (1651), but released at the request of Christina of Sweden; and returning to Scotland (1654), died at Balgonie 4th April 1661. The present Earl of Leven is eleventh in descent from him. See *Leslæus Lethanus Explicatus*, by Father William L. (Gratz, 1692); *The Pedigree of the Family of L. of Balquhain* (Bakewell, 1801); and *Historical Records of the Family of Leslie*, by Col. Leslie of Balquhain (Edinb. 1869).

Lesley, John, a Scottish prelate, born September 29, 1526, studied at the universities of Aberdeen, Poitiers, Toulouse, and Paris, and was made vicar-general of Aberdeen in 1554. He was a staunch upholder of the Catholic faith, publicly defending it in disputations with Knox and other reformers, and in 1561 repaired to Mary at the court of France, to lay before her proposals for the suppression of heresy by armed force. Returning in the Queen's train to Scotland, he was made, in 1564, Abbot of Lindores and Bishop of Ross, and to him, as one of sixteen commissioners, was chiefly due the publication of a Scotch codex, known as the *Black Acts*, from its being printed in black letter (1566). Faithful to his unfortunate queen, he waited upon her at Bolton (September 1568), was one of her commissioners at York, and appeared as her ambassador at the court of Elizabeth. There, finding entreaties useless, he joined in the plot for Mary's marriage to the Duke of Norfolk, and was imprisoned in the Tower, at Winchester, and at Ely. Released in January 1574, he resided one year in France, and three at Rome, where he published his *De Origine, Moribus, et Rebus Gestis Scotorum* (1578), and in 1579 became vicar-general to the Cardinal de Bourbon, Archbishop of Rouen. Twice the Huguenots seized him to give him up to Elizabeth, and he only escaped by ransoms of 3000 pistoles. In 1593 he was made Bishop of Coutances, but shortly after retired to the monastery of Guirtenburg, near Brussels, where he died May 31, 1596. L. founded the Scotch colleges at Rome, Paris, and Douai. He was the author of five Latin works, and of a *History of Scotland, from* 1436 *to* 1561 (edited by T. Thomson for the Bannatyne Club, 1830), which is of great linguistic value.

Leslie, Charles Robert, R.A., born of American parents in London, 19th October 1794, became a student at the Royal Academy in 1811, where his studies were superintended by two distinguished Americans—Benjamin West and Washington Allstone. He at first essayed large historical pictures, but soon found himself more at home with humbler subjects. His first important work, 'Anne Page and Master Slender,' was followed by 'Roger de Coverley going to Church,' exhibited at the Royal Academy in 1820. Next year his 'May-day in the Reign of Henry VIII.' made him an A.R.A.; and in 1826 he became R.A. In 1847 he was elected Professor of Painting at the Royal Academy, a post which he held four years. He died 5th May 1859. No British artist ever excelled L. in illustrating the writings of the great poets and humorists of his country. L. published in 1845 *Memoirs of John Constable, R.A.*, and in 1858 a *Handbook for Young Painters*. In 1860 Tom Taylor edited L.'s *Autobiographical Recollections*.

Leslie, Sir John, a Scotch mathematician and natural philosopher, was born at Largo, Fifeshire, April 16, 1766. He was educated at the universities of St. Andrews and Edinburgh. In 1788 he went to Virginia as tutor to two young American students; and after his return settled in London in 1790, distinguishing a certain independence by the translation of Buffon's *Histoire des Minéraux* (1793). In 1805 he obtained the chair of mathematics in Edinburgh, rendered vacant by the appointment of Playfair as Professor of Natural Philosophy. In 1819 he succeeded Playfair in the chair of physics, was made a baronet in 1838, and died November 3, the same year, at Coates, his residence in his native county. L. is well-known as the inventor of the differential thermometer, with which he made his famous experiments on the radiation of heat; and of the hygrometer, with which he discovered the process of artificial freezing. As an original experimenter, L. stands among the first of his time. His chief works are *Experimental Inquiry into the Nature and Properties of Heat* (1804); *Elements of Geometry* (1809); *Geometry of Conic Lines* (1821); *Elements of Natural Philosophy* (vol. i., 1823); besides numerous memoirs in the *Edinburgh Philosophical Transactions*, and valuable articles in the *Encyclopædia Britannica*.

Lessing, Gotthold Ephraim, a celebrated German writer, born January 22, 1729, at Kamenz, in Ober-Lausitz, went to Leipsic University in 1746, where he neglected theological study, for which his father had designed him, for literature, some gymnastics, and the study of the stage. In 1748, after a year's stay at Wittenberg, L. removed to Berlin, where he published *Beiträge zur Historie und Aufnahme des Theaters*, besides some poems and translations for the booksellers. He graduated at Wittenberg in 1752, returned to Berlin, where he associated with Moses Mendelssohn and Nicolai, and completed (at Potsdam) *Miss Sara Sampson*, the first German drama that broke with the French academic rules. From this time till 1758, when he was elected a member of the Berlin Academy, and went to Breslau to be secretary of General Tauenzien, he wrote farces, started (1759) the critical review, *Briefe die neueste Literatur betreffend*, and began *Virginia*, a tragedy, completed (1772) under the name of *Emilie Galotti*. At Breslau, where he remained till 1765, he wrote *Minna von Barnhelm*, which marked an epoch in the national literature. His greatest work is *Laokoon oder über die Grenzen der Malerei und Poesie* (1766), which wrought a revolution in criticism, and has gained for L. the honour of first expounding the true principles of æsthetics. After a two years' stay in Berlin he became director of the Hamburg theatre, and published *Dramaturgie* (1768–69), a series of theatrical reviews, ranking only second in importance to *Laokoon*, in which he did battle for the English drama against the French. In 1770 he was appointed librarian at Wolfenbüttel, where he brought to light Berengar of Tours' treatise against Lanfranc, *De Corpore et Sanguine Jesu Christi*, and published (1774–78) *Wolfenbüttelsche Fragmente eines Ungenannten* (an unacknowledged work by H. C. Reimarus), thereby involving himself till his death, 15th February 1781, in endless theological disputes with various opponents, bitterest of whom was the Hamburg clergyman Goeze, against whom L. directed his sport *Antigoeze*. His drama *Nathan der Weise* (1779) is a noble plea for toleration and a rational religion, whose main idea is laid down in philosophic form in *Die Erziehung der Menschheit* (1780), which contains the germ of Herder's view of the philosophy of history. Though only the forerunner of the later great period of German poetry, and not himself a *great* poet, he saw the weakness of his own age, and claimed superiority for the more natural poets of earlier times. See L.'s *Sämmtliche Schriften* (30 vols. 1774–94); critical ed. by Lachmann (13 vols. 1838–40); by Maltzahn (12 vols. 1853–55), and the Biography by his brother Karl (1793); by Danzel and Guhrauer (1850–54), and by Stahr (5th ed. 1868). L. left fifty-four plans of dramas

n some of which the outline was to a considerable extent filled n. These were published by Robert Roxberger (Berl. 1876).

Less'ons (Fr. *leçons*, Lat. *lectiones*, 'readings') are 'portions of the Holy Scriptures read in churches at the time of divine service.' The use of L. formed a part of the service of the Jewish synagogue (Luke iv. 17; Acts xiii. 15). Justin Martyr (about 140) in his *Apology* speaks of 'the memoirs of the apostles, or the writings of the prophets' being read 'as long as the time permits.' According to the Apostolic Constitutions, after two L. from the books of Moses, Joshua, Judges, Kings, Chronicles, Job, Solomon, the sixteen prophets, &c., had been read, psalms were sung, and then another lesson was read from the Acts or Epistles, and one from the Gospels. Particular, appropriate L. were soon appointed for the different seasons of the ecclesiastical year. Thus, in Holy Week, Job and Jonah were read; on Good Friday were read 'all such Scriptures as had any relation to the cross;' and on Easter day such passages as gave an account of Christ's resurrection; between Easter and Pentecost the Acts of the Apostles was read, to give men the evidence and proofs of his resurrection in the miracles of the apostles contained in that book. During Lent Genesis was read, or, according to the Gallican Lectionary, the Acts and the Apocalypse. After Pentecost the Pentateuch and the Books of Samuel and Kings were read, followed by Job, Proverbs, and Ecclesiastes, and these again by Tobit and Judith. Besides the canonical Scriptures and apocryphal books, L. were read out of lives of saints, homilies of the fathers, and acts of the martyrs. The L. were at first read by the deacons, but afterwards by the readers, an inferior order of the clergy appointed for the purpose (see HIERARCHY), although the reading of the gospel was afterwards reserved for a deacon, an archdeacon, or even a presbyter.

L'Estrange, Sir Roger, an English author, was born at Hunstanton Hall, Norfolk, 17th December 1616. An ardent royalist by education and sympathy, he was imprisoned from 1644 to 1648, when he escaped to the Continent. He returned to England in 1653, and on the Restoration became censor of plays. He started the *Public Intelligencer* in 1663, and the *Observator* in 1679, journals in which he championed High Toryism with an able but virulent and vindictive pen. He was knighted by James II. His mind failed latterly. He died in London 11th September 1704. L. published many political pamphlets and classical translations.

Le'thal Weapon, in Scotch criminal law, means a weapon such as a man would use in assaulting another with the intention of killing him. Were a stick the implement of assault, the weapon would not *prove* intention to kill; but were a sword the implement, it would be held to do so. The corresponding term of English law is 'Fatal weapon.'

Le'the (Gr. 'forgetfulness'), in Greek mythology the river of oblivion in Hades (q. v.), of which spirits drank before entering Elysium (q. v.).

Lett'er, a term in the law of England and of Scotland. *Letter Missive* is a letter from the sovereign to the Dean and Chapter (q. v.), enclosing the name of a person whom he desires them to elect a bishop. *Letter of Attorney* is, in English law, a writing empowering some one to act legally for the writer; as to transfer stock or sign a deed. The person empowered is called the *attorney* of his constituent. The instrument may be general or special. In the first case it may embrace the transactions of the whole affairs of the constituent; in the latter case, the power may be restricted to one transaction. The agent has precisely the same legal power as his principal, until the letter is recalled. L. of A. is generally executed under hand and seal, that is, by Deed (q. v.); and when it contains authority to bind the principal by deed, it is essential that it be so executed. *Letter of Credit*, see under CREDIT, *Credit, Letter of*. *Letter of Licence* is a letter given by creditors to their debtor allowing him prolonged time for paying his debts, and protecting him from arrest. *Letters Patent*, or *Open Letters*, are writings sealed with the great seal of England, by which the grantee is protected in the profit of a discovery or privilege. (See PATENT.) In Scotland, *Signet letters* are writs for enforcing the decrees of courts, or for attaching the property of debtors, or for citing parties before the Court of Session (q. v.). They run in the name of the sovereign, and are authenticated by the Signet (q. v.). *Letters of Marque* was a commission from the crown during war, authorising a private ship to make war upon and seize property belonging to the enemy. So doing was called *privateering*. The system was abolished by the treaty of Paris in 1856; but there can, of course, be no guarantee against its revival. See *Maritime Warfare*, by Thomas Gibson Bowles (Ridgway, Lond. 1877). *Letters, Private*. The receiver of a private letter has but a joint right of property in it along with the writer. The receiver is not entitled to publish it, and an injunction has been granted to restrain the printing of letters without the consent of the executors of the writer. This rule prevailed in the case of *Hansom and Hobhouse*, executors of Lord Byron, v. *Knight*, although there appeared a strong presumption that the writer expected that the receiver would publish them.

Letters are the primitive elements of articulate utterance, not of language—which is not mere sound, but always significant sound. It was a favourite idea with Epicurus and Aristotle to compare the concurrence of atoms with the fortuitous formation of words from letters. But though by putting twenty-four L. together in every possible variety, we might produce every word of every spoken language—the number of such combinations amounting, according to Leibnitz, to 620,448,401,733,239,439,360,000—still none of these would be words if they lacked the one necessary ingredient, the ideas, namely, that called them into life. Nor does the existence of roots consisting of a single vowel, as Sansk. *i*, 'to go,' or Chinese *i*, 'one,' prove that a letter may be a root; it only shows that a root may be a letter. One word there is, and one only, consisting of mere letters—*alphabet*, and even that is formed not of the sounds, but of the names of the sounds, *alpha* and *beta*. By themselves, then, L. have no existence, any more than colour exists apart from some ethereal substance; or, if we must view them abstractly, it is as dead, like notes only acquiring vitality and significance through combinatory ideas. But as optics treats of colour and light as self-existent, so it is convenient to anatomise the phonetic structure of language without reference to its living function. Thus doing, we find that physiologically L. fall into three main groups—L. formed (1) of vocalised breath, Vowels (*phōnēnta*), requiring no contact of the tongue with the other organs of speech, as *a* or *o*; (2) of breath not vocalised, Breaths or Semivowels (*hēmiphōna*), with slight contact, as *h*; and (3) of articulate noise. Checks or Consonants (*aphōna*), with complete contact. The last, again, are subdivided, according to the different parts of the active and passive vocal organs by which they are formed, into (1) Gutturals, by the root of the tongue and the palate, as *k*; (2) Dentals, by the tip of the tongue and the teeth, as *t*; and (3) Labials, by the upper and lower lip, as *p*. Another division of the checks, and one, too, of great importance to the philologist, as on it is based Grimm's Law (q. v.), is that into Hard (*tenues*), Soft (*mediæ*), Hard Aspirated (*tenues aspiratæ*), and Soft Aspirated (*mediæ aspiratæ*). Thus—

	Guttural.	Dental.	Labial.
Hard . . .	K	T	P
Soft	G	D	B
Hard Aspirated	KH	TH	PH
Soft Aspirated	GH	DH	BH

In Sanskrit, although the soft aspirated checks largely predominate over the hard aspirates, still the system is complete; Greek has one set of hard aspirates, *ch*, *th*, and *ph*; in Latin, Gothic, and O. H. German there are no real aspirates; and in the Slavonic languages the aspirates were originally wanting. But, though thus deficient, these languages were rich in L. compared with the dialects of rude and uncivilised races. The Mohawks, for instance, have no labials; the natives of the Society Islands, no gutturals; and *s* is absent from the Australian and many of the Polynesian languages. The following list shows the relative wealth of consonants in some of the principal languages:—Hindustani has 48 consonants (14 of which are Arabic); Sanskrit, 39; Turkish, 32 (of which only 25 are really Turkish); Persian, 31 (9 of them Arabic); Arabic, 28; Kafir, 26, besides the clicks; Hebrew, 23; English, 20; Greek, 17 (3 of them com-

pound); Latin, 17 (1 compound); Finnish, 11; and some Australian languages only 8. See ALPHABET, PHONETIC WRITING, and the separate articles on each of the letters; also Max Müller's *Lectures on the Science of Language*, vol. ii. lecture 3; Dr. M. Thausing's *Natürliche Lautsystem der Menschlichen Sprache* (Leips. 1863); and the works on phonetics by Alexander J. Ellis.

Letter-Wood is procured from *Brosimum Alicastrum*, a large tree belonging to the bread-fruit family (*Artocarpaceæ*). It is a native of British Guiana and Trinidad. The name has been chosen in consequence of the rich brown, hard, and heavy heart-wood being mottled and streaked with more or less regular black spots, forming an exceedingly beautiful effect when the wood is polished. Hence it is in demand for fine veneering and inlaying: the supply, however, is small. Snake-wood and leopard-wood are synonyms.

Lett'ic is one of the two divisions, the other being Slavonic, of the Wendic branch of the Indo-European family, and falls itself into three subdivisions—Lithuanian, Old Prussian, and Lettish, languages which, though of little literary value, are of great linguistic importance, as preserving in their grammatical forms closer affinities with Sanskrit than either Greek or Latin. Of these, Lithuanian is written in Roman characters, with an orthography based upon Polish, and its earliest literary document is a small catechism of 1547. It has an approximation to the post-positive article, in its inflection of adjectives by the incorporation as a suffix of the demonstrative pronoun, thus *geràm*, 'to good,' *geramjam*, 'to the good,' where *-jam* is the dative pronoun. Its popular songs (*dainos*) were collected by Rhesa (Königsb. 1825), its tales, proverbs, and riddles (*mísla*) by Schleicher (Weim. 1857), who has also edited the complete works of Christian Donaleitis (died 1780 as pastor of Tolmingkemen), the leading poet of Lithuania (St. Petersb. 1865), and published a Lithuanian grammar (Prague, 1856), the best dictionary being by Nesselmann (Königsb. 1854). The Old Prussian, which became extinct in the 17th c., and is only known through some paternosters and a 16th c. catechism, possessed a definite article, and is handled by Nesselmann in his *Thesaurus Linguæ Prussicæ* (Berl. 1873). Lettish, the youngest of the group, was first reduced to writing in the middle of the 16th c., but now possesses a considerable literature (in 1865 upwards of 1900 works), mostly of a religious character. See Bielenstein, *Die Lettische Sprache* (2 vols. Berl. 1864).

Lettres-de-Cachet were letters written by order of the kings of France, signed by a secretary of State, and sealed with the royal seal, which were meant to anticipate the delays of justice. Armed with them, the police were entitled to seize and keep people in custody without trial, or even intercourse with their friends, so long as government had a mind to do so. Before the Revolution of 1789 they were put to the most infamous uses to gratify the cravings of private revenge or unfounded suspicion. See Taine's *Les Origines de la France Contemporaine* (1875).

Lett'uce is applied to the genus *Lactuca*, which belongs to the chicory tribe of the *Compositæ*, and consists of some fifty species, distributed through temperate regions of the N. hemisphere, appearing also in S. Africa. The L. is an annual or perennial leafy herb, with a milky juice, the alternate leaves often sagitate, flowers mostly yellow, arranged in small capitula, the fruit with a long slender beak. The best-known representative is the garden L. (*L. sativa*), which was known to the Greeks and Romans as a salad herb. Some suppose it to be a state of the wild *L. virosa*, much modified by long cultivation, whilst others consider *scariola* as its origin; but like many of our common culinary vegetables and cereals, the native country and original stock is a mystery, and any statements are little better than botanico-literary speculations. In Britain it has been grown at least from the time of Elizabeth. The very numerous gardeners' varieties range under the names Cos and Cabbage L., the first including those with round leaves and growth something like a small cabbage, and the latter those with upright oblong leaves. By suitable management a crop may be secured all the year round. The milky juice mentioned above as a characteristic of the genus yields the *Lactucarium* or L.-opium of materia medica.

Leuca'dia, the ancient name of **Santa Maura** (q. v.).

Leu'cine ($C_6H_{13}NO_2$) is one of the products of the decomposition of glue, horn, wool, and other animal substance, either during putrefaction, or under the action of an acid or alkali. It crystallises in white shining scales, which melt at 100°. It is slightly soluble in water, sparingly so in alcohol, and insoluble in ether.

Leucipp'us, the founder of the Atomistic philosophy in early Greece, and the teacher of Democritus (q. v.). Nothing is known regarding his life.

Leucis'cus, a genus of *Teleostean* fishes, represented by the roach (*L. rutila*); dace (*L. vulgaris*); chub (*L. cephalus*); bleak (*L. alburnus*); and minnow (*L. phoxinus*). It is included in the *Cyprinidæ* (q. v.). The dorsal and anal fins are short. No *barbules* or mouth-filaments exist.

Leu'cite, a mineral found in abundance in the lavas of Italy, crystallising like the garnet in trapezohedra. It is usually opaque, and gray or white in colour. It is a silicate of alumina and potash, and is interesting as the mineral by which Klaproth first discovered that potash was not confined to the vegetable kingdom.

Leucocythe'mia (Gr. *leukos*, 'white,' *kytos*, 'a cell,' and *hæma*, 'blood'), is a disease in which the number of white corpuscles in the blood is greatly increased, with a simultaneous diminution of the red. L. is the result of exhausting diseases, serious acute affections, or affections of the lymphatic glands or of the spleen. The disease was first described by Drs. Craigie and Bennett of Edinburgh, and Professor Virchow of Berlin in 1845.

Leuco'ma (from Gr. *leukos*, 'white'), is the term applied to a white opacity of the cornea—the transparent part of the Eye (q. v.). *Nebula*, the slightest degree, includes only those opacities which are cloudy or hazy. In *albugo*, the effusion of lymph is dense, and has a pearly appearance. True L. is always the result of cicatrisation, and has a contracted circumscribed appearance. In most cases it is persistent and incurable.

Leucorrhoe'a (*leukos*, 'white,' and *rheō*, 'I flow'), a white, mucous discharge, very frequently the result of debility. Treatment:—General hygienic measures to restore the general health. Astringent injections, containing gallic or tannic acid, alum, sulphate of zinc or the sulpho-carbolate of zinc are serviceable.

Leuc'tra, a village in Bœotia, to the S. of Thebes, famed as the scene of the victory, B.C. 371, by which Epaminondas and the Thebans overthrew the supremacy of Sparta.

Leuk (*Loëche*), a Swiss village, in the canton of Valais, on the right bank of the Rhone, gives name to the celebrated mineral springs, distant eight miles northwards, at the head of the Dala valley and at the foot of the Gemmi pass. The springs, twenty-two in number, are saline and sulphurous, and vary in temperature from 93° to 123° F. The bathers are required to remain as long as eight hours in the water. L. is chiefly frequented by Swiss, French, and Italian visitors.

Leu'then, a village of Prussia, in Lower Silesia, 9 miles W. of Breslau, is famous as the scene of a great victory gained by Friedrich the Great over the Austrians, 8th December 1757. The loss of the latter was 7000 killed and wounded, 21,500 prisoners, and 134 pieces of artillery.

Leut'schau (Mag. *Lőcse*), a town of Hungary, in the comitat of Zips, 37 miles N.W. of Kaschau. Its Gothic Jacobikirche contains the largest organ, and its Protestant gymnasium is the oldest, in Hungary. There is a famous mead-brewery, and flax, saffron, hops, and fruit are largely cultivated in the neighbourhood. Pop. (1869) 6887.

Le Vaillant, François, a French traveller and naturalist, was born at Paramaribo in Dutch Guiana, in 1753. He early showed a decided taste for travel, and during his stay in Paris from 1777 to 1780 studied natural history most assiduously. In 1781 he set out for the Cape, and for about sixteen months travelled through portions of S. Africa. He made a second series of travels—this time for eighteen months—and returned to Paris in 1785, devoting his time to the arrangement of his valuable collections. Under the Reign of Terror he suffered one year's imprisonment, and escaped death only through the fall of Robespierre. He died at his residence near Sézanne, in Champagne, November 22, 1824. L.'s chief works are *Voyage dans l'Intérieur de l'Afrique* (2 vols. 1790); *Second Voyage dans l'Intérieur de l'Afrique* (2 vols. 1796); *Oiseux d'Afrique* (6 vols. 1796-1812);

and natural histories of *Perroquets* (2 vols., 1801–5); *Oiseux-Paradis, Rolliers*, &c. (2 vols. 1801–6).

Levant' (Ital. *levante*, 'orient,' or 'rising'), a geographical name given by European nations generally to the E. waters and shores of the Mediterranean. The chief ports, Constantinople, Smyrna, Iskanderun, Aleppo, and Alexandria, are called by the Italians *Scale di Levante*, by the French, *Échelles du L., i.e.*, steps of the L. The name L. originated early in the middle ages when the Italian republics controlled European commerce.

Levant and Couchant (Fr. 'rising up and lying down'), a legal phrase applied to animals to indicate that they have been long enough on land not their owner's to rise up and feed, 'such time,' according to Blackstone, 'being held to include a day and night at the least.'

Leva'ri Facias, Writ of. See ELEGIT and FIERI FACIAS.

Lev'ee (from Fr. *se lever*, 'to rise'), originally a *morning* assembly of visitors to a sovereign, is in England applied to a general gathering at court of guests of rank and fortune from among the Queen's subjects, and differs from a *drawing-room* in that it is restricted to gentlemen, except in the case of the chief ladies of the court.

Lev'el and Lev'elling. A *level* surface is one at which the force of gravity is everywhere perpendicular. At any locality on the earth's surface, such a surface is practically plane and parallel to the plane containing the horizon, and an instrument which shows the direction of a line parallel to this plane is called a *level*. Such an instrument is the plummet or plumb line which, if provided with a graduated quadrant or semicircle, indicates at once the horizontal plane, to which the line is everywhere perpendicular. The most convenient and accurate instrument is, however, the *spirit-level*, which consists of a slightly curved tube nearly filled with liquid—usually spirits of wine. The air-bubble always seeks the highest point. Hence, if the ends of the spirit-level be so set that reversal of the instrument does not alter the position of the bubble, the points of support must be situated in a horizontal line. In this way astronomical and geodetical instruments are now universally set and tested. Another form of level consists of a U-shaped tube filled to a certain height with water or other liquid, the upper surfaces of the columns of which must, in accordance with hydrostatic laws, lie in a horizontal line, and thus afford an easy and in many cases sufficiently accurate method for fixing such a line. This form of apparatus may be conveniently used for the purposes of *levelling*, though, of course, a telescope with spirit-level attached is the more accurate. Levelling is an extremely convenient method for ascertaining the height of small elevations. Levelling staves furnished at the top with a level, and carefully graduated throughout their length, are fixed perpendicularly at intervals. The level of each is then compared carefully with the next above it, and thus the height of the elevation is ascertained.

Le'ven, Loch (Gael. *Leamhan*, the lake of the 'elm tree'), a beautiful sheet of water in the E. of Kinross-shire, Scotland, is 3¾ miles long, and 2 broad, contains several islets, of which the largest are St. Serf's Inch, with the remains of the Culdee Priory, founded in the 8th c. (where excavations in July 1877 resulted in the discovery of the dust of St. Ronan, abbot of the priory in the 10th c., and of Patrick Graham, first archbishop of St. Andrews), and another about half a mile from the town of Kinross, with the ruins of Loch Leven Castle. The loch, fed by the Queich, Gairney, &c., and drained by the Leven into the Firth of Forth, is famed above all lakes in Scotland for the quality of its trout. Queen Mary was imprisoned in the castle in June 1567, but escaped on the 2d of May 1568.—*Loch L.* is also the name of a romantic inlet on the E. side of Loch Linnhe (q. v.), between the counties of Inverness and Argyle, 11 miles long, by one broad, and enclosed by lofty mountains. A river L., flowing from Loch Lomond into the Clyde, is celebrated in exquisite verse by Smollett. There are other streams of the name in Gloucestershire, Yorkshire, Cornwall, Cumberland, and Lancashire.

Le'ver, in mechanics, is a rigid rod, movable about a fixed point called the *fulcrum*, and having at two or more points weights or forces applied. The motion is usually supposed to take place in a vertical plane, and the power applied to be used to raise a weight. Calling the power P, and the weight W, it is easily deducible, upon the universal law, that work done has its equivalent in work spent (see ENERGY), that the *moments* (see MOMENT) of the forces with respect to the fulcrum are equal; and that, therefore, P : W = *distance of W from fulcrum : distance of P from fulcrum*. This is the principle of the L., which holds under all possible modifications of form which this machine may assume. See BALANCE, WHEEL AND AXLE, &c., which are as truly levers as the simple rod described above.

Le'ver, Charles James, an Irish novelist, was born in Dublin, 31st August 1806. He studied medicine at Dublin and Göttingen, and was appointed in 1837 physician to the British Legation in Berlin. While there he published his first novel, *Harry Lorrequer*, a rollicking story of Irish military life. *Charles O'Malley* (1840), *Jack Hinton* (1843), and *Tom Burke* (1844) followed in the same vein—works of abundant dash and spirit. His later novels, though less exuberant, have much of his old brilliancy, and are calmer, riper studies. Such are *The Knight of Gwynne* (1847); *Roland Cashel* (1849); *Sir Jasper Carew* (1855); *The Martins of Cromartin* (1859); *Luttrell of Arran* (1865); *Sir Brooke Fossbrooke* (1867); *The Bramleighs of Bishop's Folly* (1868); *Lord Kilgobbin* (1872), &c. L. was editor of the *Dublin University Magazine* (1842–45), and contributed the brilliant series of *Cornelius O'Dowd* papers to *Blackwood*. In 1858 he was appointed British consul at Spezzia, and in 1867 to a similar post at Trieste, where he died June 1, 1872.

Leverr'ier, Urbain Jean Joseph, the greatest of living French astronomers, was born at St.-Lô (Manche), March 11, 1811. After a distinguished course at l'École Polytechnique, he accepted the office of engineer to the administration of tobaccos, thereby fixing his residence in Paris. In 1836 he made some interesting experiments upon the compounds of phosphorus and hydrogen, but afterwards relinquished chemistry for the more congenial study of mathematics. In 1846 he startled the astronomical world by indicating the spot where a planet, further removed from the sun than Uranus, should, in accordance with the results of theory, be situated. The almost immediate sighting of this predicted planet by Galle of Berlin created a great sensation; and honours were showered upon the young astronomer from all sides. The same prediction was simultaneously made by an Englishman, J. C. Adams of Cambridge (q. v.). In 1854 L. succeeded Arago in the observatory of Paris, was dismissed owing to some misunderstanding in 1870, but reappointed in 1873. As a Member of the Legislative Assembly, he has been a keen promoter of the education movement in France; and chiefly through his endeavours has the extensive system of meteorological observation been developed in the country. His most valuable contributions to astronomical science are his tables of Mars, the Earth, Venus, and Mercury.

Le'vi (Heb., from *lavah*, 'to adhere,' *cf.* Gen. xxix. 34, and another explanation of the etymology in Num. xviii. 2) was the third son of Jacob by his wife Leah. The tribe was entirely devoted to the service of religion, either as regular priests or as subordinate officials. To leave them free for this work they had no territory assigned them, except forty-eight cities. But in lieu of this they were supported by the tithes of the rest of the people.

Levi'athan (Heb. 'a serpent,' or 'dragon') occurs four times in the A. V. of the Bible, besides Job iii. 8 ('mourning,' marg. L.). In Job iii. 8, xli. 1, and Psa. lxxiv. 14, the crocodile is evidently meant, in Psa. civ. 26, probably some species of cetacean. In Isa. xxvii. 1, L. as a serpent is applied figuratively to a foreign power.

Levi'ta, Elias (properly **Elia Ha-Levi Ben Ascher, Aschkenasi**, *i.e.*, '*the German*'), a learned Jewish grammarian, born about 1470 at Neustadt, near Nürnberg, removed to Venice, where, as afterwards at Padua (1504–9) and Rome (from 1514), he taught Hebrew with great success. On the sack of Rome by Karl V. in 1527, he was forced to return penniless to Venice, whence he went (1540) to join Paul Fagius at Isny, in Swabia, returning in 1547 to Venice, where he died in 1549. L.'s knowledge of Hebrew was profound, and his enlightened views and fair spirit were appreciated alike by Christians and Jews. He promulgated the opinion, held by the first reformers, that the vowel points of Hebrew were invented by certain Jews of Tiberias in the 6th c. His chief works were *Bachur*, a Hebrew grammar (1518); *Meturgeman*, a dictionary to the Targum

(1541); and *Masoreth Hammasoreth*, on the criticism of the Hebrew Scriptures (1538, Ger. trans. by Semler, 1772).

Le'vites sometimes denotes the whole tribe of Levi (*cf.* Ex. vi. 25; Lev. xxv. 32), but specially is the title of that portion of it—the families of Gershon, Merari, and Kohath—which discharged the subordinate duties of the priesthood as assistants to the smaller portion of their own tribe called the sons of Aaron or the Priests (Num. viii. 19), and who formed as it were the body-guard of the ark of Jehovah (Num. iv.). According to the traditional view, the L. having been appointed to their duties at Sinai, were re-organised by David in preparation for the service of the temple. Having been the bearers of the ark to Zion (1 Chron. xv.) some of them were appointed 'to minister before it,' to be door-keepers, and especially for choral service (1 Chron. xv. xvi.), and this arrangement was adopted by Solomon on the completion of the temple (2 Chron. viii. 14). Such of the L. as returned from Babylon resumed their functions as these had been formerly assigned to the various classes. On the other hand, it has been pointed out that while in Exodus the sons of Aaron only are the priests, in Deuteronomy there is no distinction made between members of the tribe of Levi, who are all competent to be priests; that Samuel differs from Chronicles in making no mention of L. as bearers of the ark to Zion, or of Levitical musicians; that Ezekiel gives the services of the altar to the sons of Zadok, and excludes the rest of the sons of Levi from the priesthood, not by reference to the Mosaic law, but because they had been ringleaders in idolatry (Ez. xliv. 10–16). This has led some critics to the conclusion that it was only by degrees that the whole temple service was assigned to the L.

Levit'icus, the third book of the Hebrew Scriptures, is so called from its consisting chiefly of laws concerning the priests (see LEVITES), sacrifices, &c. The traditional view that the book came from the hand of Moses, as it stands, has been strongly controverted by some critics; *e.g.*, it has been maintained that Moses could not have written both chapters xviii. and xx., the latter being simply a repetition of the former, but not so well arranged. The book, as a whole, is of the highest importance for a knowledge of Jewish antiquities.

Lé'vy, the name of a great publishing firm in Paris, founded by two brothers, Calmann and Michel, in 1836. The brothers were born at Phalsbourg (Meurthe), the former 19th October 1819, the latter 20th December 1821. They have issued a multitude of works in all departments of literature—writings of Guizot, Victor Hugo, Lamartine, Sainte-Beuve, Renan, Rémusat, Balzac, Heine, &c.; translations of Macaulay, Poe, Dickens, Thackeray, Motley, &c. A specialty with the firm is dramatic literature, including contemporary plays, the *Entr' Acte* (since 1858), and a *Bibliothèque Dramatique*. Michel L. retired several years ago.

Lew'es (Old Eng. *laše*, 'pasture land'), the county town of Sussex, England, on the Ouse, 50 miles S. of London, and 7 N. of Newhaven, its port, by rail. It has massive remains (the gatehouse and keep) of a Norman castle, and some slight ruins of a priory founded by William de Warenne, who married Gundreda, the daughter of the Conqueror, and to whom was given the town and surrounding territory. The bodies of Warenne and Gundreda were discovered here in leaden coffins in 1845. L. has an Early English church of St. Anne (restored in 1867), one of St. Thomas-à-Becket, in perpendicular style, the Fitzroy Memorial Library, an exchange, large barracks, a theatre, &c. There are manufactures of paper, leather, rope, twine, and farm implements, besides iron and brass founding, brewing, and boat and barge building. In addition to bi-weekly markets, fairs are held on Whit-Monday and 6th May for horses, on 20th July for wool, and on 21st–28th September for South Down sheep, when over 50,000 are sometimes penned. Three papers are published weekly, and races take place in June and August on the course at Mount Harry. Pop. (1871) 10,753. L. sends one member to parliament. It was anciently a Roman station, and many antiquities have been found in the vicinity. The battle of L., the great victory of the baronage under Simon de Montfort over Henry III. was fought near the town, 14th May 1264.

Lew'es, George Henry, a variously gifted and cultured English author, was born in London, April 18, 1817, educated abroad, and after pursuing lengthened studies in medicine and philosophy devoted himself to literature. He edited the *Leader* newspaper from 1849 to 1854, founded the *Fortnightly Review* in 1865, and has contributed very largely to several magazines. If never very profound, he is always luminous, sensible, and attractive. The *Life of Goethe* (1855, Ger. trans., 8th ed. 1872) was the first work of his which could be termed thorough. It is one of the best specimens of biographical literature produced in the 19th century. His *Biographical History of Philosophy* (new ed. 1864, under the title *The History of Philosophy from Thales to Comte*), has at least proved it a possibility to write on such subjects in a clear, graceful, incisive style; and his *Comte's Philosophy of the Sciences* (1853) forms a better guide to the study of Positivism than most of the more pretentious works on the subject. L. has also publised *The Spanish Drama* (1846); *Rose, Blanche, and Violet*, a novel (1848); *The Life of Robespierre*, and a tragedy entitled *The Noble Heart* (1850); *Seaside Studies* (1858), and *Physiology of Common Life* (1860); *Aristotle* (1861; Ger. trans. 1865); *Actors and Acting* (1875); but his reputation as an original thinker is based on *Problems of Life and Mind*, of which 2 vols., constituting the first series, appeared in 1874–75; *The Physical Basis of the Mind*, constituting the second series, in 1877.

Lew'is-with-Harris, the largest and most northerly of the Outer Hebrides, the N. part of which, Lewis, belongs to Ross-shire, the S. and lesser portion, Harris, to Inverness-shire. Area 770 sq. miles; pop. (1871) 25,947. It lies about 30 miles off the coast of Ross-shire, from which it is separated by the North Minch, is 60 miles long and 30 broad, and its coast is indented by Broad Bay, and Lochs Erisort, Seaforth, Resort, Roag, &c. The scenery is varied and sublime, wild mountain masses alternating with green pastoral glens, gemmed by solitary tarns, or penetrated by long, sinuous arms of the sea. A broken chain traverses the island, rising in Suanival and Clisseval to a height of 2700 feet, and running N. to the Butt of Lewis, a promontory 142 feet above the sea. There are many small streams; the largest lake is Langabhat; the inlets are full of rocks and minor islands, of which the chief are Tarnansay, Scarpa, Bernera, and Scalpa. The climate is mild, observations of four years at Stornoway giving the mean at 46° F., and the rainfall at 32.2 inches. Some barley and potatoes are raised, and there is a productive fishing industry. Otters and seals abound in the rivers and on the shores; deer and hares are plentiful; the salmon and trout fishing are among the best in Scotland, and the winged game is specially rich. The chief town is Stornoway (q. v.). Sir James Matheson, Bart., whose seat is Stornoway Castle, purchased the district of Lewis for £190,000, and has introduced various improvements. Gaelic is generally spoken, and in the N. there is a purely Scandinavian colony. Perhaps the most interesting remains on the island are the ancient church of Rowdill, in the extreme S., and pre-historical standing-stones of Callanish (forty-eight in the form of a cross) near Loch Roag, 16 miles W. of Stornoway.

Lewis, Right Hon. Sir George Cornewall, the son of a Radnorshire baronet, was born in London, 21st April 1806, educated at Eton and Christ Church, Oxford, and called to the bar in 1831, where he did not, however, practise. In 1839 he was appointed Poor-Law Commissioner, a post previously filled by his father. In 1847 he was returned to Parliament for Herefordshire, and became Secretary to the Indian Board of Control, in 1848 Under Secretary for the Home Department, in 1850 Financial Secretary to the Treasury. L. was elected M.P. for Radnor in 1855, having been deprived of his seat for three years, a period during which he conducted the *Edinburgh Review*. In the government of Lord Palmerston L. became Chancellor of the Exchequer (1855), Home Secretary (1859), and War Secretary (1861). He died 13th April 1863. During the whole period of his political activity L. devoted himself with enthusiasm to science, history, philosophy, and philology. In 1835 appeared an *Essay on the Origin and Formation of the Romance Languages*; in 1852, *On the Methods of Observation and Reasoning in Politics*; in 1855, *An Inquiry into the Credibility of Early Roman History*; in 1861, *Astronomy of the Ancients*; and in 1876, *On the Influence of Authority in Matters of Opinion*. L.'s mind was of a severely critical and judicial order. The keen distrustful logic that directs and guides his thinking has a certain icy charm. It is at least the outcome of rigorous honesty. L.'s scholarship was at once deep, exact, and wide. His name will be remem-

bered even if his books should be superseded. His wife, **Lady Maria Theresa L.** (born 8th March 1803, died 8th November 1865), was also an author.

Lewis, Matthew Gregory (Monk Lewis), was born in London, 9th July 1775. While in Germany he composed *The Monk*, his best known book, vigorously but coarsely written, full of murders, ghosts, and impurities. The *Bravo of Venice* (1804) was his second-best novel, and the *Castle Spectre* (1797) his only successful play. One or two stirring ballads of his still live, and his *W. Indian Journal* is a good book of travels. He died returning from a visit to his estates in the W. Indies, 14th May 1818. L.'s *Life and Correspondence* was published in 1839.

Lewis'ia is a genus of Mesembryaceæ represented by a single species, the *L. rediviva* of Pursh. It is a somewhat succulent perennial, bearing in the midst of its fleshy bunch of leaves a single stalk surmounted by a single rose-coloured flower. The leaves wither away as soon as the flower expands, and the whole plant passes entirely from sight in less than two months from its first appearance above ground. It is indigenous to N. W. America; and the large starchy root was once extensively used by the Indians as an article of food.

Lew'iston, a city of Maine, U.S., on the Androscoggin river, 35 miles N. of Portland by rail. It has splendid water power, supplying 10 cotton-mills, with 242,548 spindles, and 5 woollen-mills, which together produced goods to the value of $11,500,000 in 1873. The river here falls 50 feet over a ledge of rocks, and the vicinity is very picturesque. In the public park there is a soldier's monument. L. is now (1877) the second largest city in the State. Pop. (1870) 13,600.

Lex'ington, a city in Kentucky, U.S., on a branch of the Elkhorn river, 20 miles S.E. of Frankfort by rail. It has eighteen churches, a public library of 16,000 vols., a State asylum, an orphanage, &c. The Transylvania university, the oldest in the Western States, founded here 1798, was united to the Kentucky State University, removed hither in 1865, and the institution had in 1872, 21 professors, 9 other teachers, 579 students, and 20,000 volumes. There is a large agricultural trade and carriage, bagging and rope factories. L., incorporated in 1782, was for some time the State capital, and soon became the chief place W. of the Alleghanies. Pop. (1870) 14,801.—**L.**, a city of Missouri, on the S. bank of the river Missouri, 250 miles W. of St. Louis (370 by river). It is a railway centre, and has a coal trade. Pop. (1870) 6336. L. was taken by the Confederates, 20th September 1861, retaken on 16th October following, and again unsuccessfully attacked by General Blunt in October 1864.—**L.**, a post-village (pop. 2277) of Massachusetts, 11 miles N.W. of Boston by rail, was the scene of the earliest (18th April 1775) resistance to the British troops, in the War of Independence. Though a slight and ineffectual affair, it has gained for L. the name of 'the birthplace of American liberty.'

Lex Loci Contractus, a legal term denoting the law of a country in which an obligation was contracted. L. L. C. rules all relating to the nature of the obligation; while *Lex Fori*, or law of the country whose courts are asked to enforce the obligation, regulates the mode of action for that purpose. See INTERNATIONAL LAW.

Ley or **Lye** (Lat. *lix*, ashes, lye), water impregnated with an alkali, such as soda-ash or potashes, employed in soap-making and other industries. In printing, benzine forms an efficient substitute for L. in cleaning type.

Ley'den or **Lei'den** ('the fort on the marsh;' the *Lugdunum Batavorum* of the Romans), a well-built town in the Dutch province of S. Holland, on both sides of the Oude Rijn ('Old Rhine'), 7 miles from the sea, and 16 miles N. of Rotterdam by rail, with many canals and wide streets, of which the Breedestraat ('Broad Street') is one of the finest in Europe. The oldest part is the citadel, on a hill in the centre. Among its public buildings are St. Pancras' Church (1280), near which is the corn exchange, on a bridge with covered porches; St. Peter's (1315), in which are buried Boerhaave, Scaliger, Spanheim, and Camper; the town house, with pictures by Lucas van Leyden, Cornelis Engelbrechtsen, and Van Bree; and the famous university (founded in 1575, and connected with many great names, as Grotius, Descartes, and Ruhnken), now attended by 600 students, and enriched with an observatory, a valuable library, and fine anatomical and botanical collections. L. was the birthplace of the painters Rembrandt, Dow, Metzu, and Mieris, and the seat of the famous Elzevir (q. v.) printing-press. Printing and cloth-manufacture were formerly the main industries of L., which is now the chief mart in Holland for wool and woollen goods. There are some iron-foundries and salt-works, and a lively trade in agricultural produce. Pop. (1876) 40,724. L. suffered greatly from a siege (31st October 1573 to 24th March 1574), and subsequent blockade by the Spaniards, till saved by Prince William of Orange, who, piercing the dams of S. Holland, laid the surrounding lands under water, and raised the siege (3d October 1574).

Leyden, John, a Scottish poet and scholar, was born at Denholm, Roxburghshire, 8th September 1775. He studied at Edinburgh University, not only the prescribed subjects, but French, German, Spanish, Italian, and Icelandic. In 1797 he was licensed as a probationer of the Church of Scotland, but never received a charge. In 1799 he published *A Historical and Philosophical Sketch of the Discoveries and Settlements of the Europeans in Northern and Western Africa at the close of the Eighteenth Century*. Two years after, he edited with great learning the *Complaynt of Scotland*, the authorship of which he attributed to Sir David Lindsay. He also assisted Walter Scott in collecting materials for his *Minstrelsy of the Scottish Border*. In 1802 he undertook the editorship of the *Scots Magazine*, but in the same year obtained an Indian surgeonship, for which he qualified himself in six months. Before leaving he finished his poem entitled *Scenes from Infancy*. Gaining his Indian experience first in the districts of the Mysore, he removed for health's sake to Prince of Wales Island, where he obtained information for his essay on the *Languages and Literature of the Indo-Chinese Nations* (10th volume of *Asiatic Researches*). Thence he removed to Calcutta, as Professor in Bengal College, afterwards becoming judge of the Twenty-Four Pergunnahs of Calcutta. He accompanied the governor-general, Lord Minto, to Java, there to accumulate information as to the institutions of native tribes; but at Batavia he was struck down by fever 21st August 1811. By extraordinary combination of genius with industry, L. raised himself from the humblest position to the first rank of European scholars. In all departments of philology he was learned; but his labours in the field of Asiatic language and literature are of special value. His *Poetical Remains* were published in 1819; and a new edition of his *Poems and Ballads*, with memoir by Walter Scott, in 1858. The centenary of his birth was celebrated in 1875, and in the same year an edition of his Poems, with Life, was published by Nimmo (Edinb.).

Leyden, Lucas van, was born at Leyden in 1494. He studied drawing under Cornelis Engelbrechtsen, and when a mere child produced paintings and prints prized now by collectors as rare curiosities. Some of his pictures are to be seen at Vienna, Dresden, Berlin, and Munich; one or two are to be found in this country; but his greatest work, 'The Last Judgment,' adorns the town-hall of Leyden. He was one of the first to engrave from his own paintings, and latterly devoted himself entirely to etching. Two hundred of his prints are extant, the most famous of which are 'Mahomet and the Monk Sergius,' and the 'Eulenspiegel.' His pictures are stiff but bold, and mellow in colour. His engravings rank next to those of Albert Dürer, wanting the free touch of that artist, but full of expression, and excelling in the rendering of aerial perspective those of other contemporaries. L. led an extravagant life, and died in 1533.

Leyden Jar. See ELECTRICITY and ELECTROSTATIC INSTRUMENTS.

L'Hospital, Guillaume François Antoine de, Marquis, a French mathematician, was born at Paris in 1661. His father intended him for the army, but this he soon abandoned, and devoted himself to the study of mathematics—particularly the newly invented calculus developed by Leibnitz and the Bernoullis. He was one of the four men in Europe who solved the *brachistochron*, viz., 'to find the curve on which a material point will fall from one point to another in the least possible time.' The others were Newton, Leibnitz, and Jakob Bernoulli. L'H. then proposed, as a challenge, 'of all the curve

lines which can be described on a given ordinate base and of a given length, to find that which contains the greatest area." L'H. also solved Newton's problem of the solid of least resistance. Cycloids and epicycloids were the favourite subjects of his meditations. His chief works are *Analyse des infiniment Petits* (1696), and *Traité Analytique des Sections Coniques* (1707). L'H. died 2d February 1704. In spite of the many attestations of John Bernoulli, repeated by Montucla in his *Histoire des Mathématiques*, no one has ever seriously doubted L'H.'s brilliant originality or his fairness towards his great contemporaries.

L'Hospital, Michel de, a great French statesman, born in 1505 at Aigueperse in Auvergne, studied law at Toulouse and Padua, was auditor of the Rota at Rome, came in 1534 to Paris, where he practised as an advocate and counsellor for the Parliament, was appointed by Marguerite of Valois her chancellor, and in 1554 became superintendent of finance. On the accession of François II. (1559) he entered the Council of State, and in 1560 was made chancellor of the kingdom by Catherine de' Medicis. A good man, a genuine patriot, and a prudent councillor, he laboured to restore order and smooth party differences, but his moderation was taken for secret heresy, and led to his losing the seals, 24th May 1568. He died at Belébat, near Étampes, 13th March 1573, during the Civil War, against which he had constantly remonstrated. See his *Œuvres Complètes*, by Dufey (5 vols. Par. 1824), and the biographies by Villemain and Lévesque de Pouilly.

Liability, Limited, Acts. See JOINT STOCK COMPANIES, LAW REGARDING.

Lia'nas (from French *liane*) are woody, climbing, or twining plants that often in tropical countries, by their exuberant and interlacing growth, so mass together the forests as to render the traveller's progress a matter of the greatest difficulty. In Brazil, for instance, species of bignonia overtop the tallest trees, their flexible stems twisted like ropes pass from tree to tree, descend to the ground at intervals, take fresh root, again ascend other trees, and thus continue a perennial growth over vast areas. The rattans or canes are also L., climbing over and amongst the trees and supporting themselves by the hooked spines of their leaf-stalks, and the 'Supple-Jacks,' 'Wild-Irishmen,' and 'Bush-Lawyers' of the colonies come under the same category. The clematis may be quoted as an illustration, on a small scale, of this group of plants.

Li'as Formation, The, is usually regarded as forming the base of the Jurassic or Oolitic System (q. v.), lying between the Upper Trias and the Lower Oolite. It is divided into three sections, called respectively the *Lower L.*, the *Marlstone*, and the *Upper L.* The Lower L. consists essentially of bluish-grey argillaceous limestone, alternating with laminated clay or shale, rich in fossil remains of corals, molluscs, fish, and reptiles. It furnishes limestones which are in some places extensively used for flags and building stones. The Marlstone is a well-marked division, composed mainly of calcareo-argillaceous sandstone, which is widely quarried in the N. and S. of England for the ironstone which it contains. The Upper L. consists of a thick deposit of blue clay, topped by bands of brown and yellow sands which were at one time classed with the Inferior Oolite. The L. is exceedingly rich in fossils, and each of the subdivisions has its characteristic assemblage of fossils which at once separates it from the rest. The clayey consistency of the formations in many places, and the presence of corals, molluscs, and fish, stamp them in great measure as marine deposits; but there are nearly 100 distinct species of plants (chiefly cycads), besides numerous remains of insects and reptiles (Ichthyosaurus, Plesiosaurus, &c.), which indicate the contemporaneous existence of conditions for terrestrial life.

Liba'nius, a distinguished Greek sophist and rhetorician, was born at Antioch, A.D. 314 or 316. He went to Athens in pursuit of knowledge, and there prosecuted his studies with marked success. He opened a private school at Constantinople, and attracted numerous pupils; but in consequence of the revengeful spirit manifested by his professional rivals he was (346) expelled from that city, to which, however, he subsequently returned on several occasions. He taught also, and with equal success, at Nicomedia, to which place he was warmly attached. He finally retired to his native city, where he died in 393. Though a pagan, he was moderate and tolerant in spirit, and was at once the teacher and friend of St. Basil (q. v.) and John Chrysostom (q. v.), and the favourite of the Emperor Julian (q. v.) and Theodosius (q. v.). Many of his works are still extant, the best edition of the orations and declamations being by Reiske (4 vols. 1791–97), and of the epistles by Wolf (1738).

Liba'tions (from Lat. *liba*, 'I pour out;' Gr. *loibai* or *spondai*, drink-offerings of unmixed wine, milk, or honey, were employed by the Greeks and Romans in the ratification of a treaty, at funerals, and on many other public and private occasions, as at the opening and close of a banquet, when the Greeks made L. to the Good Genius, to the sound of a flute, by pouring wine and laying a cake upon the altar, with the words *Agathôi Daimôni*; the Romans, to the Lares, by committing to the flames upon the hearth wine or some delicate morsel, or both together. L. are also common to the Celtic, Teutonic, Slavonic, and other folk-lores.

Libau', or **Leepaja**, a seaport of Russia, government of Courland, on a low tongue of land between the Lagoon and the Baltic, 120 miles W.S.W. of Riga. It is a railway terminus, and an emporium for the grain and hemp of W. Russia. Its chief buildings are a town-house, several churches, a synagogue, hospital, and theatre. The harbour, constructed in 1865, is free of ice during most of the year. In 1873, the imports (herrings from Norway, colonial wares from Lubeck, wine, salt, &c., from England, and fruit from Italy) amounted to £200,219; and the exports, mainly grain, flax, linseed, and railway sleepers, to £723,959. L. is a favourite bathing-place for the Courland aristocracy. Pop. (1870) 10,767.

Li'bel is a malicious defamation of one man by another, by means of writing or representation. Spoken defamation is *Slander* (q. v.). With regard to an individual, any matter maliciously hurtful to his reputation is a L.: With regard to Government, all matter holding it up to public contempt or disesteem is libellous.

In a civil action, a L. must appear to be false as well as defamatory. In a criminal information by an individual, when the L. contains a direct charge which the applicant can deny, the court will require an affidavit that the charge is unfounded.

Between L. and mere verbal defamation there is an important distinction, the former being presumed to be a more deliberate injury, and more widely and permanently diffused. Hence the word *swindler*, if spoken of another, unless in relation to his calling, is not actionable, but if published in a written form, it is so. Printing or writing may be libellous though the scandal be not directly charged, but obliquely and ironically. To constitute L. it is not necessary that the person libelled be named; if so described or indicated as to leave no reasonable doubt to whom the libellous matter was meant to apply, this is enough. A comment on a literary work, holding it and its author up to ridicule, is not libellous, unless it attack the writer in his domestic or social relations, or in circumstances unconnected with his literary work. The same rule applies to criticism on the works of a professional artist. Under Lord Campbell's Act, if one man publishes or threatens to publish a L. on another, with intent to extort money or other valuable consideration from him, the offender is liable to three years' imprisonment, with or without hard labour.

Libel (ecclesiastical) is the name given to the summons commencing a suit, and containing the accusation of the plaintiff or pursuer.

Libe'ria, a negro republic on the W. coast of Africa, in Upper Guinea, founded in 1821 by the American Colonisation Society, extends from the Sherboro River in the N.W. to the Pedro River in the S.E., a distance of some 600 miles, and has an extreme breadth from the coast inland of nearly 100 miles. Area estimated in 1873 at 9700 sq. miles; and the pop. at 720,000, of whom 19,000 are emancipated American slaves, and the rest natives. The coast is low and sandy, except in the S.E., where it is precipitous, and the interior rises in woody hills and lofty mountain ranges, opening in fine fertile valleys, watered by many small streams. The climate is tropical, and very dangerous for immigrants. Among the forest trees are teak, mahogany, rosewood, palms, and various dye and gum-trees. Along the St. Paul River are the principal farms, and here 300,000 lbs.

of sugar were produced in 1871. Coffee is successfully raised, and cotton is indigenous, yielding two crops yearly. Other products are maize, rice, wheat, barley, oats, vegetables, tomatoes, cucumbers, lemons, oranges, guavas, tamarinds, pineapples, and African peaches. Besides the principal of these articles, L. exports palm-oil, gold-dust, ivory, and hides. The capital is Monrovia, with some 13,000 inhabitants; and other settlements are New Georgia, Caldwell, Virginia, Edina, Greenville, Lexington, &c. The constitution is modelled on that of the United States. Election is by ballot, and every male citizen who possesses real estate has the suffrage. No white man is admitted to citizenship. The president is elected for two years, senators for four, and representatives for two. In 1875 the revenue (chiefly customs' duties) amounted to £21,500, and the expenditure to £23,100. English is the official language. L. was proclaimed an independent state in 1847, and was recognised by Britain in the following year. See Thomas's *West Coast of Africa* (New York, 1860), and Stockwell's *Republic of L.* (New York, 1868).

Libe'rius, Bishop of Rome from 352 to 356, was one of the bishops who, on account of their refusal to subscribe the condemnation of Athanasius at the synods of Arelate (353) and Milan (355), were deposed from their sees and banished. To regain his office L. afterwards subscribed the semi-Arian confession of faith drawn up by Eusebius of Nicomedia. In spite of this heterodoxy he is regarded as a saint by the Roman Catholic and Greek Catholic Churches.

Lib'erty, a term of English law denoting the same as *Franchise* (q. v.).

Lib'erty, Equal'ity, and Frater'nity are the formulæ representing from different points of view the creed of a certain class of political speculators. Different republics have adopted the phrase as a motto, and France, at the present time (1877), adorns with it the portals of all her public institutions. The democratic idea which it represents has now passed in some form or other into the literature, politics, and religions of every region where Aryan civilisation prevails. The doctrine in its boldest shape simply means a readjustment of society with the elimination of all the inequalities of class. Its most important English manifestation in the present generation is made in the writings of those who profess it as the Religion of Humanity. In their view the destiny of the human race can only be nobly and efficiently fulfilled by the withdrawal of all restraints upon human conduct, by the practical realisation of a scheme under which the cruel contrasts in the lot of life may be removed, and by the sublimation of self-love into a general love for the whole family of man. In the ethical works of J. S. Mill, in the miscellaneous writings of John Morley, and the English school of Comtists, these principles, though not systematised, are represented in their highest literary form. L. F. Stephen in his *L., E., and F.* (1873) subjects them to a keen analysis, and supports the thesis that the people who use these words most rationally exaggerate their advantages, and that the words themselves are ill-adapted to be the creed of a religion, while they do not typify any state of society which a reasonable man ought to regard with enthusiasm or self-devotion.

Libourne', a town of France, department of Gironde, at the confluence of the Dordogne and Isle, 20 miles N.E. of Bordeaux by rail. It has remains of old fortifications, and a tower of the 14th c. The Dordogne is crossed by a stone bridge, and the Isle by a suspension bridge. L. has tanneries, nail and rope factories, &c., and a large trade in grain, timber, salt, brandy, and wine. Pop. (1872) 11,456.

Li'bra, an insignificant constellation, situated on and to the S. of the celestial equator, just below the feet of Bootes. Its importance arises from its once having been the *sign* of the zodiac which the sun occupied at the time of the autumnal equinox. When used in this sense, it corresponds to the *constellation* Virgo.

Li'braries. The oldest national library of which we have record is that collected by Osymandus, king of Egypt, at Memphis, some 14 centuries B.C., according to Diodorus of Sicily, whose general testimony is supported by modern Egyptologists. But the most superb in Egypt, perhaps in all the ancient world, was the Alexandrian Library (q. v.), enriched by the addition of that of Pergamus (q. v.). Alexandria also possessed a great library in the Sebasteum, and another of later date attached to its 'School.' L. gathered early in Hebrew synagogues and Persian palaces, but more remarkable are the 'L. in clay' of Assyria. In the palace at Nineveh the excavations revealed a vast collection of clay tablets, bearing cuneiform inscriptions, and forming a sort of royal library. Some 20,000 such tablets are now in the British Museum. Pisistratus is said to have been among the earliest of the Greeks who projected a great library, and one of the most famous private collectors was Aristotle. The L. of the various countries they conquered were eagerly acquired by the Romans. Sulla brought from Athens the library of Apellicon. Magnificent private L. were possessed by Crassus, Cæsar, Cicero, and Lucullus—the latter, like Sulla, generously allowing free access to his treasures. Julius Cæsar projected a *public* library, and chose Varro as librarian, but the scheme was foiled by the dagger of Brutus. After the reign of Augustus, the emperors were ambitious to found and give their names to L. According to Publius Victor, Rome had 29 public L., the first of which was opened by Asinius Polio. Augustus founded two public L.—the Octavian and Palatine. The most important of all was the Ulpian of Trajan. At Herculaneum was discovered a library of 1700 scrolls. Constantine the Great began the formation of a library at Byzantium, especially for the rescue of the Christian works that had been doomed to destruction by Diocletian. It is commonly supposed that Amurath IV. sacrificed it in a fit of devotion; yet many scholars still believe it to be concealed in the Seraglio. The largest L. in ancient times might correspond to modern collections of 80,000 vols.

In the Middle Ages the chief conventual L. were Benedictine; such are those of Monte Casino (q. v.), Fleury on the Loire, Clugni in Burgundy, Corbie in Picardy, St. Gall (q. v.), those of the monasteries of Christ Church and St. Augustine at Canterbury, and the abbeys of Durham and Peterborough. Karl the Great founded a library near Lyon; the choice books of Karl the Bald are now in the British Museum; Pope Sylvester II. was an ardent collector of classics.

On the revival of learning in the 15th c., learned men, aided by princes, popes, and scholars, were despatched throughout the civilised world to collect MSS., and in the course of a few years most of the classics now known were brought together in the rich L. of Rome, Naples, Venice, Florence, Vienna, and Paris. The L. of Federico, Duke of Urbino, and Matthias Corvinus, King of Hungary, were counted among the marvels of the age. Now, also, began the formation of those town L., in which Germany is so rich. Modern L. continued to multiply with increasing rapidity after the invention of printing.

Of modern L., all that can be given is the merest summary. In Great Britain the chief L. are the British Museum (q. v.), with 1,150,000 vols., the Bodleyan (q. v.), with 330,000, the Advocates' Library (q. v.), Edinburgh, with 250,000, Cambridge University with 250,000, Dublin University with 170,000 (each entitled to a copy of all books published in the empire); Edinburgh University with 138,000, Glasgow University with 105,000, Liverpool (public) with 100,000, and Manchester with 120,000. Those of Paris are the Nationale with 2,000,000 vols., the Arsenal (300,000), St. Geneviève (200,000), Sorbonne (140,000), Mazarin (160,000), and Institute (100,000); Bordeaux has 140,000 vols., Lyon 120,000, and Rouen 120,000. Those of Germany are the Berlin Royal (710,000, and 15,500 MSS.), Breslau University (340,000), Darmstadt (450,000), Dresden (305,000), Gotha (240,000), Göttingen (360,000), Hamburg (250,000), Heidelberg (175,000), Königsberg (200,000), Leipsic (350,000, and 2500 MSS.), Munich (800,000, and 25,000 MSS.), Munich University (300,000), Strassburg (160,000, rich in Incunabula, q. v.), Wölfenbüttel (250,000), Würzburg University (200,000), and Tübingen (220,000). Germany has some 15 other L. of over 100,000 vols. Those of Italy are the Vatican (105,000 vols. and 25,000 MSS.), the Casanata, Rome (160,000 vols.), the Brera, Milan (185,000), the Ambrosian, Milan (140,000), the Nazionale, Florence (300,000), Nazionale at Naples (200,000), Bologna (200,000), Parma (140,000), Turin (150,000), and St. Mark's, Venice (120,000, and 10,000 MSS). Other remarkable L. are the Imperial, St. Petersburg (802,700, and 28,536 MSS.), Moscow University (160,000), the Royal, Copenhagen (500,000), Copenhagen University (200,000), Stockholm (125,000), Christiania (150,000), Upsala (150,000), Brussels (250,000), Freiburg (250,000), Madrid National (230,000), the Imperial Public, Vienna (400,000), Vienna University (210,000), Buda-Pesth (200,000), Athens (125,000), Harvard College, U. S. (250,000),

the Library of Congress, Washington (280,000), Boston (public, 225,000), and the National, Mexico (100,000). In 1874 there were 790 public or associated L. in the United States, with an aggregate of 7,760,118 vols.

Libraries and Museums, Free, Act. The 18 and 19 Vict., c. 70, may be adopted by any municipal borough, if by the last census the population exceed 5000, and if two-thirds of the ratepayers consent. A rate may be levied not exceeding one penny per pound, for the founding and maintaining of a free public library. By 29 and 30 Vict., c. 114, a public meeting to consider the adoption of the Act is to be called on the request of the town council, or on the request of the ratepayers residing in the borough, and parishes or districts may unite in adopting the Act.

See *Memoirs of L.* (2 vols. Lond. 1859), and *L. and Founders of L.* (Lond. 1864), by E. Edwards.

Libra'tion, the name given to two inequalities of the moon, arising from the circumstances that her orbital motion is not uniform, and that her axis of rotation is not perpendicular to the plane of her orbit. The effect of the first is to render apparent at times a small strip of her surface lying just round the eastern or western edge of her visible disc; while, in virtue of the second, portions of her surface surrounding either pole come into view.

Libri-Carucci, Guillaume, a mathematician, of Italian origin but French by naturalisation, was born at Florence, January 2, 1803. In 1823 he became Professor of Physics at Pisa, and the succeeding year went to Paris, returning to Florence in 1825. In 1830, compelled for political reasons to leave Italy, he revisited Paris, and in 1832 succeeded Biot in the Collége de France. L. is perhaps best known in connection with the charge of abstracting books and MSS. from the public libraries to the value of £20,000. He was found guilty, and condemned to ten years' imprisonment, but had in the meantime fled to England, where he died in October 1869. L.'s chief work is *l'Histoire des Sciences Mathématiques depuis la Renaissance jusqu'à la Fin du XVIIe. Siècle* (4 vols. 1838–41), and he is the author of numerous memoirs, scientific and political.

Lib'ya was the name applied by the early geographers to that portion of Africa which lay between Egypt, Æthiopia, and the shores of the Atlantic, and which was bounded on the N. by the Mediterranean, and on the S. by the mythical river Oceanus. The L. of Homer and Hesiod comprised Africa to the W. of Lower and Middle Egypt; and to Herodotus L. was sometimes the whole of ancient Africa, and sometimes Africa exclusive of Egypt. The province of L. Proper lay between Egypt and the Syrtis Major, and comprehended the regions of Marmarica, and Cyrenaica or Pentapolis. The wars with Carthage, the Jugurthine war, and various expeditions of discovery gave to the ancients a more extended knowledge of the continent, but its form and dimensions were not clearly ascertained till the Portuguese doubled the Cape of Good Hope in 1497.

Li'cence is in law a power or authority given to a man to do some lawful act. It cannot be assigned unless it bear to be granted to a man and his assignees. See GAME LAWS. Under DANCING, *Dancing and Music L.*; MARRIAGE LICENSING ACT, 1872.

English Licensing Act (1872). This Act, which does not extend to Scotland, was passed to amend the licensing Acts. Justices having an interest in the liquor trade are disqualified from acting. No L. granted at a general license meeting in respect of premises not previously licensed is to be valid in counties till it is confirmed by the county licensing committee. Registers of licences are to be kept in licensing districts, and every person applying for a new L. is to state the name of the owner of the premises for which the application is made.

Licen'tiate (Lat. *licentia*, 'permission,' *i.e.*, to deliver lectures and afterwards to dispute for the degree of doctor), a degree intermediate between bachelor and doctor, now restricted to the theological faculty in continental universities, and only used in England at Cambridge, which gives the degree of L. of Medicine. L., in Scotland, means one *licensed* by a presbytery to preach.

Li'chen is a papular disease of the skin, distributed upon a single region, or over the entire surface of the body. The papules are conical in form, of the size of millet seeds, slightly reddish in colour, and are attended with itching, tingling, and smarting. They may terminate in resolution, furfuraceous desquamation, or in superficial ulceration. L. is described under six varieties, depending on the appearance, situation, form, and severity of the disease, viz.: *L. simplex*, *L. annulatus*, *L. circumscriptus*, *L. urticatus*, *L. tropicus*, *L. agrius*. In *L. simplex* the eruption is ushered in by smarting and pruritus, which are increased towards night. In three or four days the redness and pruritus subside; the papules decline, disappearing entirely in a week or ten days, and then follows a furfuraceous desquamation of the cuticle. In the chronic form, successive crops appear, and the eruption may be prolonged for months or years. The use of indigestible articles of diet and spirituous drinks, more especially in hot weather, is a frequent cause of L. *Treatment:* milk and farinaceous diet, saline aperients, with locally a tepid bath, a lotion containing *liquor plumbi diacetatum*, distilled vinegar, or lemon juice, will be sufficient to allay the irritation in *L. simplex*.

Li'chens. In the present state of the scientific discussion as to whether L. are a family of autonomous plants or are Fungi parasitic upon Algæ, it seems desirable to speak of them here as the former, the theory of their dual constituency not having as yet been accepted by the bulk of botanists. L. form one of the largest tribes of cellular cryptogams, are distributed through all countries of the world, generally draw their nourishment from the air, are of slow growth and long endurance, and may roughly be described as consisting of two parts, namely, their frond or thallus, and their fructification. The thallus is commonly developed in the form of incrustations, which cover stones, and the bark of trees, or penetrate between the lamellæ of the epidermis of woody plants. These are termed Crustaceous L., and are mostly so closely united to the substance on which they grow, as not to be separable without injury. In another group—the Foliaceous L.—the thallus forms flat-like expansions, which can be completely detached from the ground, stone, or bark, &c., that supports them, since they are attached to their host only in a few places by root-like organs called Rhizines. A third form of L.-thallus is shown in the Fruticose group, which are attached only by a narrow base at one spot, and grow in the form of miniature much-branched shrubs. Certain genera again are met with in a slimy condition, and are called Gelatinous L. The reproductive organs appear in the form of protuberances of various kinds, either bursting through the surface of the frond, and expanding into shield-like or hollow discs, or remaining covered by its outer layer, and opening by pores; the first form the Gymnocarpous L., the latter Angiocarpous L. Berkeley, one of the prominent authorities on cryptogamia, says in fructification they agree with ascomycetous Fungi, and like them have either a second form of fruit (stylospores), contained in distinct cysts (pycnidia), or minute bodies variously borne, which are supposed to have the power of impregnation. Nylander (the best specialist), divides L. into three families, using the vegetative element for separating purposes, whilst Acharius employs the fructification for his divisions. L. furnish valuable dyes, and to some extent are useful for food. See ARCHIL, CUDBEAR, ICELAND MOSS, LITMUS, REINDEER MOSS, TRIPE DE ROCHE.

Lich'field, an old episcopal city of England, in Staffordshire, on a small feeder of the Trent, 18 miles S.E. of Stafford, and 116 N.W. of London by rail. The cathedral, the architectural glory of L., is partly of the Early English period, and has been restored by Sir G. G. Scott. It is 410 feet long, and 153 wide, has three spires (the central one 280 feet high), and is rich in beautiful sculpture. The body of St. Mary's Church was rebuilt (1868) in Second Pointed style, to harmonize with the tower. L. has a diocesan theological college, a museum and free library, and a grammar school, founded by Edward IV., and attended by Addison, Ashmole, Johnson, and Garrick. The industries are brewing, malting, flax-spinning, paper-making, and market-gardening. Pop. (1871) 7347. The name L., originally *Licedfeld*, means 'field of corpses,' and possibly marks the scene of a battle of which there is no record in history. The ancient see of L. corresponded to the original Anglian kingdom of Mercia, and was established as an archbishopric by Offa (q. v.) in rivalry of Canterbury. The town received its first charter from Edward II., and returns one member to parliament.

Licin'ia Gens was a celebrated plebeian gens, to which belonged *C. Licinius Calvus Stolo*, who carried the measure throwing open the consulship to the plebeians, and who, when

tribune, brought forward the rogation to restrict each citizen to 500 jugera, or about 333 acres, of the public land. The rogation was adopted, and in 356 B.C. L. was himself convicted under it. The L. G. attained the imperial dignity in the person of *L. Publius Flavus*, a Dacian peasant, who by the favour of the Emperor Galerius was raised to the rank of Augustus, and made governor of the Illyrian provinces, A.D. 307. In 313 he married Constantina, sister of Constantine, and, by defeating Maximinus, became sole master of the Eastern empire. In 315, and again in 323 war broke out between Constantine and L., in which the latter was completely crushed. He was banished to Thessalonica, where in 324 he was put to death by the orders of his rival.

Lic'tor (from Lat. *ligo*, 'I bind;' he who *binds* the rods or the culprits) was an attendant granted to Roman magistrates of the highest rank, as a sign of official dignity. The lictors bore the Fasces (q. v.) and walked in single file before the magistrate, calling out to the people to make way for him, and to pay their respects to him. They had also to execute sentences of judgment, to bind criminals to the stake, to scourge, and to behead them. In the earliest times the kings had twelve lictors; and, on the first institution of the consulship, twelve were assigned to each consul. In the city the axe was removed from the fasces of the consul, and in the Comitia the lictors lowered their fasces in acknowledgment of the supreme power of the people.

Lidd'on, Rev. Henry Parry, D.D., D.C.L., the greatest living preacher in the English Church, born in 1830, studied at Christ Church, Oxford, and graduated in 1850, became Johnson's theological student (1851), and having taken orders, was Vice-Principal of Cuddesdon Theological College (1854–59). He was made a canon of Salisbury in 1864, and as Bampton lecturer (1866) delivered a masterly course of sermons, *The Divinity of our Lord* (Oxf. 1867). In 1870 he was advanced to a prebend of St. Paul's Cathedral, and the same year became Ireland Professor of Exegesis in the University of Oxford. As a leader of the Anglo-Catholic party, L. has attended several of the Bonn conferences of the 'Old Catholics,' and in 1876 expressed his sympathy with the Greek Church by a visit to the revolted provinces of Turkey. He is the author of *Lenten Sermons*, *Some Words for God*, *Sermons Preached before the University of Oxford*, and *Some Elements of Religion*.

Lie. The uttering of a L. is not usually punishable by law, unless uttered under legal procedure, when it constitutes the crime of *Perjury* (q. v.).

Lie'big, Justus, Freiherr von, a celebrated German chemist, was born at Darmstadt, May 12, 1803. His taste for the physical sciences early showed itself, and after studying successively at Bonn and Erlängen, he obtained in 1822 a stipend from the Grand Duke of Hesse-Darmstadt, which enabled him to visit Paris, where he stayed two years perfecting his knowledge of chemistry. A memoir on *Fulminic Acid*, presented at the Academy of Sciences, attracted the attention of Humboldt, who introduced the young chemist to Gay-Lussac, Dumas, and other distinguished men of science, and who by his influence obtained for L. the post of extraordinary professor of chemistry at Giessen in 1824. In 1826 he was appointed ordinary professor in the university, and as such established a laboratory for teaching practical chemistry, the first of its kind in Germany. This laboratory was for nearly twenty-five years the resort of students from all parts of the world, and the system of instruction pursued here has been the model to other like institutions. In 1850 L. succeeded Gmelin at Heidelberg, and two years later removed to Munich, where he performed his double duties as professor of chemistry and director of the chemical laboratory, till his death, April 18, 1873. His world-wide reputation as a chemist, and as one of the founders of that branch of the science known as organic chemistry, secured him many honours. In 1845 Ludwig II., Grand Duke of Hessen, conferred on him the title of baron. He was a member of almost all the scientific societies in Europe, and was repeatedly invited to fill chairs in England and other countries. The latest tribute to his memory is a monument at Darmstadt, unveiled May 12, 1877, the seventy-fourth anniversary of his birth. L.'s numerous and valuable researches are contained in some three hundred memoirs, the majority of which are published in the *Annalen der Chemie und Pharmacie*, begun by him and Geiger in 1832, and in the *Handwörterbuch der Chemie* (9 vols., 1837–64), which he compiled together with Poggendorff of Berlin. His most important works are—*Die organische Chemie in ihrer Anwendung auf Agricultur* (1840, 8th ed. 1865), *Die Thierchemie oder organische Chemie in ihrer Anwendung auf Physiologie und Pathologie* (1842, 3d ed. 1846), *Grundsätze der Agricultur Chemie* (1855), *Theorie und Praxis der Landwirthschaft* (1856), *Naturwissenschaftliche Briefe über die Moderne Landwirthschaft* (1859), and *Suppe für Säuglinge* (2d ed. 1866). The most popular of his writings are his *Chemische Briefe* (1844), translated into English under the title of *Familiar Letters on Chemistry*. They are charmingly written, and were published with a view of indicating the importance of studying chemistry as a general branch of education. L.'s life work has done more than the work of any other single individual in directing the attention of agriculturists, physiologists, and pathologists to the bearing of chemistry upon their special departments. The animal tissues, their manner of deriving material from the nourishment taken into the body, and their decomposition, were investigated by him in great detail. He showed the source of animal heat to be the decomposition of the carbon present, and traced back the carbon to certain kinds of food, such as starch, sugar, oil. Fat he attributed to the oxidation of hydrogen in the starch and sugar of the food—a theory which met with powerful opposition. He analysed flesh, and found it to contain kreatine, lactic acid, phosphoric acid, inosinic acid, &c., and discussed the chemical processes of respiration. Though some of his theories have been proved erroneous, there can be no question that L. gave the sciences intimately related to the chemistry of life an immense impetus, and that in his discoveries, and in the practical applications of these discoveries, he must be regarded as the greatest chemist of the 19th c.

Liech'tenstein, a small principality, bounded N. and E. by the Tyrol, S. by the Grisons, and W. by the Rhine, which separates it from the canton of St. Gall. Area, 60 sq. miles; pop. 8060. It is very mountainous, excepting a narrow strip along the Rhine. There is some produce of wheat, flax, good wine, and cattle. Vadux is the chief town with a pop. of 921. L. is governed by an annual diet of representatives, subject to a council at Vienna, where the prince usually resides. From mediatised possessions in Austria, Prussia, and Saxony the prince derives a revenue of other 1,400,000 florins. L. was the smallest state in the former German Confederation.

Liége (Germ. *Lüttich*, Flem. *Luik*), a province of Belgium, is surrounded by the provinces of Luxemburg, Namur, Brabant, and Limburg, Dutch Limburg, and Rhenish Prussia. Area, 1117 sq. miles; pop. (1875) 635,076 (nearly all Walloons and Roman Catholics). It is drained by the Maas, which receives on the right the Ourthe, with its affluents Amblève and Weeze (or Vesdre). L. is occupied in the S. and E. with offsets of the Ardennes, some peaks reaching 2000 feet. Herveland, the fertile district N. of the Weeze, produces butter and 'Limburg cheese' in great quantity. Cloth, hardware, machinery, firearms, and cannon are extensively manufactured. Of mineral products, iron and coal abound; and copper, lead, zinc, alum, and several kinds of stone are largely worked.

Liége, the capital, the most picturesque town in Belgium, lies on both sides of the Maas, near its junction with the Ourthe, 55 miles E.S.E. of Brussels by rail. It is divided by the river into an old or upper quarter with narrow streets, and a new quarter with open streets and squares. The river is spanned by seventeen bridges, the most remarkable being Pont des Arches, the Boverie Bridge, and Pont de Val-Benoît. There are several fine churches, among which are the cathedral of St. Paul's, completed in 1557, St. James's Church (1014–1538), a Gothic building, St. Martin's, where, in 1246, the feast of Corpus Christi (q. v.) was instituted, St. Bartholomew's, built in the 12th c.; and the church of the Holy Cross, consecrated in 979; a beautiful palace of justice, formerly the residence of the prince-bishop; a university, founded in 1817; and an excellent school of mines. On an overhanging rock lies the citadel, once regarded as very strong. L. has a large trade, and its chief industries are tanning, and the making of cannon, firearms, glass, and cloth. Close to the town are large iron-mines and coal-pits. Pop. (1871) 115,956. L. (anc. *Leodicus vicus*, 'the people's town'), is mentioned as early as the 8th c., when it

the Library of Congress, Washington (280,000), Boston (publi[illegible] 225,000), and the National, Mexico (100,000). In 187[illegible] were 790 public or associated L. in the United St[illegible] aggregate of 7,760,118 vols.

Libraries and Museums, Free, Act. Th[illegible] 70, may be adopted by any municipal [illegible] sus the population exceed 5000 [illegible] payers consent. A rate ma[illegible] per pound, for the fou[illegible] library. By 29 and [illegible] the adoption of the [illegible] council, or on the [illegible] and parishes o[illegible]

See *Memoi* [illegible] *of L.* (Lond

Libra[illegible] arising f[illegible] uniform [illegible] plane [illegible] at t[illegible] or [illegible] r

[illegible] has the assistance of a privy council. Till within a century [illegible] the L.-L. was rarely in Ireland, but now he resides princi[illegible]pally at Dublin Castle, where he holds a viceregal court, to maintain the dignity of which he is allowed £20,000 a year. In his occasional absence lord justices are appointed.

Lieutenant-Colonel, the title of the responsible commander of a regiment in the British army. The superior post of colonel of the regiment, excepting in the artillery and engineers, where the colonel is the real commander, is a lucrative but merely honorary appointment, usually held by a general. The number of lieutenant-colonels on full pay in the army was 564 in 1876, their daily pay varying from 29s. 2d. in the Life Guards to 17s. in the Marines. In the same year there were 529 lieutenant-colonels in the auxiliary forces.

Lieutenant-General, the second in rank of the four grades of generals in the British Army. In 1876 there were 138 lieutenant-generals in the army list. In France 'lieutenant-general du royaume' was a title given to a temporary regent. Louis-Philippe was thus designated before he accepted the crown in 1830.

Life, the expression applied in physiology to indicate the sum-total of the functions which mark the active state of organic things. What L. in its essential principle is, we do not know; and definitions of L. are useless from our utter ignorance of the nature of the condition we attempt to define. Recent biological speculations have tended to connect L. with protoplasm as a property of that substance. This idea is very far removed from demonstration, and so long as chemical and physical forces of themselves fail to produce L. or vital action, so long must the biologist reasonably regard L. as an independent force or principle, which invests matter, but is yet not of it. See PROTOPLASM and VITALITY.

Life, in Law, is presumed to extend to 100 years.

Life, Mean Duration of, at a given age, is the average length of life enjoyed by a given number of persons who are of that age. Thus, if n be the number of persons of the same given age at a given time, n_1 the number left after the lapse of one year, n_2 the number after the lapse of two years, and so on, then evidently the number of those who have died during the first year is $n - n_1$. These may be assumed to enjoy each half a year of life; and hence, since $n - n_1$ live half a year and n_1 a whole year, the n enjoy, in the first year of calculation, an aggregate of $n_1 + \frac{1}{2}(n - n_1) = \frac{1}{2}(n + n_1)$ years. Similarly, in second, third, &c., years, they enjoy $\frac{1}{2}(n_1 + n_2)$, $\frac{1}{2}(n_2 + n_3)$, &c. The sum of these until none is left surviving, gives the aggregate number of years enjoyed by the n persons; and consequently, this sum divided by n gives the average life of each individual. It is represented by the series

$$\frac{1}{2} + \frac{n_1 + n_2 + n_3 + \ldots}{n}$$

The M. D. of L. is practically found from tables of mortality, which give, out of a certain number born, the number of those left at each successive birthday. On account of the necessary imperfection of the tables, and also because of the assumption that those who die in any one year die at regular intervals throughout the year (an assumption the more correct the greater the number involved in the calculation), the results cannot of course be regarded as mathematically correct.

Life'boat, a boat of peculiar construction designed to rescue shipwrecked persons. The essential qualities of a L. are—(1) Extra buoyancy, (2) great lateral stability or resistance to upsetting, (3) speed against a heavy sea, (4) immediate discharge of water, (5) self-righting if upset, (6) ample space for passengers and crew, and (7) facility of transport along the shore and in launching. A quarter of a century ago no L. existed combining all these qualities, while in June 1877 there were 266 stations in the United Kingdom under the control of the Royal National L. Institution, thoroughly equipped with its excellent lifeboats and other life-saving apparatus.

The first L. was invented in 1780 (patented 1785) by Lionel Luken, a London coachbuilder. Extra buoyancy was obtained by bands of cork and air-cases, and an iron keel served for ballast. This L., notwithstanding its merits, received little attention; and not till 1789 was the need for providing a boat for saving life in tempestuous weather forcibly brought home to

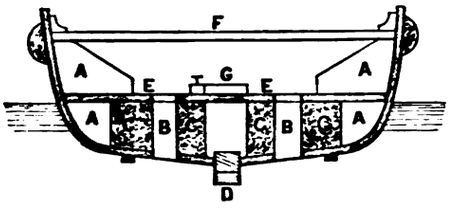
Lier, or **Lierre** (*Ledi*), a town in Belgium, in the province of Antwerp, at the junction of the Greater and the Lesser Nethe, 22 miles N.N.E. of Brussels by rail, has oil-mills and breweries, and considerable manufactures of musical instruments, knives, lace, silk, calico, and beet-sugar. Pop. (1875) 15,659.

Lieuten'ant (Fr. *lieu tenant*, Lat. *locum tenens*, 'one holding place for another'), a subordinate or representative officer. The term is used to designate junior officers in all European armies. In the British army the L. holds rank immediately below the captain. The daily pay runs from 10s. 4d. in the Life Guards to 5s. 3d. in the Royal Marines, which is also the pay of sub-lieutenants in most regiments. In the Royal Navy the lieutenant holds a rank equivalent to that of captain in the army, six years' service and the passing of an examination being indispensable. A lieutenant in command of a sea-going ship draws 14s. 9d. a day full pay, one without command 11s. 6d., a sub-lieutenant 5s.

Lieutenant, Lord-, of a county, is the representative there of the crown, the chief of the magistracy, and the medium of communication between that body and the government. He has also the control of the auxiliary military forces; and, having the power to raise them and grant commissions in cases of rebellion, is responsible for the public security and peace. He is assisted by permanent deputy-lieutenants. The office is of considerable antiquity. 'Commissions of array,' which empowered a chosen person to array troops in each county, were drawn up during the reign of Henry IV., and were superseded in the 16th c. by 'Commissions of lieutenancy.' The disputed right of the crown to issue these commissions was the immediate cause of the civil war, but this right was confirmed at the Restoration by Parliament, 14 Charles II., cap. 3.

Lieutenant, Lord-, of Ireland, the Queen's viceroy in that country. The office is usually given by the government in power to a political supporter, and it consequently becomes vacant with a change in the Administration. The opinions of the Cabinet regarding matters connected with his government are communicated to him through the Home Secretary. He has extensive powers, the superintendence of justice, and the control of the police. The commander-in-chief of the forces in Ireland acts under his orders if necessary. He can confer knighthood, but his power of bestowing other preferments and honours is limited to a recommendation to the crown.

the public mind. In September of that year the ship 'Adventure' was wrecked at the mouth of the Tyne, in view of crowds on shore only 300 yards distant, and the whole crew perished for want of means to succour them. A subscription was forthwith started by gentlemen in the district, and a premium offered for the best L. Henry Greathead, of S. Shields, was thereafter intrusted with the construction of a L. which was to combine the several advantages of the leading competition boats. This L., which had great curvature of keel and bottom, raking stem and stern, with 30 inches of sheer, and internal lining and external fender of cork, was launched in January 1790, and by the year 1804 thirty-one such lifeboats had been built and 300 lives saved. Notwithstanding their deficiencies, as mability to discharge water and to right when upset, Greathead's lifeboats practically remained the chief protection of our coasts for upwards of fifty years. In December 1849 the upsetting of the South Shields' L., resulting in the loss of twenty pilots, created a fresh and energetic movement to provide lifeboats more worthy of the name, and a premium of 100 guineas was offered by the Duke of Northumberland for an improved L. The prize was awarded to Beeching of Yarmouth, whose L., improved and modified, constitutes the L. adopted by the Royal National L. Institution, which possesses in the highest degree the recognised qualities of a L. The form is that of a whale-boat, sides straight, raking stem and stern, with a long flat floor amidships, the whole being diagonally built of fir and copper-fastened. The most common dimensions are—length, 33 feet; breadth of beam, 8 feet: and inside depth, 3 feet 4 inches. This size pulls ten oars double-banked. Extra buoyancy is obtained by means of large air-cases in the extremes, and by others in the sides. The self-ejection of water is provided for by six relieving-tubes in the deck, closed with self-acting valves which freely admit of the egress of water, but obstruct its entrance from below. These tubes free the L. of water in twenty or thirty seconds. For ballast, which increases stability, gives additional weight, and enables the boat to make headway in a heavy sea, an iron keel of about 9 cwt. and about the same weight of cork packed in cases under the water-tight deck are provided. Should the bottom of the boat be stove in, the cork-cases would keep her afloat. Self-righting is secured by considerable sheer of gunwale, the air-tight chambers in the bow and stern, the cork ballast, and the keel. When upset, the L. is buoyed up by the end air-chambers, but the ballast and keel place her in the condition of unstable equilibrium, which is destroyed immediately the keel heels to one side of the perpendicular, and then in virtue of her centre of gravity the L. rights herself, and the water escapes through the relieving-tubes. The annexed diagram represents a cross-section of the foregoing L., showing the arrangements amidships. A A are the side air-cases, B B the relieving-tubes, C C the cork ballast, D the keel, E E the watertight deck, F a thwart, G a scuttle for ventilation and fitted with a pump to



Section of Lifeboat.

discharge water leaking beneath the deck. The L. carriage of the Royal National L. Institution is admirably adapted for transporting the L. along the shore, and for launching her on a level keel with her crew seated ready for rowing.

Of late years an important addition in the form of collapsible boats, invented by Rev. E. L. Berthon, of Romsey, Hants, has been made to the means of saving life at sea. The frame, of Canada elm, is composed of the keelson with stem and stern posts attached, and on each side, jointed by a peculiar chain-hinge, are four longitudinal flat curved timbers. Externally and internally the frame is covered with a skin of specially prepared soft and pliable canvas, which the curved timbers divide into water-tight compartments, thereby localising the effect of fracture. In collapsing, the timbers arrange themselves in parallel planes on each side of the keelson. A boat 32 feet long and 11 feet broad, capable of holding 100 men, can be compressed into two feet of breadth. British troop-ships and men-of-war are supplied with these boats, which are stowed away at the ships' sides, and may be expanded and lowered with crew on board with great rapidity.

The Royal National L. Institution was founded in 1824, and up to 1876 has been instrumental in saving 23,790 lives. It is supported entirely by voluntary contributions, and additions are annually being made to the number of L. stations under their management, while rewards are given to the several crews engaged in saving life. See R. Lewis, *History of the L. and its Work* (2d ed. Lond. 1877), and Rev. J. Gilmore, *Storm Warriors* (Macmillan & Co., 1875).

Life Estate, in English law, is an interest for a life—either the life of the owner or of a third party—in real property. The right entitles the owner to use and enjoy the subject without wasting its substance, or *salva rei substantia*, according to the expression of the Roman law. When in land, a L. E. is Freehold (q. v.). The analogous term of Scotch law is Life-rent (q. v.).

Life-Guards, the two senior regiments in the British household cavalry, superseded in 1783 four troops of Horse Grenadiers raised from the gentry in 1660, 1661, 1693, and 1702, for the sovereign's personal defence. They served in the Peninsula, and did brilliant service at Waterloo. The men are still carefully selected, and form a splendid body of soldiers. The daily pay of a private is 2s. 0½d., or twice that of a private in the infantry of the line. The uniform is scarlet, with steel helmets and cuirass. This useless and cumbrous armour only dates from 1815. The strength of each regiment in 1876 was 27 officers, 64 non-commissioned officers, and 343 rank and file, with 275 horses (black).

Life Insurance. See INSURANCE.

Life'rent, a term of Scotch law analogous to that of Life Estate (q. v.) in English law. The proprietor of the subject is called the *Fiar* (q. v.); the subject is called the *Fee* (q. v.), and the temporary possessor, the *Liferenter*. The legal liferents are *Terce* and *Courtesy*. See these articles.

Life-Saving Appara'tus. Under this head are mentioned the principal contrivances, other than the Lifeboat (q. v.), that have been designed for saving life at sea. A description of the machine used for rescuing persons from buildings on fire is given under FIRE ESCAPE. In the United Kingdom hundreds of lives are annually saved from stranded vessels by means of a rope thrown out from the shore with a hawser attached. To Sergeant, afterwards Lieutenant Bell, belongs the honour of having first proposed, in 1791, the employment of a mortar to project a shell carrying a deep-sea line; but the first to carry the idea into successful operation in 1807 was Captain Manby, R.N. His apparatus was adopted in 1811 for the coastguard service, and till a few years ago was regularly issued to the various stations, now under the control of the Board of Trade. Several improvements and modifications have been effected since its adoption, and at present the service-pattern consists of a 24-pr. oblong shot which is fired from a 5½ in. mortar. Four holes are drilled in the shot for the reception of fuses, and projecting from its base is an iron bolt terminating in an eye through which a 2 feet plaited hide thong is passed. The fuses emit a bright light illuminating the path of the projectile and enabling those on shore to correct wrong elevation. The thong serves to connect a deep-sea line to the shot and preserves the rope from injury from the flash of the mortar. The line is coiled up in a tub or box close to the mortar, so as to run out without check. The charge is 12 oz., and the maximum range of the projectile 400 yards, which is seldom attained, owing to the force of the wind against which it has almost invariably to be projected. Manby's shot has been almost superseded by rockets which possess several advantages over it for carrying a line. They are more portable, and as they are self-illuminating, fuses are unnecessary; the angle of elevation in firing is also much less than with the mortar, and less rope is consequently required. In 1865 the life-saving rocket designed by Colonel Boxer (which is here shown in section, together with the mode of attaching the line to the stick), was adopted by the Board of Trade, in preference

to Mr. Dennett's rockets, which had previously been used at some stations. The Boxer rocket is a compound one, and contains two rockets embedded in an inflammable composition and separated by a partition, the whole being enclosed in a metal cylinder and secured to a stick. It is fired with a detonating tube, or port fire and fuse, from a tripod stand at an elevation of 35° or thereby. The ignition of the first rocket carries the projectile to a little beyond the highest point of its trajectory, and at this point the second is calculated to explode, giving an additional impulse without undue strain on the line. The French *Société de Sauvetage* practise Delvigne's system of firing a steel bolt from a small cannon, swivel gun, or musket, according to the distance of the wrecked ship. In connection with the foregoing plans of establishing a communication with a stranded vessel, the sling life-buoy invented by Lieutenant Kisbee is generally employed. Like other life-buoys, it is annular and composed of cork, and in addition it has appended a pair of short canvas breeches. By means of the line thrown out to the ship the crew haul out a hawser, with the sling life-buoy suspended from it by a block, and tackle for pulling the life-buoy to and fro. When the hawser and tackle are properly secured to a mast, and one of the crew enters the sling life-buoy, the signal is given to draw him ashore. That being accomplished, the life-buoy is again pulled out to the ship, and the remainder of the crew are in like manner severally rescued. With the L.-S. A. of Messrs. Rogers and Adamson a double line of communication is at once established, and the work for those on board the ship greatly lessened. They employ a cone block shot, fired from a mortar, to carry the double line. In 1875 there were 289 stations on the coast of the United Kingdom equipped with L.-S. A., and during the previous five years they were instrumental in saving 1740 lives. Other contrivances for saving life are generally carried on shipboard, as life-rafts, life-buoys, and mattresses formed of a waterproof covering packed with cork, and other appliances either inflated or capable of inflation so as to support an individual in water. There are several forms of tubular life-rafts made of metal tubes connected with girders. In midsummer of 1867 three men voluntarily crossed from New York to Southampton under sail on a tubular raft of inflated canvas. Mr. Stockwell's recently invented life-saving vessel presents advantages in stability and freeboard over others of its class. It is constructed of an annular metal cylinder, 20 feet across, and spanned by an open sparred deck. The inside of the tube is fitted up as a cabin, proper ventilation being attended to. Seats are arranged round the tube for holding provisions, and all the appurtenances necessary for navigation are provided. The vessel is carried above deck amidships on iron ways which can be lengthened so that in launching it may clear the ship's side. An important addition to L.-S. A. has lately been made by Mr. C. S. Merrimen of New York, who has designed a vulcanised indiarubber dress which covers the whole body, the face excepted. It is in two pieces, which join, watertight, at the waist; and in the hood, breast, back, and upper legs are air chambers, and tubes, provided with stop-valves, to inflate them. Numerous public exhibitions in proof of the value and utility of this dress have been given, on behalf of the inventor, by Captain Paul Boyton. In June 1875, he paddled himself, clad in the dress, across the English Channel, from Cape Grisnez to the South Foreland.



Boxer 12-pr. Rocket.

Liffey, a river of Ireland, some 80 miles long, rising in the Kippure Mountain, county Wicklow, at a spot 1715 feet above the sea: flows first S.W. then N.E. through Kildare, and W. through Dublin county, passing the city of Dublin before entering Dublin Bay.

Lifford (Irish Gael. *Leithbhean*, 'the grey water'), a decayed market-town of Donegal, Ireland, at the point where the Mourne and Finn form the river Foyle, 15 miles S S.W. of Londonderry by rail. Near it are the ruins of a church said to have been founded by St. Columba. L. is given in the census of 1871 as a suburb of Strabane (q. v.) in Tyrone.

Lig'ature, the term applied in Surgery to the thread tied round a vessel to arrest the circulation. The L. is used to stop hæmorrhage after an accident or operation, or to stop the circulation through an aneurismal tumour. The later Roman surgeons employed it, but it afterwards fell into disuse, red hot knives, the application of the actual cautery, boiling pitch or molten lead to the bleeding surface, being employed instead. In the middle of the 16th c. the use of the L. was revived by Ambrose Paré. It was not until 1761 that Sharpe, surgeon to Guy's Hospital, advocated its employment in this country as a mode of arresting hæmorrhage, but it did not come into general use until about the beginning of the present century. The ligatures most commonly in use consist of strong hempen or silk threads, but catgut and horse-hair are also used. The occlusion of arteries by means of Acupressure (q. v.) was introduced by the late Sir James Simpson. Carbolised ligatures, according to the method of Professor Lister, are now generally adopted, and those made of catgut may be left in the wound without causing irritation, as they are eventually absorbed.

Light is that form of radiant energy which is sensible to our organs of vision. Certain bodies have the power of always emitting L., others again have no such power inherent in themselves, and when seen are seen by borrowed L. The former, including the sun, the stars, some meteors, probably comets, and matter generally in a state of combustion, are called *luminous*; the latter *non-luminous*. Non-luminous bodies differ greatly in the manner in which they act to L. which falls upon them. Some which are called *transparent* permit the greater portion of the L. to pass right through; others, known as *opaque*, permit none to pass; while others, distinguished as *translucent*, *subtranslucent*, *semi-opaque*, &c., occupy intermediate positions. They all *reflect* or throw back a portion of the incident L.; and it is this reflected L. which gives to each object its peculiar colour. The ordinary white solar L. is, as is well known, heterogeneous, being composed of rays of various colours. These, whose resultant effect upon the retina produces originally the sensation of *white*, are before reflection absorbed by the body in different proportions, so that the resultant effect of the reflected rays is a colour-sensation other than white. Thus a red body is red because it absorbs the blue rays; a blue body blue because it absorbs the red rays. This explanation is supported by the fact that a body viewed in homogeneous L., in rays of red, yellow, green, blue, or violet, appears, if it be not fluorescent, of that colour (see FLUORESCENCE). From experience we learn that L. travels in straight lines as long as it keeps in the same homogeneous medium; but that, when it enters another medium of different density, any other transparent body in fact, it is in general *refracted*, and pursues a new course, which is also rectilinear as long as the ray remains in the new medium. See OPTICS, where the experimental laws of reflection and refraction are discussed in detail. L. then travels in straight lines, but further it travels with a measurable finite velocity. This fact was discovered and the velocity first measured by the Danish astronomer Römer in 1676. He observed that the eclipses of Jupiter's satellites occurred sometimes sooner, sometimes later, according to the relative positions of the earth and Jupiter, than the calculated time; and this discrepancy was only explicable upon the hypothesis that L. took about 16 minutes 16 seconds to cross the earth's orbit. The earth's distance from the sun is not quite 92,000,000 miles, which gives 187,000 miles per second as the velocity of L. Bradley's discovery of the Aberration (q. v.) of the stars affords another source from which to deduce the value of this velocity, which bears the same ratio to the earth's orbital velocity per second that the tangent of 20″·5 does to unity. From these data, the value comes out 185,000 miles per second. The velocity of L., however, may be and has been measured directly by terrestrial experiments; and the results agree closely with the above. The late French physicists, Fizeau and Foucault, attacked the problem in two totally different manners, and deduced 185,000 and 191,000 miles per second respectively. They applied their methods to find the velocity of L. in water, and proved that its velocity is less in the denser medium, a result which once for all decided between the claims of the rival theories concerning the nature of L. These are known respectively as the *emission* and *undulatory* theories. The former regards L. as material, as being made up of minute corpuscles, projected with great velocity from the luminous

source. The laws of reflection and refraction are sufficiently explained upon this hypothesis by supposing the corpuscles to take that path between two given points which in the circumstances is traversed in the least time, provided the further assumption be made that L. travels *faster in the denser medium*. This theory then, which, though supported by the authority of Newton, is quite at variance with experiment, must be abandoned. Even before this decisive experiment of Foucault, the corpuscular hypothesis, like the Ptolemaic system of astronomy in the days of Galileo and Kepler, was gradually becoming less and less tenable. The numerous assumptions which had to be made to account for the simpler phenomena, the increasing and utterly unmanageable complexity of these when the higher truths of experiment had to be dealt with, were condemnatory of the emission theory to the scientific mind. The constant velocity of L. could not plausibly be reconciled with the corpuscular theory, except upon some such assumption as suggested by Arago, that a luminous body projected light-particles with different velocities, but that only those which travelled with a certain definite velocity were capable of affecting our organs of vision. Each particle must be endowed with a different property according to its colour sensation; and the phenomena of fluorescence require the possibility of transmuting one particle into another of a different kind. To account for Diffraction (q. v.) and Interference (q. v.), Newton had to suppose the light-corpuscles to suffer attraction and repulsion when passing close past the edge of a body; and to explain the colours of thin plates, which were discovered by him (see NEWTON'S RINGS), he was forced to endow his corpuscles with peculiar properties, in virtue of which they were sometimes in a fit of easy transmission, at other times in a fit of easy reflection. Further the more complex phenomena of Polarisation (q. v.) are quite inexplicable upon the emission theory, except, of course, other arbitrary assumptions be made respecting the physical properties of the corpuscles—a method which may be made to explain anything, but is wholly unscientific, and restrains instead of advances knowledge. No such necessity for continually rebuilding the foundations, so to speak, of the theory appears in the undulatory hypothesis, which has been gradually developed since the time of Huyghens the Dutch physicist, who seems to have been the first to enunciate it in anything resembling its present form. According to this hypothesis, L. is a form of energy which is transmitted in undulations and with a finite constant velocity through the space-pervading ether. The only assumptions are that this ether acts to light as an elastic solid, and that the particles are set into vibrations transverse to the direction of the ray of light, so as to give rise to waves in a manner somewhat analogous to the production of waves along a stretched rope. See UNDULATORY THEORY, where the nature and form of the undulations are more fully treated of. L. we have defined as a form of radiant energy; but it is not the only form. It is known that the sun emits other than light-rays, which are commonly called heat-rays and actinic-rays. These three forms differ in nothing essential. They differ only as long waves differ from short waves. The undulations which constitute radiant heat are too long to affect our organs of vision; the actinic rays consist of waves too short. They all, heat, light, and actinic rays, travel in straight lines with the same velocity; they are reflected and refracted according to the same laws; and they all suffer polarisation, plane, circular, and elliptical. No body is inherently luminous which is not heated to a high temperature; and the rays of L. which it emits are due to the direct transference to the luminiferous ether of the vibratory energy of the molecules. The molecules of a heated gas vibrate to a certain wave length, exactly as a tuning-fork vibrates to a certain note; and hence a glowing gas, if not too condensed, gives forth rays of a definite wave-length, which produce a definite colour-sensation upon the retina. In a very condensed gas or solid, the vibrating molecules do not vibrate freely, and the result is the production of rays of different wave lengths, which give a composite light, and continuous spectrum when viewed through a prism. (See SPECTRUM ANALYSIS.) The same medium which transmits these forms of radiant energy is also probably the seat of those electric and magnetic actions which still await explanation. In the various text-books of physics, the ordinary phenomena of L. are described and explained; but for the more scientific treatment of the theory, reference should be made to Lloyd's *Theory of Light* (3d ed. 1873), and Airy's *Undulatory Theory* (1870).

Light, Law regarding. The right to have light when it interferes with the convenience of a neighbour, is in English law a kind of Easement (q. v.), and in Scotch law a kind of Servitude (q. v.). In England and in Ireland the right may be acquired by twenty years' prescription. Thus, if one proprietor build on the edge of his ground, the conterminous proprietor cannot, after twenty years without building, build so as to obscure the light of the first builder. A right of *prospect* is not, however, recognised in English law, as it is by the Roman. In Scotland, a proprietor's right to build on his own ground cannot fall by prescription. It can only do so by written agreement.

Light'er, an open, flat-bottomed boat, chiefly used in *lightening* or unloading large vessels.

Light'foot, John, D.D., a great English Orientalist, born at Stoke-upon-Trent, Staffordshire, March 19 or 29, 1602, was educated at Morton Green, in Cheshire, and Christ's College, Cambridge, became assistant-master in Repton School, Derbyshire, and, having taken orders, received the curacy of Norton, Shropshire, where he formed an intimacy with Sir Rowland Cotton, his instructor in Hebrew. In 1628 he was presented to Stone in Staffordshire, and in 1631 to Ashley, and here he continued to reside till 1643, when, having come to London to attend the Westminster Assembly of Divines, he was made minister of St. Bartholomew's, Master of Catherine Hall, Cambridge, and rector of Great Manden, Herts. He became D.D. (1652), and Vice-Chancellor of Cambridge (1653), at the Restoration sat in the Savoy Conference (q. v.), and received a prebend of Ely, where he died, 6th December 1675. L., who was profoundly versed in the Rabbinical literature, published, besides sermons, thirteen different works, which have been edited in a collected form by John Strype (2 vols. Amst. 1684, with a Life prefixed); by Leusden (3 vols. Utrecht, 1699); and by Pitman (13 vols. Lond. 1822–23); while the best-known of them, his *Horæ Hebraicæ et Talmudicæ*, has been separately edited by R. Gandell (4 vols. Oxf. 1859).—**Joseph Barker L.,** D.D., a distinguished scholar and theologian, was born at Liverpool in 1828, studied at Trinity College, Cambridge, where he graduated B.A. in 1851 as Senior Classic and Chancellor's Medallist. In 1853 he was Norrisian University prizeman, was appointed Tutor of Trinity College (1857), Hulsean Professor of Divinity (1861), examining chaplain to the Archbishop of Canterbury (1868), canon of St. Paul's (1871), and one of the deputy clerks of the closet to Her Majesty (1875). L. is the author of very learned editions of St. Paul's Epistles to the Galatians, Philippians, and Colossians, and of the Epistles of St. Clement of Rome (1869), a work *On a Fresh Revision of the New Testament* (1871), and many contributions to journals, of which the most notable are his papers in the *Contemporary Review* (1874–75) on 'Supernatural Religion.'

Light'house, a building erected on a conspicuous part of the coast from which a light is shown at night to warn and guide mariners, and to serve as a landmark by day. The term *pharology* is descriptive of the modern system of L. economy which also comprises lightships, beacons, buoys, fog-signals, and landmarks. Lighthouses are necessarily placed in exposed positions—on bold headlands, islands, isolated, and sunken rocks, low promontories, and shifting sandbanks—each requiring structures specially designed to meet the varied requirements of their sites. Ordinary stations have a tower and dwellings for the keepers, and bear a strong family resemblance, the principal difference being in the size and height of the tower, and the kind of lighting apparatus employed. Those towers which have been erected in the open sea on isolated wave-swept rocks or reefs, whether viewed as to the dangers encountered and difficulties overcome in their erection—their fitness for the unique sites they occupy, the solidity of their construction giving the maximum of strength with the minimum of material, or the severely simple grace and beauty of their outlines—are not only triumphs of engineering, but are among the most perfect specimens of modern architecture. The most important of those sea-girt towers are Smeaton's Eddystone, Stevenson's Bell Rock, and more recently Alan Stevenson's Skerryvore, James Walker's Bishop and Wolff Rocks, and Messrs. Stevenson's Dhu Heartach and Chicken's Rock lighthouses, information as to some of which will be found under

their separate heads. It will, therefore, be necessary only to refer to the apparatus for directing the rays proceeding from the radiant to the horizon—the lamps and their fuel—the distinctions or characteristics, and the lanterns.

The first L. towers had on their summits grates or chauffers in which coal or wood was burned, and so recent is modern pharology that there are lighthouses in existence which have passed through all the successive stages of illumination from the wood-fire to the dioptric apparatus. A great step in advance was made when the lights, however feeble, were enclosed by glazed lanterns, but L. optics was for a long time far behind that of architecture. Among those who have contributed to the present system of L. illumination are Argand, Teulère, Fresnel, and the Stevensons. The first gave us the lamp known by his name, the second reflectors, and Fresnel and the Stevensons our systems of improved catoptric and dioptric lights.

Nothing can be simpler than a lamp placed in the window of a fisherman's cottage to guide him homewards, but to make this lamp efficient as a signal, as many of the rays as possible proceeding from it must be utilised. By placing a parabolic mirror behind the flame we can gather up the rays going off on one side, and reflect them in a beam of parallel rays in the opposite direction, or by placing a lamp behind a lens, which has the property of refracting or bending in a given direction all the rays falling on it, we can produce a similar beam of parallel rays. The former or independent burner system is named *catoptric*, and the refracting or central burner system *dioptric*, while apparatus combining reflecting and refracting instruments is styled *catadioptric*. The earliest reflectors, which were about 18 inches in diameter, consisted of small squares of mirror glass embedded in plaster of Paris, the lamps having thick torch-like wicks. About the end of last century they gave place to reflectors of silver-plated copper formed to the parabolic shape by hand hammering, burnishing, and polishing. They are from 21″ to 25″ diameter, and fitted with Argand burners 1″ in diameter, their power being about 450 times that of the unassisted flame. By arranging a number of these reflectors on a circular frame there can be sent all round the horizon a number of beams of light of nearly uniform intensity, thus producing a *fixed light*, and by assembling them on a frame having three or more sides, each with from one to ten reflectors, and giving the frame a horizontal motion by machinery, a *revolving* light is obtained. As the faces of the frame come round, a beam of light sweeps the horizon succeeded by an interval of darkness, depending on the rate of revolution, until the next face with its reflectors comes into view. Reflectors are still used in some of the best lighthouses in Britain. The parabolic reflector, however, allows fully one-third of the rays to escape, by natural divergence, past the lips of the reflector. To obviate this defect, Mr. T. Stevenson, in 1849, devised the holophotal reflector, which consists (fig. 1) of a lens *l* with a parabolic mirror *a*, and instead of the back portion of the reflector he substituted a hemispherical mirror *bb*, which returns all the rays falling upon it back on the flame. This form of apparatus has been largely used both in this country and abroad.

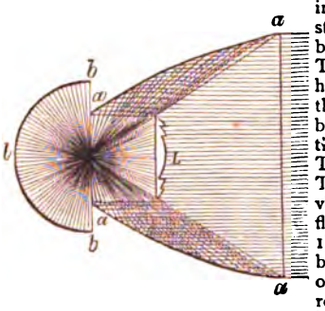


Fig. 1.

To Augustin Fresnel belongs the honour of inventing and introducing the dioptric system, and combining it with a central lamp having concentric wicks. He left three perfect instruments—the lens, reflecting prisms, and central belt for small fixed lights; and since his day nearly all the improvements in L. apparatus have originated with the engineers to the Scotch L. Board. Fresnel's lens is plano-convex, 3′ 3″ in height by 2′ 6″ in breadth, composed of a central disc about 11″ in diameter, surrounded by annular rings gradually decreasing in breadth as they recede from the centre from 2¾″ to 1¼″—the whole being separately built up. This arrangement not only admits of the thickness of the glass being reduced, but corrects spherical aberration. When illuminated by a four-inch lamp the power of this lens equals that of 3000 Argand burners. If these lenses be assembled round a frame with a lamp in the focus, and made to revolve, they produce the same effect as a revolving catoptric light, but as they do not intercept all the rays of light, Fresnel formed a canopy of inclined lenses above the lamp. These collected the upper rays and transmitted them upon plane mirrors, which reflected them horizontally, while the rays falling below the lenses were utilised by silvered glass mirrors arranged like the leaves of a venetian blind (fig. 2). When designing the revolving light for Skerryvore, Mr. Alan Stevenson substituted fixed catadioptric prisms for the mirrors below the lenses, and at the time of its exhibition (1844) it was the most perfect revolving dioptric light in existence. The next improvement was devised in 1849 by Mr. T. Stevenson, who dispensed entirely with the double agents above and the mirrors below the lenses, and substituted totally reflecting holophotal prisms which parallelise the rays in every plane. These prisms act by internal reflection, and effect a great saving of light. The first order holophotal revolving light is now universally adopted, and consists (fig. 3) of eight lenses *L*, eight panels of eighteen prisms each above the lenses *p*, and seven panels of eight prisms *p*, each below the lenses, the whole forming a structure of glass nearly 9 feet in height and 6 feet in diameter, illuminated by a central lamp with four concentric wicks, the flame of which measures 3½″ in diameter, and 4″ in height.

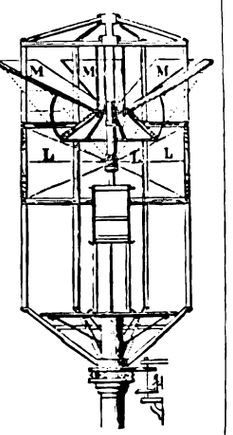


Fig. 2.

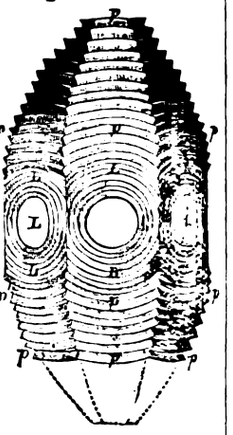
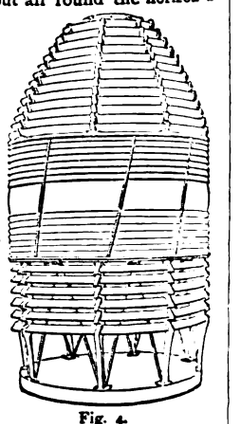


Fig. 3.

Fresnel also applied the dioptric principle to fixed lights, which illuminate constantly the whole horizon, using the same profile for the refracting hoop as a vertical section through the axis of his polyzonal lens. This hoop acts only in the vertical plane, giving out all round the horizon a vertical strip of light depending on the breadth of the central flame. To intercept the rays passing off above and below the belt, a series of totally reflecting prismatic rings project the rays in directions parallel to those coming from the hoop. But instead of the central hoop he used a polygon of thirty-two narrow lenses, with inclined mirrors above and below them. Mr. A. Stevenson, however, in 1835, resolved to improve the first order apparatus, and he had constructed a truly cylindrical belt for the Isle of May lighthouse, to the several sections of which he gave a rhomboidal form with oblique joints to prevent interception of light. He further dispensed with Fresnel's inclined mirrors, and had executed on a large scale totally reflecting prismatic rings (fig. 4).


Fig. 4.

To obviate the great loss of light by metallic reflection, Mr. T. Stevenson invented the dioptric holophote (fig. 5), consisting of a hemispherical mirror entirely of prismatic rings of

glass, so formed as to prevent any light passing through them, and to reflect totally the light that radiates backwards from the flame, and he combined with this mirror a lens surrounded by annular prisms, which send out the whole light from the flame in one sheaf of rays. The spherical mirror is also applicable to fixed and revolving dioptric lights, when they do not require to show all round the horizon.

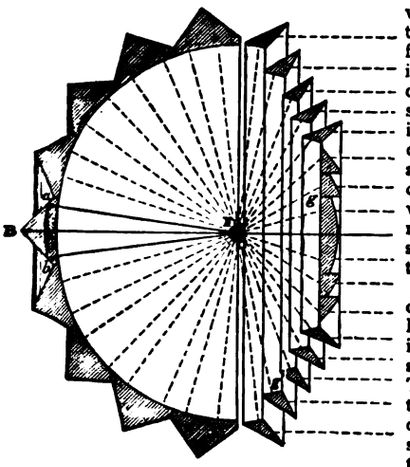


Fig. 5.

The azimuthal condensing light, first used in 1857, was designed by Mr. T. Stevenson, to suit the requirements of special localities, such as narrow sounds and channels where the light does not require to be equally distributed round the horizon. One of the best examples of a condensing light is that of Buddonness on the Tay (fig. 6), where the whole rays are thrown into an arc of 45° by the union of the following instruments, viz.:—Fresnel's fixed light *a b c*, and lens *i*; Mr. T. Stevenson's condensing prisms *p*, holophote *h*, right-angled conoidal prisms *f g*, and dioptric spherical mirror *e d*.

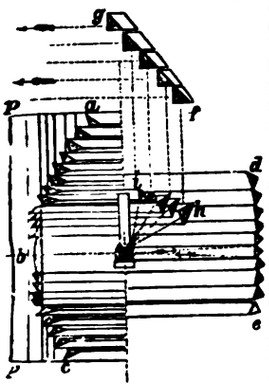


Fig. 6.

The only other apparatus which the limits of this paper admit of being noticed is the *apparent* light, first used at Stornoway Bay by Mr. T. Stevenson. It consists of a powerful light thrown from a lighthouse on shore upon optical apparatus (fixed on a perch erected on a rock in the Bay), which reflects it seawards so as to give the appearance of a lamp on the beacon, thus indicating the position of the danger by a light projected from the land 200 yards distant.

Lamps.—The lamps are either fountain-pressure or mechanical. The burners have all cylindrical wicks. When oil is used in the multiple wick lamp the burner requires to be kept cool by an overflow nearly three times greater than what the wicks can consume; but with paraffin the fluid is not allowed to rise beyond a certain height in the wick chambers, the overflow being returned by a tube to the fountain. The following table gives the number of wicks, the rate of consumption per hour, and the candle power for colza and paraffin of the lamps generally used in lighthouses:—

Number of Wicks.	Colza in Scotch Lighthouse Lamps.		Paraffin in the Doty Burners.	
	Rate of Consumption per hour in Gallons.	Candle Power.	Rate of Consumption per hour in Gallons.	Candle Power.
1	·0133	11·33	·0148	23·65
2	·0521	53·16	·0508	80·13
3	·1395	160·8	·1262	200·75
4	·2077	261·3	·1801	287·62

The introduction of paraffin has led to the adoption of five and even six-wick burners.

Illuminants.—The oils used in modern lighthouses are lard, seal, spermaceti, colza, olive, cocoa-nut, and more rarely hempseed. Until recently colza was very largely used, but it is fast giving way to paraffin, which is not only a more powerful, but a much cheaper radiant. Captain Doty invented burners whereby paraffin, such as is made by Young's Paraffin Company, with a high specific gravity and flashing point, can be consumed in L. lamps, effecting a saving in cost and augmenting the power of the lights from 10 per cent. for the four-wick burner to over 100 per cent. for the one-wick lamp. The Doty burners are equally suitable for the consumption of colza or paraffin.

Wherever gas can be applied without requiring to be specially manufactured at L. stations, it forms an efficient and cheap illuminant. In 1827 Mr. Wilson erected a very simple intermittent gas light at Troon harbour, the alternations of light and darkness being got by suddenly shutting off the supply of gas so as to extinguish the light and again as suddenly letting it on, the light being reignited by a separate small burner supplied by a 'by pass valve.' He also introduced the use of different powers of light to suit the varying states of the atmosphere. This mode of using gas has been revived by Mr. Wigham of Dublin, who has patented a 'crocus burner,' and other improvements which have been introduced into some Irish lighthouses with good results, so far as intensity of light is concerned.

The electric light, first tried at South Foreland, in 1858, is now used in five lighthouses. Mr. Holmes and Mr. Wilde have invented machines for generating the electric current, both of which require steam engines, regulators for keeping the carbon points in adjustment, and an extra staff of attendants, entailing considerable expense. Special dioptric apparatus was designed by Mr. T. Stevenson for utilising the small but intense light between the carbon points, but owing to difficulties, mainly financial, there is little prospect, in its present state, of the speedy introduction of the electric light in coast illumination.

Lanterns.—The apparatus, of whatever kind, requires to be enclosed within a lantern. In 1835 Mr. A. Stevenson introduced into the Scotch lights diagonal astragals, which do not intercept light in any azimuth throughout their whole height. The astragals are straight, of 1 inch section, and made of gunmetal, periodical painting being thereby entirely avoided. This trigonal arrangement secures a structure of great rigidity and strength, and is practically helical. Plate glass ¼" in thickness is used for glazing. Mr. Douglass a few years ago patented a steel helical lantern 14 feet in diameter, but it is costly and requires annual painting.

Characteristics.—The main distinctions are *fixed* and *revolving*, and by the introduction of colour a sufficient variety is obtained. The principal characteristics are as follows:—fixed, fixed red or green, revolving white, revolving red and white, flashing, intermittent, double lights, either fixed or revolving. The flashing and intermittent lights were both introduced by the late Mr. R. Stevenson.

Light'ning is the luminous appearance accompanying a sudden electrical discharge between the clouds and the earth, or between cloud and cloud. There are three kinds of L., known respectively as fork L., sheet L., and fire-balls. The first appears as a continuous zig-zag line of light passing from earth to cloud, or cloud to cloud; and is very similar in configuration to the long sparks taken from the prime conductor of a good electrical machine. This suggests at once the probable cause of L.—the disruptive discharge between two contiguous charged bodies. Sheet L. consists of a more or less bright diffused flash, and is due probably to a disruptive discharge taking place behind the clouds, or below the horizon. Both of these kinds last for less than a thousandth part of a second, their apparent duration being entirely due to the persistence of the image upon the retina. Fire-balls, on the contrary, are said to last some seconds, and are usually described as descending slowly to the earth, rebounding once or twice upon the ground, and exploding with great violence. Of them, however, no authoritative observations are recorded. Fork L. is always, and sheet L. usually, accompanied by thunder, which is merely the audible effect of the disturbance in the air, due to the discharge of the L. Its duration and continuous irregular variation in intensity are usually attributed to the re-echoing of the sound from the clouds.

Lightning Conduc'tor is a long metallic rod, placed on the top of a steeple, chimney, or high edifice, as a means of protection from lightning. If an electrically charged body be brought up to another, it first acts upon it inductively, electrifying the nearer portions with the opposite kind of electricity to what it itself possesses. When sufficiently close, a disruptive discharge takes place, and takes place always in the line of least resistance. Now a thunder cloud is a highly charged body; and as it passes over a portion of the earth's surface it must electrify it inductively. If sufficiently near, a discharge takes place as above indicated in the line of least resistance. By leading a conducting wire from a height to the earth a passage is opened up for the lightning to go to earth, which is as a rule of much less resistance than would be supplied by any ordinary erection of stone or wood. Thus a lightning conductor, by discharging the cloud overhead, very much diminishes the danger of accidents—since the probability of the lightning striking a badly conducting material is very small. Should the connection of the conductor with the earth be in any way broken, the effect will be not only to render the apparatus useless as a lightning conductor, but to very much endanger the structure to which it is attached.

Lights, Use of, in Public Worship. From the earliest times there has been a connection between the idea of the divine presence and that of a material light. Thus the presence of God was represented to Abraham on one occasion by 'a smoking furnace and a burning lamp' (Gen. xv. 7–17, *cf.* Jer. xxxiv. 18), to Moses in a burning bush (Exod. iii.), and to the Israelites in their wanderings by a pillar of fire (Exod. xiii.), while the Shechinah or symbol of the divine presence in the Tabernacle and Temple was evidently a bright light (*cf.* Exod. xl. 35, 1 Kings viii. 10, 11). It is not improbable that the original, literal significance of such an association may have been connected with sun or fire-worship. Be this as it may, as the Jews had had their seven-branched golden candlestick, the use of artificial light was early (4th c.) introduced into the ritual of the Christian Church. Candles were lighted when the Gospel was read, at the celebration of the sacraments of Baptism and the Eucharist, at funerals, and at the festivals of martyrs. Indeed the Feast of the Purification derived its name of Candlemas (q. v.) from the great number of lights used on the occasion. In Martin *versus* Mackonochie (1868), on appeal from the judgment of the Dean of Arches to the Judicial Committee of the Privy Council, Lord Cairns pronounced against the use of lights in the Church of England at the celebration of the Holy Communion.

Lig'nin (from the Lat. *lignum*, 'wood') is the substance which gives hardness and solidity to the cells and vessels of plants, forming the encrusting matter of their interior, and is often deposited in concentric layers. It occurs in large quantity in the wood of trees, and is present in the stems of herbaceous plants, giving support to the structure. It cannot be separated in a pure state, hence its exact composition is unknown. In some cellular plants it is absent, and the object of many horticultural operations—as blanching—is to prevent its formation. Dissolves in strong nitric acid forming oxalic acid. Is not coloured by iodine. (Balfour, *Manual*, ed. 1875).

Lig'nite is wood in a state of fossilisation, intermediate between peat and coal, *i.e.*, imperfectly mineralised. Jet and brown coal may be quoted as examples of L.

Lig'num-Rho'dium, the commercial name for several woods having a pleasant smell resembling rosewood. The stem and root of the two species of *Rhodorrhiza*, a genus peculiar to the Canary Islands (sometimes merged into Convolvulus, q. v., but the produce is not real rosewood as there implied), is the source of Atlantic L. R., and they yield also by distillation the powerfully scented *Oil of L. R. Amyris balsamifera*, a Jamaica small tree or shrub, belonging to the Myrrh and Frankincense family, yields another description of L. R., likewise an aromatic oil. It is stated, however, that the name L. R. was originally attached to the wood of *Liquidambar* (q. v.) *orientale*, a native of Asia Minor, but now seldom met with in the market.

Lig'num-Vi'tæ is the greenish-black heart-wood of *Guaicum officinale*, an ornamental tree, native of Jamaica, St. Domingo, Guiana, &c. Contrary to the usual structure of wood, in this, the fibres cross each other diagonally, producing a timber of extraordinary hardness and weight, much used in the manufacture of blocks, pulleys, skittle-balls, pestles, &c. The tree also yields Guaiac resin of materia medica, a stimulating diaphoretic prescribed for rheumatism, gout, and skin diseases; it is obtained by natural exudation, by incisions, or by heat applied to the felled wood.

Lig'ny, a village of Belgium, province of Namur, 10 miles N.E. of Charleroi, is famous for the great battle of June 16, 1815 (two days before Waterloo), in which Napoleon attacked and drove back the Prussians under Blücher. On the same day Ney engaged the British and Belgians under Wellington at Quatre Bras (q. v.). The object of Napoleon was to engage the Allies separately, and before they had time to co-operate.

Lig'ulate, or strap-shaped (Latin, *ligula*, 'a little tongue'), is defined in botany as not very narrow or long, and with nearly parallel sides. A frequent application is to the corolla of many of the Compositæ, *e.g.*, the white ray florets of the daisy, and the yellow florets forming the dandelion head.

Lig'ule. See GRASSES.

Liguo'ri, Alfonzo Maria de, was born 27th September 1696 at Marianella, obtained his doctor's diploma 1714, and practised successfully at the bar of Naples. In 1722 he forsook law for the Church, and was ordained to the priesthood in 1726. Burning with the desire to spread the doctrines of Christianity in true apostolic simplicity, L. went about among the people addressing them in a language new to their ears. In 1732 he founded a religious brotherhood for carrying out his conception of teaching, which, after much opposition, received the approbation of the Pope (25th February 1749). Under the name of the Order of the Redeemer the brotherhood rapidly spread throughout Italy, and as Liguorians made headway in Spain, Austria, and France. L. became, much against his inclination, Bishop of Santa-Agata dei Goti in 1762, and, as long as he held the office, distinguished himself by his pastoral visits and his generous schemes for charity. He died at Nocera dei Pagani, August 1, 1787, and left behind him seventy volumes which range over the whole field of theology. See *Life of St. Alphonse de L.* (2 vols. Lond. 1848).

Liguorians, or *Redemptorists*, are the missionary priests who minister to the people by means of assiduous personal intercourse, discarding the externals of Catholic officialism. The order has been confounded with the Jesuits, but they have nothing in common. Besides the hold they have established over various Continental nations, they have in more recent years extended their sphere of labour to England, Ireland, and America.

Ligu'rian Republic, the name given to the republic of Genoa by Napoleon, June 6, 1797. The Genoese territory formed part of ancient Liguria, hence the name. See GENOA.

Li'lac is a Persian word that accompanied the familiar shrub to which it is applied on its introduction to the gardens of western Europe in the 16th c. Its botanical name is *Syringa vulgaris*. L. belongs to the olive family. There are several garden varieties, differing principally in colour and size of the sweet-scented flowers. Other species in ordinary cultivation are the Persian L. (*S. Persica*), which has smallish lanceolate leaves, and *S. dubia* or *chinensis*, with large, almost scentless flowers. The bark has febrifuge properties. The wood is fine-grained, and serves various useful purposes, such as inlaying.

Lilia'ceæ, an extensive natural order of Monocotyledons, which is of special importance, chiefly on account of the horticultural value of many of its species, while others have medicinal and economic properties. Among the garden specialties may be mentioned the asphodel, convallaria or lily of the valley, day-lily, dogtooth-violet, fritillary, hyacinth, gloriosa, lily, squill, Solomon's seal, star of Bethlehem, tuberose, yucca. Of medicinal constituents, the aloes and squills are notable. Economic botany is represented by the phormium or New Zealand flax, and dragon's-blood; and some of the culinary and fodder products are the onion, leek, asparagus, grass tree, &c. Altogether the order contains of described plants about 1650 species. It is at present (1877) being monographed by Mr. J. G. Baker in a series of papers communicated to the London Linnean Society. He divides it into three sub-orders, Liliaceæ proper, Colchicaceæ, and Asparagaceæ.

Lille ('the island,' Flemish, *Ryssel*), the capital of the department of the Nord, France, situated on a fertile plain on the

Deule, 62 miles S.E. of Calais by rail. It is one of the strongest fortresses in Europe, having been originally fortified in the 11th c., reconstructed by Vauban, and again improved in the present century. The principal buildings are the church of St. Catherine of the 12th c., the Gothic church of St. Laurence, that of Notre Dame, rebuilt recently in the Gothic style of the 13th c., and the Hôtel-de-ville, containing a gallery of 449 Italian (eighteen by Raphael), Flemish and Dutch pictures, and the Wicar collection of designs. L. has also a preparatory school of medicine and pharmacy, an academy of music, a botanical garden, various literary and scientific societies, and a library of 40,000 vols. Its importance, however, is chiefly industrial, and it is connected by a network of canals and railways with the coast, and the whole of Belgium and N. France. Flax is grown extensively in the vicinity, and there is a large manufacture of linen, especially of table-cloths. There are also great bleaching grounds, 36 cotton-spinning mills, Government tobacco factories producing 11,000,000 lbs. yearly, besides manufactures of beetroot-sugar, rapeseed oil, gum, powder, gloves, lace, porcelain, &c. Pop. (1872) 144,165. L. arose around a castle built here in an insulated marsh by Baldwin I., Count of Flanders, in 863, and called *L'Isle* (later L.), from its position between the rivers Deule and Lys. It belonged alternately to France and the Count of Flanders, fell to Burgundy at the end of the 14th c., passed to Austria, but was finally taken by Louis XIV. in 1667. During the War of the Spanish Succession it capitulated to Marlborough and the allies after a siege of 120 days in 1708, was restored by the treaty of Utrecht (1713), and was severely bombarded by the Austrians, who were obliged to raise the siege, 7th October 1792.

Lilliputian, 'diminutive,' an adjective derived from *Lilliput*, the name of an imaginary island, peopled by a race of pygmies described by Swift in *Gulliver's Travels*.

Lill'o, George, a London jeweller with a turn for writing plays, was born 4th February 1693. The only one of his plays which kept the stage was *George Barnwell*, a tragedy played at Drury Lane for twenty consecutive nights in 1731, and a great favourite with Queen Caroline. *Fatal Curiosity* was his next best performance. Lillo wrote simply, with tenderness and good feeling, but no genius. He died 3d September 1739. See the biographical memoir prefixed to Davies' edition of L.'s *Dramatic Works* (2 vols. Lond. 1770).

Lill'y, William, an English astrologer, was born at Diseworth, Leicestershire, in 1602, entered the service of a merchant in the Strand, whose widow he afterwards married, and in 1632 began the study of astrology. He read with enthusiasm Cornelius Agrippa's *Ars Notoria*, and soon acquired considerable reputation as a caster of nativities and foreteller of events. In 1644 he began the publication of his *Almanack*, which had a considerable influence, and continued till his death. L. sided with the Parliament in the Civil War, and under the Commonwealth acquired sufficient fortune to buy a small estate in Surrey. At the Restoration he was imprisoned for a short time, and again fell under suspicion in 1666 as being in some way privy to the cause of the Great Fire of London. He died June 9, 1681, at his estate at Hersham. L. wrote numerous utterly valueless works, among them *Observations on the Life and Death of Charles, late King of England* (1651; reprinted 1774, along with his *Life*, written by himself).



Lilium Chalcedonicum.

Lil'y (*lilium*), the genus from which the natural order Liliaceæ takes its name. It embraces about fifty species, often bearing large showy erect or drooping flowers, and contains several common garden favourites. The whole are natives of the N. temperate zone, ranging from the United States eastward to Japan. The best-known and longest-cultivated are the White L. (*L. candidum*—the poet's L.), the Orange L. (*L. bulbiferum*—the Orangeman's L.) the Turk's-cap L. (*L. Martagon*), all three species of the Mediterranean district, the Tiger L. (*L. tigrinum*), a native of China, and *L. superbum* and *L. canadense*, belonging to the western hemisphere. Various Japanese species and varieties are more recent importations, and are very handsome. The medicinal and economic services are insignificant, though the bulb of several species, as *L. tenuifolium* and *L. avenaceum*, are eaten in some of the Eastern semi-civilised countries.

Lily of the Valley (*Convallaria majalis*), the sole representative of this genus of *Liliaceæ*. It is a general favourite, combining what may be termed the elegance and purity of plant life, enhanced by a delicate perfume, and appearing, moreover, in the woods, the garden, and the market at the early period of the year, when flowers possess a special attraction. Botanically, the L. of the V. may be described as a stemless herb, with a creeping rootstock, from which arise at intervals sets of two or three sheathed leaves, together with scapes bearing a one-sided raceme of white drooping almost globose flowers, which are followed in due course by a round red berry. The plant is a native of Europe and N. Asia. In England the home-growth is insufficient to supply the spring demand, and it is said that a single London florist annually imports from Germany alone 'clumps' and 'crowns' of the plant to the extent of four tons weight.

Lily-Tree, a name given to the *Dracæna Draco* or Dragon-tree of Teneriffe, as being a liliaceous plant, with a branching tree-like stem. Each branch is surmounted by a crowded head of lanceolate leaves, from amid which the flower-stalk rises forth. The common name is derived from the tree being one of the sources of Dragon's-blood (q. v.). The colossal and historic specimen at Orotiva was by Humboldt's measurements 70 feet high and 48 feet in girth. Unfortunately it was totally destroyed during a hurricane in 1867, after a supposed existence co-equal with the Egyptian pyramids.

Li'ma, the capital of Peru, at the foot of the Cordilleras, in a fertile plain, on the Rimac (of which the name L. is a corruption), 6 miles by rail from Callao, its port on the Pacific. The streets run regularly at right angles, and the houses are mainly built of sun-dried bricks. Of thirty-three public squares, the Plaza Mayor has an area of nine acres, and a covered colonnade on three sides. There are some seventy churches, and the chief buildings are the beautiful cathedral, built in 1748 on the site of a previous one founded by Pizarro; the palace of Pizarro, now used as Government offices; the University of San Marcos, founded in 1551; the senate-house, formerly the palace of the Inquisition; the Exhibition Palace, opened on July 1, 1872. L. has also a theological seminary, a college of medicine, a naval and military institute, a large penitentiary, two theatres, and a circus for bull-fights (the largest in the world). The transport trade of L., once famous, is still extensive. Pop. (1871) 160,056, comprising whites, blacks, Indians, and Chinese. L., generally styled 'the city of the kings' (*Ciudad de los Reyes*), was founded by Pizarro in 1535. It suffered severely from earthquakes in 1630, 1687, 1746 (the most destructive), 1806, and 1828.

Lima Wood, the commercial name of an important dye-wood used for the production of various tints of red, orange, and peach colour. See BRAZIL-WOOD and SAPPAN-WOOD.

Li'max, a genus of *Gasteropodous* mollusca, belonging to the *Pulmoniferous* section of the class, and represented by the various species of Slugs (q. v.). The shell is rudimentary, and is hidden by the mantle. The *L. ater*, or black slug, and the *L. antiquorum*, or great grey slug, are familiar species.

Lim'ber, a two-wheeled vehicle for the conveyance of artillery, furnished with an ammunition chest. For transport, the gun-carriage is hooked on to the L., which is drawn by horses. In action the L. is disattached and kept at a conveniently near distance. The vehicles are constructed so as to allow these two operations called 'limbering' and 'unlimbering' to be performed with the greatest speed and facility.

Lim'burg, a former duchy on the N.W. of Luxemburg, and on both sides of the Maas, was divided at the peace of Westphalia between the States General of the Netherlands and the Austrian Netherlands, fell to France in 1797, returned to the

Netherlands in 1814, joined Belgium in the Revolution of 1830, and was finally divided between the present states of Belgium and Holland in 1839.—*Belgian L.*, the most north-easterly province, has an area of 931 sq. miles, and a pop. (1873) of 203,922. It is covered in the N. by part of the heathy *Campine*, but is partly arable, especially in the S. and along the E. border, where it is watered by the Maas. The chief occupation is cattle and swine rearing, and there are some iron and coal mines, besides paper, tobacco, and beet-sugar industries in the capital, Hasselt, St. Frond, Tongres, &c. 'L. cheese' is famous.—*Dutch L.*, a province in the extreme S.E. of Holland, is chiefly on the E. side of the Maas, but comprises in the N. a strip of the swampy *Peel* on the W. side of the river. Area, 1353 sq. miles; pop. (1875) 232,562. The country and products are similar to those of the Belgian province. Maestricht is the capital, and other towns are Roermond and Venlo.

Lim'bus (Lat. 'a border') is the term which was used by the schoolmen to denote 'the abode in the state intermediate between death and the judgment of those who lived before the coming of Christ, and of infants who died unbaptized.' It was divided into five divisions—(1) *Paradise*, where the fathers of the Old Church, who received an accession of glory through the incarnation of Christ, the faithful freed from purgatory, and the martyrs under the altar (Rev. vi. 9) await the resurrection; (2) *L. Patrum*, also called 'Abraham's bosom,' the place of those who lived before the time of Christ, but merited no accession of glory; (3) *L. infantum*, the place of unbaptized infants; (4) *Purgatory*, the place of the baptized whose imperfections require a remedial fire to purge away defilements and fit them for heaven; (5) *Infernum*, the place of those without hope.

Lime (CaO) is the oxide of calcium, and is prepared from the carbonate ($CaCO_3$) by burning out carbonic acid. The carbonate is the principal constituent in all limestones, chalks, and marbles, and occurs in nature crystallised as calc-spar and arragonite. It is also an important constituent in shells of fishes and in corals. To obtain L., a kiln in the form of an inverted cone of brickwork is filled with alternate layers of limestone and fuel, which are burned from below upwards. The carbonate is readily decomposed in the presence of the products of combustion of the fuel, and the resulting compound, *burnt* or *quicklime*, as it is called, is raked out from below. A ready test of its quality consists in sprinkling it with water, with which it should at once combine, evolving much heat, expanding greatly, and crumbling to the white powder known as *slaked lime*, or the hydrate of lime (CaO,H_2O). L. which slakes feebly is called a poor lime, and contains considerable quantities of foreign substances, silica, magnesia, alumina, &c. *Overburnt* L. contains hard masses of the silicate, which results from the combination of a portion of the L. with the silica found in the limestone. Slaked lime is about twice as soluble in cold as in boiling water—the cold water dissolving about $\frac{1}{700}$th of its weight of L. If L. be treated with hydrochloric acid, the *chloride of calcium* ($CaCl_2$) results, which, when evaporated to dryness and heated, forms a white porous mass. It is extremely deliquescent, and is of great use in the laboratory for drying gases. Chloride of calcium is also formed when ammonia is prepared by the action of L. upon sal-ammoniac. The *fluoride of calcium* is abundantly met with in nature as fluor-spar, and is useful as a flux in metallurgical operations. L. is a powerful base, and when treated with acids forms well-defined salts. The *sulphate* ($CaSO_4$) is found native, forming gypsum and selenite. Gypsum when heated to between 300° and 400° F., and then powdered, forms what is known as *plaster of Paris*, which, when remixed with water, forms a hard solid mass of hydrated sulphate of lime. *Stucco* consists of plaster of Paris mixed with a solution of size. The *carbonate* has been already mentioned as the chief source of all our L. It is the chief element in giving water its *temporary* hardness, and may be removed by adding to the water some L.-water when the carbonate is precipitated. It is very slightly soluble in pure water, but is readily dissolved in a solution of carbonic acid. Several distinct *phosphates* are known, but they are of minor importance. The mineral apatite is chiefly composed of a phosphate of L., and the phosphates obtained from calcined bones are the great source of our Phosphorus (q. v.).

Lime is the popular name for the fruit of one of the varieties of *Citrus medica* of Linnæus, distinguished as *C. limetta*. The plant forms a tree of shrubby growth, and is largely cultivated in the S. of Europe, the W. Indies, &c. Its native country is supposed to be the mountainous region of Eastern India. It has been cultivated from an early date. The rind of the fruit is thin, and the acid contained in the pulp, besides being very abundant, is much purer than that procured from the lemon. It yields our principal supply of citric acid, and has also a considerable value in a medicinal point of view, furnishing the 'lime-juice' commonly administered aboard ship during long voyages, to preserve the health of the seamen in the absence of fresh meat and vegetables.

Lime, or **Linden**, the popular name of *Tilia*, the typical genus of the natural order *Tiliaceæ*. There are eight species, all peculiar to the northern hemisphere. The *T. parvifolia* is perhaps native through a small restricted area in England, but the common L. (*T. Europæa*) is certainly not indigenous. It is, however, well known from its common cultivation as an ornamental tree in parks, public gardens, boulevards, &c. In Scotland it does not appear to have been planted before the reign of Charles II. It grows under favourable circumstances to a height of 120 feet, and is exceptionally as much as 50 feet in girth. The pale, soft, and close-grained wood is sought for turning, carving, and charcoal-making. By maceration in water the fibrous portion of the bark of the L. can be separated, and easily divided into its thin component layers. These are used for making ropes, cordage, fishing-nets, peasants' shoes, and 'Russia' mats. The mats serve largely as packing material for heavy bulky goods, as furniture, machinery, &c., for covers and carpet substitutes, and for a variety of garden purposes. It is estimated that on an average 14,000,000 are made annually. In some parts of Russia the entire population go to the forests in May and June, the time at which the bark separates with the greatest facility. The villages are then almost deserted, all the inhabitants being occupied either in barking the L. trees or in making the mats. The sap is sometimes evaporated for the sugar it contains. The silver L. (*T. argentea*) of S.E. Europe is a magnificent tree, producing a fine effect in gardens with its leaves covered below with a silky-white pubescence. The flowers are deliciously fragrant, yield an abundance of honey, and by distillation a valuable oil. The wood is not attacked by boring insects. The basswood-tree of America (*T. Americana*) extends N. to 52°. Its timber is pale and soft, but is utilised in various ways.

Lim'erick, a county of Ireland, in the province of Munster, bounded N. by the Shannon and its estuary, which separates it from Clare, S. by Cork, E. by Tipperary, and W. by Kerry. Area, 680,842 sq. miles; pop. (1871) 191,936. It is hilly in the S. and W., the Slieve Felim mountains on the border of Tipperary rising to a height of 1670 feet. The country, stretching from about the contre to the estuary of the Shannon (the 'Golden Vale'), is flat and very fertile, being watered by the rivers Mulkear, Maigue, Deel, &c., all flowing N. to the Shannon. In 1871 there were 189,176 acres under tillage, 404,467 in pasture, 8734 under plantation, 18,474 under water, and 59,991 in waste, bog, mountain, &c. Horned cattle and sheep are extensively reared; among the exports are butter, corn, and cider. The climate is moist and healthy. Limestone, trap, and sandstone are the chief rocks, and the western hills yield a fine reddish marble, an inferior kind of coal. Veins of iron, copper, and lead have also been found in L., but are almost unwrought. The country, indeed, has but few and slight industries. L. is the capital, and other towns are Newcastle, Askeaton, and Rathkeale. There is an unusual number of interesting remains, including stone circles, cromlochs, round towers baronial castles (upwards of 100), abbeys, and churches.

Limerick (Irish Gael. *Luimneach*, 'the barren spot'), the capital of the county of L., lies on both sides of the Shannon, 51 miles N. of Cork and 129 W.S.W. of Dublin by rail. It consists of the old English town on the S. end of the river islet known as King's Island, the old Irish town on the E. bank of the Shannon, the modern Newtown Perry on the same side, below Irish Town, and the large suburb of Thomond Gate on the W. or Clare bank of the river. The Shannon is here crossed by five bridges, one of which, the Wellesley Bridge, is a fine five-arched structure spanning the harbour. The two older parts of L. are crowded and dirty, and are liable to inunda-

tion by high tides. The English town has many quaint Flemish houses. Newtown Perry, with fine squares and broad handsome streets, is one of the best modern towns in Ireland, standing at some height over the river. The most notable buildings of L. are the cathedral of St. Mary, founded in 1180 and rebuilt in 1490, the Roman Catholic cathedral of St. John, built in 1860; the church of St. Alphonsus, containing a splendid altar of Caen stone and Irish coloured marbles; the county and city court-houses, the town-hall, linen-hall, exchange, custom-house, county hospital, Mount Barrington's infirmary, military barracks, literary institute, assembly-rooms, and theatre. L. has increasing manufactures of lace, gloves, linens, iron wares, fish-hooks, leather, and spirits. There are important weekly markets for corn, butter, and cattle, and the great Munster fair is held here on the last Thursday of June. The harbour, which is deep and commodious, was improved by an outlay of £200,000 advanced on loan by Government. A vast wharfage irregularly skirts Abbey River and the main stream, and there are several large floating docks and shipbuilding yards. A large graving dock was opened by Earl Spencer, 13th May 1873. In 1875 there entered the port 576 vessels of 138,456 tons, and cleared 354, of 88,811 tons. The exports are cattle, pork, butter, grain, &c.; the imports, coal, timber, and manufactured goods. L. sends two members to Parliament. Pop. (1871) 39,828. The town was a place of note in the 5th c., and was first attacked in 812 by the Danes, who subsequently held it till the end of the 10th c., when they were forced to render tribute to Brian Boroihme. In 1106 it was made the residence of the kings of Thomond and N. Munster, but was occupied by the English in the reign of Henry II. In the Rebellion of 1641 L. became the headquarters of the Roman Catholics, but surrendered to Ireton after a six months' siege in 1651. The last stronghold that held out for James II., it was thrice assaulted in vain by William III. with 20,000 veterans, but after a six weeks' siege by Ginkel, it capitulated 3d October 1691. Its fortifications were dismantled in 1760.

Lime'stone is a widely distributed and important class of rocks, which consist essentially, sometimes almost wholly, of carbonate of lime. There are a vast number of different varieties, many of which are peculiar to certain formations, and are at once distinguishable by the trained eye. Limestones occur hard or soft, compact, concretionary, or crystalline. *Compact L.* is hard, smooth, and fine-grained, and frequently when of a pleasing colour is polished and used for ornaments. *Crystalline L.* varies from a coarse grained rock of various colours to a pure white grained one, known sometimes as statuary marble. Its crystalline structure may be due to the fragments of fossil shells of which it is composed (such, for instance, as *chalk*), or it may have been superinduced by metamorphic action on an originally compact L. A peculiar form of L. is that known as *Oolite*, which, from its constant occurrence in the British formations corresponding to the Jurassic rocks of the Continent, has given the name of Oolitic System to these formations. Its structure is concretionary, something like the roe of a fish—hence the name, signifying *egg-stone*. It is ordinarily a dull yellow colour—sometimes grey. Its capability of being cut in any direction makes it valuable as a building stone. *Pisolite* is an Oolite the concretions of which are as large as peas. *Fresh water limestones* are generally very smooth in texture, and dull white or pale grey in colour. They are frequently soft and earthy, and can be distinguished by their fossils or by their petrological relations. Stalactites and stalagmites are formed by the evaporating of dropping or slowly trickling water holding in solution a quantity of lime carbonate. There is an important class of limestones known as *Magnesian L.* or *Dolomite*, which contains a considerable quantity of carbonate of magnesia. Typical specimens are easily distinguishable by their crystalline texture, pearly lustre, and gritty feel. The colour is generally brown or yellow, occasionally with a dash of red. L. appears to be a truly aqueous rock, formed by deposition. It is not, however, the result of the mechanical subsidence of inorganic matter like sandstone and shale. It is in most cases traceable to an animal origin, though certain well-known varieties are chemically formed by precipitation from solution.

Lim'it, in Mathematics, is a determinate quantity, to which some variable quantity continually approaches in value, but never reaches, but from which the variable quantity may be made to differ by an amount smaller than any assignable difference. For example, the series $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$ + &c., never reaches the value 2, but it continually approaches it, and by taking a sufficient number of terms may be made to differ from it by a quantity less than the smallest assignable but finite quantity; 2 is the L. of the series. Similarly, the area of a polygon inscribed in a circle may be made greater and greater by increasing the number of sides; but it can never be greater than the area of the circle, which it continually approaches in value, and which therefore is its L. Again, the tangent to a curve at a given point may be defined as the L. of a secant drawn through that point, as the two points of section are approached indefinitely near each other. The doctrine of limits was first logically expounded by Newton in his prime and ultimate ratios, and it is now recognised as the fundamental doctrine without which the calculus cannot strictly be established. See CALCULUS.

Limita'tions, Stat'ute of. In English law the defendant in an action may under this statute plead the elapse of the time allowed by it for the commencement of the action. Personal actions for trespass, or for debt on simple contract must be begun within six years from the date of the cause founded on; and actions of assault, menace, or imprisonment within four years from the date of the injury committed. All penal actions for forfeitures under statute, must be brought within two years. Actions on bills of exchange, for attorneys' fees, and on mercantile accounts must be brought within six years from the date of the cause of action. See PRESCRIPTION, and IMMEMORIAL USAGE.

Lim'ited Liabil'ity. See JOINT STOCK COMPANY.

Limnæ'a, a genus of air-breathing or Pulminiferous Gasteropoda (q. v.), represented by the common water or pond snail (*L. stagnalis*), and by other species. It belongs to the family *Limnæidæ*, in which the shell is thin and well-developed. The aperture is simple, and the tip is sharp. The L. is commonly found on the stems of aquatic plants, or floating on the surface of the water through the conversion of the foot into a 'float.' The eggs are laid in masses in the form of gelatinous ribbons. Other genera are *Planorbis*, *Ancylus*, and *Physa*.

Limno'ria, a genus of *Isopodous* Crustacea, celebrated for the ravages of one species—*L. terebrans*—on wooden piles which have been immersed in the sea. It belongs to the Cursorial section of the order *Isopoda* (q. v.), in which section the feet are of equal length, and not adapted for swimming. The L. is also known by the names 'gribble,' and 'timber-boring shrimp.' Its colour is grey. The animal burrows deeply into wood. The average size is about one-fourth of an inch. The males are smaller than the females.

Limoges', a town of France, department of Haute Vienne, 112 miles N.E. of Bordeaux by rail, on the Vienne, which is here crossed by three bridges. Among its chief buildings are the granite cathedral of St. Stephen, commenced in the 13th c., but still unfinished; the Ogival church of St. Michael, with its lofty belfry; the bishop's palace (1787); a library, with 23,000 vols.; a noble hospital, founded in the 12th c., and recently restored; and the theatre, erected (1838) on the site of the famous abbey of St. Martial. L. is one of the chief manufacturing towns of France, turning out goods of a gross annual value of 30,000,000 francs. Its thirty-seven porcelain factories and thirty-four porcelain-painting workshops employ respectively 6000 and 2000 hands; and the cloths, cashmeres, flannel, woollens, and druggets of L. are widely famed. Other articles of industry are gloves, leather, hats, paper, cutlery, beer, &c.; and there is a lively transit trade between Paris and S. France in grain, wine, chestnuts, horses, and cattle. Pop. (1872) 44,944. L., the capital of the Gallic *Limovices*, but known to the Romans as *Augustoritum*, was successively captured by the Visigoths, Franks, Northmen, and English, the last of whom, at the order of the Black Prince, massacred 3000 of its inhabitants (1370). From the 12th to the 14th c. it was famed for its manufacture of Enamel (q. v.).

Lim'pet (*Patella*), a genus of *Gasteropodous* Molluscs, belonging to the *Holostomatous* group of the class, and forming the type of the family *Patellidæ*. The shell is of simple, conical form, the apex being turned forwards. The 'foot' is large, and forms a great broad disc, by which the animal attaches itself to rocks. The gills are ranged round the edge of the mantle;

hence the name *Cyclobranchiate* ('circular-gilled') gasteropods in many systems of classification. The common L. (*P. vulgata*) is familiar on the rocks round the English coast. It adheres to the rock chiefly by the suctorial action of the foot, which produces a vacuum through its contractions. Other genera of limpets are exemplified by the keyhole L. (*Fissurella maxima*), in which an aperture exists at the apex of the shell; this aperture being used for the expulsion of the water which has been used in breathing. The duck-bill L. (*Parmophorus Australis*) inhabits tropical seas, and the 'cup and saucer L.' (*Calyptrea*) is so named from the cup-shaped process found in the interior of the shell. Several tropical species of L. attain a very large size; the shell in one species measuring 12 inches in diameter.

Limpo'po, Ouro, or **Bempe,** a large river in S.E. Africa. It rises near the S. boundary of the Transvaal district, in 24° 20′ S. lat., 28° 35′ E. long., and flows successively N.W., N.E., E., and S.E., describing two-thirds of a circle, before it falls into the Indian Ocean in 25° 15′ S. lat., 33° 33′ E. long. The L. is navigable for 60 miles, but is difficult of entrance, and the region around its lower course is very unhealthy. Nevertheless it is expected to become the outlet of the valuable but still unsettled table-lands of the Eastern Transvaal.

Lina'ceæ. See FLAX.

Lin'acre, Thomas, a physician and scholar of the 'New Learning,' was born at Canterbury about 1460, and became a Fellow of All Souls' College, Oxford, in 1484. Sent with De Selling on an embassy to the Pope, he studied Greek at Florence under Chalcondylas, and medicine under Hermolaus Barbarus at Rome, where he formed friendships with Grocyn and William Latymer, and translated several of Galen's treatises into Latin. On his return to Oxford, he lectured on Greek and physic, became tutor to Prince Arthur, and having taken orders (1507), held successively the livings of Mersham, Hawkhurst, Holsworthy, and Wigan, and prebends of Wells, York, and Westminster. He was also physician to Henry VII. and Henry VIII., and founder of the Royal College of Physicians (1518), of which he became first president. His death took place at London, October 20, 1524. L.'s learning, styled by his pupil Erasmus 'deep, searching, and refined,' is enshrined in his nine Latin translations of Galen, Proclus, and Paulus Ægineta, in a Latin grammar for the use of the Princess Mary, and in the treatise, *De Emendata Structura Latini Sermonis Libri Sex* (Lond. 1524).

Lin'coln (the *Lindum Colonia* of the Romans, hence the modern name), the capital of Lincolnshire, and a county of itself, is situated on the left bank of the Witham, 140 miles N.N.W. of London by rail. It is built on the southern slope and at the base of a hill, on the summit of which stands the magnificent cathedral, visible for many miles over the flat country to the S. One of the most beautiful specimens of Early English in the kingdom, it was founded in 1088, and is in the form of a double cross, 524 feet long, and 174 wide at the W. front, which is almost unrivalled for the richness of its carvings and tracery, and is adorned with statues of eleven English kings. At the intersection of the transept with the nave and choir rises the central tower, 300 feet high, containing the celebrated bell 'Tom of L.,' recast from an older one in 1834, weighing 5 tons 8 cwts., and measuring 6½ feet in diameter at the mouth. On the N. side of the cathedral are the cloisters, enclosing a quadrangle of 118 feet by 91, with a Roman tesselated pavement. L. has also several pre-Reformation churches, handsome county courts, a jail on the site of the castle, a post-office (1860), a corn exchange, a large semi-classic structure, with a large public hall, fine railway stations, assembly rooms, and a theatre. There are many educational and benevolent institutions. The manufactures are farm implements and machinery, portable steam engines (over 900 yearly), leather, cordage, bricks, nails, brushes, mats, &c., and there are steam flour-mills, bone mills, boat-building yards, nursery grounds, a trade in corn, wool, coal, and timber, a weekly market, and four yearly fairs—the most important, held during the last whole week in April, attracting continental and American dealers. Brayford Water forms a convenient harbour for vessels built to navigate the Witham. Pop. (1871) 26,766. L. returns two members to parliament. Its principal Roman antiquity is 'Newport Gate,' a central arch 16 feet wide, flanked by two smaller arches. At the time of the Conquest L. was one of the chief places in the kingdom, and the seat of a large trade. William I. erected a castle here, and the town received a charter from Henry II. It was besieged in 1141 by Stephen, who was, however, here defeated and taken prisoner, was for some time John of Gaunt's residence, and was stormed by the Parliamentary troops, under Manchester, in May 1644.

Lincoln, Abraham, sixteenth President of the United States, was born in a cabin on Nolin Creek, 3 miles W. of Hodgensville, Kentucky, February 12, 1809. In 1816 his father removed to Illinois, where he took a small farm. Abraham assisted his father in rough out-door work, and had only one year's schooling. In 1825 he was a ferryman at six dollars a month. Exceptionally tall and strong, L. could turn his hand to any kind of manual labour—log-cabin building, boat-making, or rail-splitting. In the Black Hawk War he was elected captain of a volunteer company, and served three months, after which he started a store. Returned to the Illinois State Legislature in 1834, and having studied law, he settled at Springfield as an advocate in 1837. L. took an active part in local politics, and was returned in 1846 to Congress, where he supported abolition, and opposed the Mexican War. He was an unsuccessful candidate for the Senate in 1849 and 1858. In 1860 he secured the Republican nomination for the Presidency, and owing to the divided state of the Democratic party was elected in November. He received 1,857,610 votes, against 2,787,780 recorded for the three Democratic candidates. The election of so strong an Abolitionist gave violent dissatisfaction in the South, and was the signal for secession. In December 1860 S. Carolina declared its independence, a step followed afterwards by ten other States. On March 4, 1861, Mr. Lincoln was installed President, and mooted a compromise—the maintenance of the Union, and the continuance of slavery. Neither Abolitionists nor Secessionists were satisfied. On April 12, 1861, General Beauregard seized Fort Sumter, an act which decided all parties in the North for war. On April 15, Mr. Lincoln called out 75,000 militia, and on July 4 obtained a vote for 40,000 men and 400,000,000 dollars. The Four Years' Struggle which followed forms the greatest event in American history since the War of Independence. On January 1, 1863, Mr. Lincoln declared the entire abolition of slavery. In November 1864 he was re-elected President. His assassination, April 14, 1865, by J. W. Booth, an actor and a fanatical Secessionist, sent a thrill of horror through the whole civilised world. L.'s remains were carried in state through the principal cities of the Union, and interred at Springfield, where a beautiful monument was erected to his memory, October 15, 1874. L. was a noble though unadorned type of the American or New World Englishman. Earnest, honest, strong of will, tenacious of purpose, he was the very man for a crisis. The years of his Presidency were the darkest in his country's history; yet with invincible courage and unfaltering hope he steered the good ship 'Union' safely through the most appalling storm that ever broke over the States. His countrymen cannot sufficiently honour his memory, as a triumphant patriot and martyr; while mankind will remember with gratitude the statesman that abolished the curse of slavery from an entire continent. See H. J. Raymond's *Life and Public Services of A. L.* (New York, 1865); A. Boyd's *Memorial L. Bibliography* (Albany, 1870); W. H. Lamon's *Life of A. L.* (1872); A. Jouault's *A. L., sa Jeunesse et sa Vie Politique* (Par. 1875), &c.

Lincoln College, Oxford, was founded in 1427 by Richard Flemming, Bishop of Lincoln, for a rector, seven fellows, and two chaplains, as a seminary of clergy who might confute the doctrines of Wycliffe. Flemming dying in 1430, the work was completed by Thomas Rotherham, his successor in the see of Lincoln, who in 1475 finished the building of the college, enriched its revenues, and gave it a body of statutes (1479). By them the fellowships were increased to twelve, and restricted to natives of the dioceses of Lincoln, York, and Wells, a limitation removed by 17 and 18 Vict. The present foundation consists of a rector, ten fellows, and fourteen scholars, and other scholarships (eight at present) are from time to time added from the proceeds of two suspended fellowships. The college presents to nine livings. In 1876 it had twelve members of Congregation and forty-four commoners.

Lincolnshire, the second largest county of England, is bounded N. by Yorkshire and the Humber, S. by Cambridge, Northampton, and Rutland, W. by Leicester and Nottingham,

and E. by the North Sea and the Wash. Area, 2763 sq. miles; pop. (1871) 436,599. It is divided into the 'parts' or districts of Lindsey in the N., Kestveen in the S.W., and Holland in the S.E. In the W. are the moors, known also as the 'L. heights,' and the S. is covered by a wide tract of the fens of the celebrated Bedford Level (q. v.). The L. wolds, or chalk downs, stretch S.E. from the Humber in a line with the coast. The moors, fens, and wolds are now in great part reclaimed by green crops and pasture. L. is watered by the Trent, Witham, Welland, Ancholme, and many smaller streams. In 1876 there were 620,024 acres under corn crops, 239,321 under green crops, 169,584 in clover, sanfoin, and grasses in rotation, and 419,730 in permanent pasture and grass; there were also in L. 62,720 horses, 202,033 cattle, 1,508,813 sheep, and 99,667 pigs. The chief crops are wheat, barley, oats, beans, peas, turnips, swedes and potatoes. Along the Trent there are rich 'warp'-lands (see WARPING). L. is famed for its breeds of horses, sheep, and cattle, and great fairs are held at Lincoln and Horncastle. Six members are returned to Parliament. Lincoln is the capital, and other towns are Boston, Grantham, Louth, and Great Grimsby. The county is particularly rich in Roman. Old English, and Danish remains.

Lincoln's Inn, so called because it belonged to the Earl of Lincoln, in the reign of Edward II. See INNS OF COURT.

Lind, Jenny. See GOLDSCHMIDT.

Lindley, John, LL.D., F.R.S., a celebrated English botanist, was born February 5, 1799, at Catton near Norwich, where his father was proprietor of a large nursery garden, a circumstance by which his taste for botany was no doubt developed. He early appeared as a botanical author in his translation of Richards' *Analyse du Fruit* (1819), which was followed next year by his *Monographia Rosarum*. Shortly after he went to London, became assistant secretary to the Horticultural Society, and was engaged by Loudon to write the descriptive portion of the *Encyclopædia of Plants*, a task which led to the consideration of the claims of the artificial and natural systems of classification, and which resulted in his becoming the warm advocate of the latter. In 1829 he was chosen Professor of Botany in University College, London, a post which he resigned in 1860. L. was the recipient of many scientific honours, and was honorary or corresponding member of almost all the foreign societies of natural science. He died at Catton, November 1, 1865. The more important of L.'s other works are *Introduction to the Natural System of Botany* (1830, republished in 1836 under the name *A Natural System of Botany*), *Introduction to Systematic and Physiological Botany* (1832), *Flora Medica* (1838), and *Theory of Horticulture* (1844). With Hutton he published *Fossil Flora of Great Britain* (2 vols. 1831–34), with Paxton, *Pocket Botanical Dictionary* (1840), and with Moore *The Treasury of Botany* (1865). He also edited the *Gardener's Chronicle*, was the author of numerous valuable papers and monographs, notably nupo *Orchids*, and wrote the greater portion of the botanical articles in the *Penny Encyclopædia*.

Lind'say, or Lyndsay, The Family of, is of Norman origin, the name originally being De Limesay. The first of the line in Scotland seems to have been Sir Walter de L., a baron under David I. His great-grandson acquired the territories of Crawford, in Clydesdale, marrying Marjory, sister of William the Lion, and leaving three sons—Sir David, Lord of Crawford, Sir Walter, ancestor of the Lamberton family, and William of Luffness. His grandson Gerard died childless, and the estates went to his sister, wife of Sir Henry Pinkeney, an English baron, whose grandson again resigned them into the hands of Edward I.; but Crawford had already been bestowed on Alexander L. of Luffness, the first of the more recent house of Crawford. The *Lambertons*, descended from Walter, brother of the first Lord of Crawford, for four generations married heiresses, eclipsing the other branches of the family; but the male line ended with Sir William, killed in a battle with Llewellyn, Prince of Wales, in 1283. William of Luffness, brother of the first Lord of Crawford, continues the direct line of the Lindsays. His descendant, David, obtained large estates from the Bruce, others accruing to him by his marriage with Lord Abernethy's daughter. His son, Alexander, espoused the daughter of Sir John Stirling, and with her received the lands of Glenesk and Edzell, in Angus, leaving for issue Sir David of Glenesk, first Earl of Crawford. Another son of David, Bruce's friend, was Sir William, founder of the *Byres* family. Earl David married Princess Elizabeth, daughter of Robert II. His grandson, of the same name, was the earl killed while endeavouring to heal the feud between the Ogilvies and Lindsays. He left a large family. The eldest son, Alexander, took the ancestral title; the second, Walter of Beaufort, founded the house of Edzell. Alexander, the fierce Earl Beardie, died of fever in 1454; and his son David, prime favourite with James III., was created Duke of Montrose, a title which did not survive him. David, eighth Earl, transferred the estates from his heir, the Wicked Master, to David L. of Edzell, who arranged that they should be reconveyed to the Wicked Master's son at his own decease. From Ludovic, the sixteenth Earl, childless, the title passed by royal patent to Lord John L. of Byres, High Treasurer of Scotland, an enthusiastic supporter of the Stuarts, for whose cause he suffered imprisonment. His grandson, John, became *Viscount Garnock* in 1703; and the son of the fourth Viscount, the twenty-second Earl of Crawford, proved the last of the direct line of Byres, the earldom reverting to the family of Balcarres. Sir David L. (q. v.) represented an ancient branch of the Byres family. The founder of the *Balcarres* house was John, son of the ninth Earl of Crawford, who became a Lord of Session under the title of Lord Menmuir. He acquired the estate of Balcarres, and his son was created Lord L. of Balcarres in 1633. His grandson was created Earl in 1651. Alexander, sixth Earl of Balcarres, succeeded to the earldom of Crawford on the death of George L. of Byres. See *Lives of the Lindsays* (1849), by the present Earl of Balcarres, and Jervise's *Land of the Lindsays*.

Lindsay, or Lyndsay, Sir David, once the most popular poet of Scotland, was the son of David Lindsay of the Mount, Fifeshire, and (according to Chalmers) was born there in 1490, but David Laing (ed. of L., 1871) points out that there is no evidence in support of this statement, and considers it just as likely that the poet was born at Garmylton near Haddington, in East Lothian. He studied at St. Andrews 1505–8, but did not take his degree. That he visited the Continent at this period of his life, though positively asserted by Mackenzie, is extremely doubtful. It is more likely that he proceeded straight from the university to the court, though the loss of the Treasurer's accounts between August 1508 and September 1511 makes it impossible for us to ascertain the exact date of his earliest employment in the royal household. The first notice of his appearance is an entry (12th October 1511) in the treasury-book for 'a play coat to D. L. for the play' at Holyrood. To the infant prince (afterwards James V.) he became usher; and in *The Dreme*, his earliest poem (1528), he recounts the expedients resorted to for his charge's amusement. In 1529, however, his *Complaynt to the Kingis Grace* laments the influence of parasites and flatterers upon his former pupil; and the *Complaynt of our Lordis Papyngo* (*Parrot*), written in the following year, hotly inveighs against the dissolute manners of Church and court. James V., on becoming his own master, had made his guardian Lyon-King-of-Arms, knighting him, and granting him revenues from the lands of Luthrie, Fifeshire. His duties took L. on several important embassies to foreign courts, and some brief notes of his adventures still remain. On the death of James's young bride (7th July 1537), he composed the *Deploratioun of the Deith of Quene Magdalene*. His well-known *Satyre of the Thrie Estaitis*, was first performed in 1540, at Linlithgow, before a full court. This satire, by far the greatest 'Interlude' or 'Mixed Play' in English literature, is filled with scathing ridicule of the priests, and preserves for us humorous and graphic sketches of men and manners in the poet's time. The *Register of Arms*, carefully prepared by L. in his capacity of chief herald, appeared in 1542, and about 1549 the *Historie and Testament of Squyer Meldrum*, a stirring tale of Scottish chivalry, wholly free from the satirico-didactic spirit that pervades the rest of the poet's writings. Beaton's memory was satirised by him in the *Tragedie of the Cardinall*; and in 1553 he published his longest work, *Ane Dialog betuix Experience and Ane Courteour of the Miserabyll Estait of the World*, commonly called *The Monarchie*, a sort of rhymed universal history, full of learning and acute reflections. The exact date of Sir David's death has not been ascertained; but Mr. Laing has proved by documentary evidence that it must have occurred before the 18th of April 1555. As a poet, L. is more remarkable for wit and trenchant

satire than for fancy. To the king he proved an invaluable friend, faithful and fearless in counsel. His strenuous attacks on abuses prevalent in his time, especially those of ecclesiastics, show him to have been a man of strong principle, and no one can reasonably doubt that had he lived a few years longer, he would have joined the Lords of the Congregation in the abjuration of Popery. His part in the work of the Reformation is only second in importance to that of Knox. L. ploughed, Knox sowed. Scotland long remembered him. During the 16th, 17th, and 18th centuries, upwards of twenty editions of his works were published. His verses were on almost every tongue. Until Burns appeared, he was in fact the poet of the Scottish people, and was appealed to as an infallible authority on the Scottish language. 'Ye'll no find that in Davie Lyndsay,' was a fatal objection to any new coined phrase which a speaker ventured to employ. The first who carefully edited L.'s poems was Chalmers (3 vols. Lond. 1806). Laing has corrected some of its errors in his edition of 1871 (2 vols. Edinb.), and is at present (1877) engaged on what, if finished, will certainly be the standard, and probably the final edition of the poet.—**Robert L. of Pitscottie**, a relative of the poet, was born about the beginning of the 16th c. He is the author of quaint, picturesque, and credulous *Chronicles of Scotland* from 1436 to 1565, beginning where Boece left off, viz., with the murder of King James I. In the Preface, L. states that he was materially helped in his work by Lord L. of the Byres, Sir William Scot of Balwirrie, Sir Andrew Wood of Largo, John Major the historian, Sir David L., and other gentlemen. The best edition of Pitscottie's *History* is that by John Graham Dalyell (2 vols. 1814).

Line, a term applied to the 'regulars' of the British army to distinguish them from other corps. It includes all the numbered regiments, with the exception of the Life, Horse, and Foot Guards, and excludes the Royal Marines, volunteer and yeomanry corps, and fencibles.

Line, in mathematics, is that which has only one dimension; or, as defined by Euclid, is that which has length but no breadth.

Lin'eal Descent' is descent in a right line—son, grandson, great-grandson, &c. Lineal ancestor is father, grandfather, &c.

Lin'en Man'ufactures. Textures of linen (Lat. *linum*, 'flax'), which comprise the manufactures from flax fibres, have been in general use among civilised communities from the earliest recorded period. The mummy cloth in which the ancient Egyptians wrapped the embalmed bodies of their dead is found to be composed of linen, and it is often in a wonderful state of preservation. Linen and the cultivation of the flax plant are also frequently alluded to in the early books of the Old Testament, and similar references are common in the works of classical authors. L. M. were, in Europe at least, the most important vegetable textile industries down to almost the end of last century, but from about 1775 the improved machinery devoted to cotton manufacture began to tell powerfully in favour of that fibre, which with extraordinary rapidity attained pre-eminent importance. In the United Kingdom the L. M. which had been generally disseminated became concentrated in special localities, and they now flourish chiefly in the north of Ireland, with Belfast as their centre, at Leeds in England, and in the counties of Forfar and Fife in Scotland, Dundee, Arbroath, Kirkcaldy, and Dunfermline being the principal towns concerned in the industry. L. M. are also prominent industries in the N. of France, Holland and Belgium; and in early times much of the linen worn in Great Britain was sent to Holland to be bleached, whence arose the name 'Holland's' Linen. L. M. embrace a wide range of textures, which are all characterised by great strength and durability. They include, of finer textures, the delicate lawns and cambrics, damasks, some of which are of highly artistic patterns and among the triumphs of the weaver's art, shirtings, and sheetings of various qualities. Diapers, drills, huckabacks, Hessians and sailcloth are also linen fabrics of a heavier class, and some of which may be made of mixed fibres or materials other than flax. The bleaching of linen, on account of the large proportion of colouring matter contained in flax, as well as from the intricate manner in which it is combined with the fibre, is a very tedious process, involving repeated 'crofting' or exposure of the fabric on grass fields. It is a prominent industry in the N. of Ireland, and in Perthshire, Scotland. Sailcloths and heavy goods are principally woven in Dundee and Arbroath, damasks in Dunfermline, and these, with fine linens, are made in Belfast; but much plain shirting, &c., is still woven by hand-loom weavers in the rural villages of the country. In 1875 there were in Scotland 159 factories with nearly 3000 spindles, and 18,529 power looms, giving employment to about 45,000 persons employed in the linen industries.

The exports of linen yarn and piece goods from the United Kingdom in the year 1875 were as follows:—Linen yarn, 27,887,681 lbs.; white and unbleached plain goods, 186,763,770 yards; checked, printed, or dyed linens and damasks and diapers, 13,742,124 yards; sails and sailcloth, 4,067,278 yards. The yarn goes principally to Spain, Canary Islands, Germany, and Holland; the piece goods are most in demand in the United States, West Indies, Australia and other British Dependencies, and France; while the sailcloth is taken chiefly by Sweden and Norway, Germany and the East Indies.

Ling (*Lota molva*), a fish belonging to the Cod-family, and very abundant on the shores of Britain. It is longer than the cod proper, has two dorsal fins, one anal fin, and one barbel at the extremity of the lower jaw. The L. is from three to four feet long, and sometimes weighs as much as 70 lbs. It is of a grayish colour, with white belly and white-tipped fins. When salted and dried, it is sent into the market in the form of *stock-fish*. The L. of the American coast is *Lota compressa*, of which great quantities are caught in the Gulf of St. Lawrence.

Linga (Sansk., 'symbol'), the *phallus* or representation of the male generative power, worshipped throughout India as the emblem of the god Siva. Any erect and cylindrical object will serve the purpose, usually a mere stone. According to the Puranas, there were in early times twelve chief centres of L. worship, and these holy spots still attract numerous pilgrims. A sect of Hindus in the S. of the Peninsula, who are chiefly engaged in trade, are known as *Lingaits*. See Kittel, *Ueber den Ursprung des Lingacultus in Indien* (Mangalore, 1877).

Lin'gard, John, D.D., LL.D., born of humble Catholic parentage at Winchester, 5th February 1771, was sent by Bishop Talbot in 1782 to the English College at Douai, where, after a brilliant course of humanities, he entered the school of theology in October 1792. On the breaking up of the Douai establishment in 1793, L. took refuge in England; and October 15, 1794, with seven fellow-students, opened a new college at Crook Hall, near Durham, himself becoming vice-president, and acting as professor of natural and modern philosophy. A tutor in Lord Stourton's family (1793), he returned to Crook Hall (1794), was ordained priest and appointed prefect of the studies (1795), served a church in Newcastle-on-Tyne (1800), and wrote for the *Newcastle Courant* (1805) a series of letters, afterwards published as *Catholic Loyalty Vindicated;* his *Antiquities of the Anglo-Saxon Church* (4th ed. 1858) appearing in the same year. In 1808 he removed with his community to Ushaw, but in September 1811 retired to the mission of Hornby in Lancashire, where, with the exception of two visits to Rome, he continued to reside until his death, 17th July 1851. Pius VII. conferred on him the degrees of D.D. and LL.D. (1821), and Leo XII., having vainly offered him a cardinalship, sent him the gold medal reserved for cardinals and princes, whilst Lord Melbourne assigned him in 1839 a pension of £300 per annum. The first three volumes of L.'s *History of England to the Accession of William and Mary* appeared in 1819, the eighth and last in 1830 (6th ed. 1854-55). The one great merit of this work is its impartiality, the only indication of its Catholic origin being the absence of Protestant bias; its defect, that results are given, their causes left unexplored, intentionally, as L. himself tells us in the edition of 1825, where he dubs the 'philosophy of history' the 'philosophy of romance.' Still the work is one of great and permanent value, and has taken its place as the text-book in the universities of Oxford and Cambridge. Among L.'s other writings should be noticed his *Documents to ascertain the Sentiments of British Catholics in former Ages* (1812), *New Version of the Four Gospels* (1836), and *Catechetical Instructions* (1840). See the Memoir by the Rev. Canon Tierney, prefixed to the last volume of the 6th ed. of L.'s *History*

Lingay'en, a town on the N. coast of Luzon, one of the Philippines, exports rice, sugar, &c., and has a pop. of 18,000.

Linguaglos'sa, a town of Sicily, province of Catania, near the N.E. base of Etna, 9 miles W. of the railway station at

Taormina. It has several good churches, and in the vicinity is some beautiful scenery. Pop. (1874) 8822.

Lin'gula, a well-known genus of *Brachiopoda* (q. v.), or lower Mollusca, possessing a horny shell of oblong shape. No hinge exists, the valves or halves of the shell being approximated simply by their muscular attachments. The arms are fleshy, but are not, as in most other brachiopods, supported by calcareous loops, —the so-called 'carriage-spring apparatus.' A fleshy stalk or peduncle passes out between the beaks of the shell and serves to attach the L. to fixed objects. L. is the type of a very important family of brachiopods.

Lin'iments (Lat. *linīre*, 'to besmear') are used in medicine for external application only. Formerly, L. were, for the most part, medicinal substances in combination with oil; but the Pharmacopœia Committee, in order to guard against mistakes, have called *strong tinctures*, employed for external use only, by the name of L. L. are applied to the affected part by means of saturated lint, painting over, or rubbing into the skin, and the object to be attained may be the alleviation of pain, the allaying of inflammatory action, the healing of excoriated surfaces or burns, counter-irritation or vesication, or the general purposes of endermic medication. The following are the L. of the British Pharmacopœia, with a general indication of their uses, and the proportion of the active ingredients contained in each. *Linimentum aconiti* (1 in 1), applied with a camel's hair pencil, relieves acute neuralgia. *L. belladonnæ* (1 in 1), may be employed similarly for the same purpose, or by means of rubbing, in combination with the compound camphor L. *L. opii* (1 in 2), is used in cases of rheumatism and local pains. *L. chloroformi* (1 in 2) alleviates pain, and acts as a stimulant on a tender skin. *L. camphoræ* (1 in 5), is a mild stimulant. *L. camphoræ compositæ* (1 in 4½), applied by means of lint soaked in the liniment, and covered with a dry napkin until redness is produced, relieves pain in tic-douloureux and rheumatism. *L. crotonis* (1 in 8) is used to produce vesication; and, in combination with olive oil, to promote the growth of the hair. *L. sinapis comp.* (1 in 40), *L. terebinthinæ* (1 in 1½), are employed as stimulants and counter-irritants. *L. hydrargyri* (1 in 6), *L. iodi* (1⅛ in 10), and *L. potassii iodidi cum sapone* (1 in 9) are employed to produce the constitutional effects of their active ingredients. *L. calcis* (*v. lime*) is chiefly used for abraded surfaces and burns. *Simple L.*, composed of four parts of olive oil, and one part of white wax, is used to soften the skin, and promote the healing of excoriations.

Lin'köping, a town in Sweden, in the län of Östergötland, on the Staang, 3½ miles S. of Lake Roxen, and 103 miles S.W. of Stockholm, regularly built of wood, has fine squares, and a Gothic cathedral, the longest (320 feet) in Sweden after that of Upsala. It is a bishop's see (one of the oldest in Sweden), and possesses a diocesan library of 30,000 vols. and 1500 MSS., with antique collections. L. has considerable trade. Pop. (1874) 8123.

Lin'ley, Thomas, an English musician and composer, born at Bath about 1725, studied under Paradies, a Venetian composer, and became conductor of concerts and oratorios in his native town. The marriage of his daughter to Sheridan led to his subsequently embarking in theatrical speculations. L. died in London, 19th November 1795. Along with his son, L. wrote the songs in Sheridan's *Duenna*, composed the accompaniments to the original airs in the *Beggars' Opera*, and published some exquisitely sweet and tender ballads.

Linlith'gow, or **West Lothian**, a county in the E. of Scotland, bounded W. by Stirlingshire, S.W. by Lanarkshire, S. and S.E. by Midlothian, and N. by the Firth of Forth. It extends from N. to S. 20 miles, and from E. to W. 15 miles. Area, 127 sq. miles; pop. (1871) 40,965. The coast is generally low and little broken. The greater part of L. is a fertile hill country, crossed by the Dumcross, Knock, and Kipp Hills, which culminate in Cairnnaple, 1498 feet high; but the S.W. is flat, with wide stretches of bog and heath. The chief streams are the Avon and Almond, with its tributary the Breich. The great Midlothian coal-formation stretches across the S. of L., and limestone, sandstone, and granite are abundant. The soil is generally clayey, with loam, sand, and shell-marl, and agriculture is in a very advanced state. In 1876 there were 18,203 acres under corn crops; 7226 in green crops; 13,866 under various grasses; and 18,800 permanent pasture. The chief industries are the cultivation of corn, flax, potatoes, and garden fruits; the working of coal, iron, freestone, and limestone; and the breeding of horses and cattle. The principal towns are L. (q. v.), Bathgate (q. v.), Borrowstounness (q. v.), Armadale, pop. (1871) 2708, and Crofthead, pop. (1871) 3151; and villages, Queensferry (q. v.), Broxburn, pop. (1871) 1457, and Whitburn, pop. (1871) 1432.

Linlithgow ('the town on the grey lake'), the county town of West Lothian, 3½ miles from the Firth of Forth, and 17 miles W. of Edinburgh, with which, as well as with Glasgow, it is connected by railway and by the Union Canal, is situated on a lake (102 acres) in connection with the Avon. It has six churches, among which St. Michael's (probably founded by David I.), though partly burned in 1424, is one of the best preserved Gothic churches in Scotland. In front of the town-house stands the crown-shaped 'Cross-Well' (rebuilt in 1807), curiously adorned with grotesque figures. There are some old houses which once belonged to the Knights of St. John. More interesting, however, are the ruins of the palace (burned in 1424, and rebuilt chiefly by James III., V., and VI.), a large quadrangular pile with corner turrets, on an eminence projecting into the lake, which was once the Versailles of Scotland and the residence of the Queens-dowager, and in which James V. and Mary Queen of Scots were born. L. was chartered probably by David I., and was taken into the Court of the Four Burghs in 1368, when its customs were only second in amount to those of Edinburgh. Here the Regent Murray was murdered, 20th January 1570. The industries of L. are tanning, distilling, and brewing. It unites with Falkirk, Airdrie, Hamilton, and Lanark in sending one member to Parliament. Pop. (1871) 3690.

Linnæ'a is a genus of *Caprifoliaceæ* restricted to a single species, *L. borealis*, which plant was selected by Linné to bear his name—its northern home, and as some interpret, its very modest appearance, fitly representing the great Swedish botanist It is a graceful little creeper, with opposite ovate evergreen leaves, and fragrant bell-shaped flowers of a delicate pinky-white, produced in couples at the summit of erect thread-like stalks. In Europe, Asia, and N. America it is found pretty freely in woods of the more northern countries, reaching in Norway to fully 71°. In Britain it has been found in shady fir-woods from Aberdeen S. to Northumberland.



Linnæa Borealis.

Linné, Carl von, or **Linnæus**, the celebrated botanist, was born at Raashult in Sweden, May 23, 1707. His attention was early directed to the study of plants; and when he entered the University of Lund at the age of twenty he knew little else. In 1728 he removed to Upsala, where he thought he would have more opportunity for study, and where in 1730 he read lectures on botany for Rudbeck the professor, who was now growing old. In 1732 he was commissioned to journey through Lapland and Norway. After his return he lectured for a time upon mineralogy and metal-assaying, and then in 1735 went to Harderwyck in Holland to obtain his degree of doctor of medicine. In Holland, he became acquainted with Royen, Gronov, Burmann, and Boerhaave, the last of whom secured for him the post of superintendent of George Cliffort's garden at Hartecamp. While holding this post he visited England, from which he seems to have returned somewhat disappointed. In 1738 L. quitted Holland, and in 1740 was elected Professor of Medicine at Upsala. His reputation as a botanist was now established, and his subsequent years were years of increasing honour and fame. He was in constant communication with botanists in all parts of the world, who sent him the results of their travels or investigations. In 1747 he was appointed physician to the king, and in 1757 raised to the nobility. He died at Upsala, January

10, 1778. Of his numerous and important works there may be cited his *Flora Lapponica* (1737); *Fundamenta Botanica* (1737); *Genera Plantarum* (1737); *Hortus Cliffortianus* (1737). These were published during his stay in Holland. His later works are *Flora Suecica* and *Fauna Suecica* (1745); *Materia Medica* (1749); *Philosophia Botanica* (1751); *Musaeum Regis Adolphi Frederici* (1754), a splendid publication, comprising a detailed description of the contents of the royal museum, and *Species Plantarum* (1753), undoubtedly his greatest work. The great merit of L. as a botanist lay in his power of systematising. His system of classification is, it is true, artificial in the extreme, depending chiefly upon the number of stamens and pistils, and must of necessity separate many closely allied species and genera (see BOTANY); but it introduced a more scientific method in the study of botany, and gave the science a greater impulse than the work of any other single individual. See Vogel's *Lebensbeschreibung Karl von L.'s* (1792); A. Afzelius, *Egenhändiga anteckningar af L. om sigsjelf* (1823); Fée's *Vie de Charles de L.* (1832); and Schleiden's *Biographie* (1871).—**Carl von L.**, the son of the above, was born at Fahlun, January 20, 1741, became demonstrator under his father in 1759, and succeeded to the chair at Upsala in 1777. He died 1st November 1783. He completed (1781) *Supplementum Plantarum*, begun by his father.

Linnell', John, born in London June 1792, was a pupil of Varley the water-colourist, exhibited pictures at the Royal Academy when fifteen, and in 1808 gained the British Institution's first prize for the best landscape. Of his portraits, generally heads, on small canvas, the best known are those of Callcott, Mulready, Phillip—brother artists; Malthus, Whately, and Carlyle. In landscapes he has been most successful in the representation of homely English scenes. His great characteristics are an affectionate fidelity to nature, and a rich, sombre colouring. 'Sand Pits,' 'Crossing the Brook,' 'The Sear Leaf,' 'Timber Waggon,' 'Eve of the Deluge,' 'Christ and the Woman of Samaria,' 'The Ford,' 'Woodcutters,' 'A Coming Storm,' may be mentioned as some of his best productions. L. refuses to become an Academician.

Linn'et (*Fringilla*), a genus of *Fringillidæ* or Finches, represented typically by the common or brown L. (*F.* or *Linota cannabina*), also known as the Greater Redfinch or Redpole. The L. is common throughout Europe, and extends to the extreme of Asia. It attains a length of 6 inches. The feathers of the head in the males are tipped with crimson, and the upper parts generally are of a chestnut-brown. The wings are black, and show a narrow edging of white. The throat is grey, and the breast red; the under parts greyish-brown. The crimson-tipped feathers of the head become greyish-brown in winter; and in the domesticated bird the red colour entirely disappears. The L. has a pleasing song, and sings well in confinement. Hence it is much in request as a cage-bird. The nest is built in open places, and the eggs, numbering five, are blue, spotted with dark-brown. Nearly allied species of L. are the mealy Redpole (*L.* or *F. canescens*), and the lesser or common Redpole (*L.* or *F. linaria*). The Mountain L. or Twite (*L.* or *F. montium*) inhabits N. Europe, and prefers hilly situations.



Linnet—Fringilla.

Lino'leum, the name given to a variety of Kamptulicon (q. v.), from the fact of linseed oil forming one of its main ingredients. It is strengthened by a backing of canvas, and as a floor covering it has the repute of being durable, warm, and elastic.

Lin'seed, the seed of the flax plant, *Linum usitatissimum*, possesses several important economic applications. It is the source of L. oil, the most important oil in use for mixing painter's colours, preparing varnishes, and similar purposes. The oil is chiefly obtained by crushing and expression without the use of heat, and the yield varies from 17 to 20 per cent. of the weight of the L. operated on. The solid residue of the oil-extracting operation constitutes **L.-cake**, the most valuable of all oil cakes for feeding purposes. The seeds ground to powder constitute L. meal, much used for poultices on account of its powerful emollient properties. An infusion of L. is employed in colds, and in bronchial and other inflammatory affections.

Lin'stock (Ger. *lunte*, Low. Sc. *lunt*, a 'match' or a 'smoking flame,' and *stock*, 'stick'), a pointed, forked staff, shod with iron, used to hold a lighted match in firing cannon.

Lint, a soft woolly material prepared for surgical dressing by scraping or teasing down old white linen rags. Surgery L. is now, however, chiefly prepared by machinery from a soft linen texture specially woven for the purpose. L. is the old Scotch name for Flax (q. v.).

Lin'tel (Fr. *linteau;* Sp. *lintel*, from *limentellum* or *limentum*, Low Lat. for *limen*, 'threshold'), in architecture, is the stone or wooden headpiece of a door or casement supporting the superincumbent weight.

Lin'ton, William James, a celebrated wood-engraver, was born in London, 1812, and apprenticed to G. W. Bonner. Many of his early works appeared in the *Illustrated London News*, and others in Jackson's *Wood Engraving*, the *Lake Country*, and *Deceased British Artists*, issued by the London Art Union in 1860. Modifying the method of Bewick, his work is distinguished by rich, powerful effects, gained by comparatively little labour. L. has written a *Life of Paine*, *Claribel and other Poems*, *The English Republic*, &c., and contributed to the *Westminster Review*, *Examiner*, *Spectator*, &c., mainly on social topics. Since 1867 he has lived in the United States, and now, at New Haven, Connecticut, conducts a large engraving business.—**Eliza Lynn L.**, wife of the preceding, born at Keswick in 1822, is the authoress of many novels, of which the latest and best are *Christian and Communist* (1872), *Patricia Kemball* (1874), and *The World Well Lost* (1877).

Linz (Lat. *Lentia*), a town of Austria, capital of the crownland of Upper Austria, on the right bank of the Danube, 813 feet above the sea, 97 miles W. of Vienna by rail. It is fortified by thirty-two 'Maximilian towers' (erected 1830–36), each 105 feet in diameter and 40 feet high. The citadel, Pöstlingberg, is 908 feet high. On the Danube is the 'Hauptplatz,' 777 feet long, and across the river, to Urfahr, stretches (875 feet) an iron bridge with granite buttresses. L. has five monasteries and thirteen churches. It has extensive river traffic, and trade in hardware, linen, cloth, thread, salt, and leather; shipbuilding, tanning, and the manufacture of linens and woollens are the chief industries. The women wear peculiar yellow caps, and are famed for their beauty. By a treaty concluded here, December 13, 1645, religious liberty was granted to Hungary by the Emperor Ferdinand I. Pop. (1575) 33,384.

Li'on (*Leo*), a well-known carnivorous quadruped, the typical representative of the family *Felidæ*, to which the tigers, leopards, &c., also belong. The teeth are thirty in number, and include six incisors, two canines, and two molars in each jaw; six premolars existing in the upper, and four in the lower jaw. The fore feet have five, and the hinder feet four toes, each toe being provided with a retractile claw. In the L. a mane is developed on the head and neck of the male animals, and the tail is tufted. The entire organisation of the animal betokens the possession of immense strength. The skeleton is massive yet compact, and the bony ridges to which the muscles are attached are large and of peculiar prominence. The teeth are large, and the muscular arrangements of the jaws show a distinct fitness for their func-



Lion.

tion of crushing the bones and carcases of prey. The structure of the tongue adapts it in the most perfect manner as an instrument to rapidly tear the flesh from the bones. The upper surface of the tongue is set with papillæ or small prominences of recurved form, and of horny nature. The average length of a full-grown male L. is about 10 feet; the height at the shoulder 4 feet. There is a remarkable difference between the sexes; the lioness being quite destitute of the remarkable mane of the male. This mane is not developed until the third year. The colour of the L. is a tawny yellow, darkest above. The ears are black, and the tuft at the extremity of the tail is also blackish. It is an extremely difficult matter to determine whether or not more than one distinct species of L. exists. Good authorities incline to the belief that several distinct species are to be found; other observers maintaining that the differences between the L. of one part of the earth's surface and another depend on climate and other conditions, and that those variations are not of sufficient value to form a basis for the specific distinction of existing lions. Thus the S. African L. has by some naturalists been named the *Leo Barbarus*, another form has been designated the Gambian L. (*Leo Gambianus*), and a third species, which certainly appears to exhibit very marked differences from other lions, is the so-called maneless L. of Guzerat; this animal—the *Leo Goojrattensis* of naturalists—possessing a shorter mane than the ordinary Indian or African L. With regard to the reputed courage and nobility of character of the 'King of Beasts,' travellers appear to agree in attributing to the L. a very small amount of courage when brought face to face with man. He will pursue his prey, however, with skill, and exhibit great powers of endurance; and will prowl about in a very stealthy manner in search of unwary animals. The L. frequently fells its prey by a blow from the paw, and springs upon the flank or shoulders in another mode of attack—the tiger appearing to prefer the neck of its prey. The young of the L. may number three or four, and it is noteworthy that the fur of the cubs is at first marked or brindled with black stripes, somewhat after the fashion of the markings seen in the tiger. The L. has been bred with the tiger—the hybrid progeny uniting the characters of the parents. *Fossil lions* occur in Pliocene and post-Pliocene strata. The fossil remains of the great cave L. (*Felis spelæa*) occur in British cave-deposits of an age subsequent to the Glacial Epoch.

Lion, in Heraldry, ranks as the king of beasts, and symbolises courage and command. He is borne on most of the royal shields of Europe, in various attitudes—Rampant (q. v.), Passant (q. v.), Gardant (q. v.), Couchant (q. v.), &c.—and of various colours, as the gold L. of England and the red of Scotland. More than three lions borne together are termed *lioncels*, and are invariably rampant. The L. *queue fourchée* ('double-tailed') of Hessen-Darmstadt and Bohemia, and that of Venice, winged, sitting, and bearing a book in his fore paws—the emblem of St. Mark—are instances of the fabulous treatment of this animal.

Lip'ari Islands, a group of seven islands and ten islets, near the N. coast of Sicily, included in the province of Messina. The largest are Lipari, Vulcano, Salina, Panaria, Stromboli (q. v.), and Felicudi. Total pop. 20,000. All are of volcanic origin, and Vulcano and Stromboli are still active. Lipari has an area of 10½ sq. miles, and a pop. of 15,000. It is hilly in the interior, rising in Monte di Guardia to a height of 1214 feet, but the plains and valleys are singularly fertile. Warm springs abound, the climate is delightful, good water is scarce, and the rain is collected on the flat roofs. The products, which are largely exported, are pumice-stone, sulphur, currants, Malmsey wine, and excellent figs. Lipari, the chief town, lies on a rocky eminence on the E. coast. It is a bishop's see (since 1400), and has a cathedral and three other churches. The harbour is good, and there is a lively export trade. Pop. (1874) 12,020. The Lipari group, variously known to the ancients as the *Æolidæ*, *Vulcaniæ*, *Hephæstiades*, and *Strophades*, was associated with Homeric and other traditions.

Lipesk', a town of Russia, in the government of Tambov, on the Voronetz, a branch of the Don, 200 miles S.S.E. of Moscow by rail. It has woollen industries, but derives its importance from its fine chalybeate springs. There is a beautiful park, many handsome bath-houses, a statue of Peter the Great, &c. Pop. (1870) 14,213.

Lip'ogram (Gr. *leipō*, 'I omit,' and *gramma*, 'a letter'), a species of writing distinguished by the omission of one or more letters of the alphabet. Such were the verses of Lasus, a Greek poet (born 538, B.C.); the Odyssey of Tryphiodorus, an Alexandrian Greek (*circa* 500 B.C.), which contained no *a* in the first book, no *b* in the second, and so on; and five novels of Lope de Vega (q. v.), each of which excluded one of the five vowels. L. is still occasionally employed in cryptography to increase the difficulty of cipher-solutions.

Lipp'e, usually called **Lippe-Detmold**, a principality in N.W. Germany, bounded W. by Westphalia, and E. by Hanover, Brunswick, Hessen, and Waldeck. Area 438 sq. miles; pop. (1875) 112,442. L. is mountainous, especially in the S., where are the Teutoburger-Wald and the Weser hills, of which Köterberg reaches 1596 feet. The Weser touches the N. boundary, and receives from L. several streams, the largest being the Werre. Thirty per cent. of the surface is covered with oaks and beeches. The main occupations are growing corn, flax, and hemp, rearing horses and cattle, and preparing salt, which is abundant in L. The people are well educated, and nearly all of the Reformed and Lutheran churches. The chief towns are Detmold (q. v.), Blomberg, and Horn. The House of L. had lands in Westphalia even in the 12th c. Bernhard VIII. (died 1663) was the first Graf. In 1613 the line split into three, L. (Detmold), Brake (extinct in 1709), and Bückeburg, or Schaumburg. L. was made a principality in 1720, entered the Rheinbund (1807), and the German Bund (1815), received a new constitution in 1836, which was much changed in 1848, but restored as before in 1853. On the 1st October 1867 L. formed a 'Militärkonvention' with Prussia.—**Schaumburg L.**, a principality N. of the above, is also hilly. Area 171 sq. miles (one fifth forest); pop. (1875) 33,133. Tillage and cattle-rearing, yarn-spinning, and linen-weaving, are the principal industries. The chief towns are Bückeburg and Stadthagen. By the constitution of 17th November 1868, the government of S. L. is representative. See Falkmann, *Beiträge zur Geschichte des Fürstenthums L.* (vols. i.–iii. 1847–69).

Lipp'i, Fra Filippo, an Italian painter, born at Florence about 1400, was educated at a Carmelite convent, the prior of which, observing his taste for art, permitted him to spend much time in the chapel, whose walls Masaccio was adorning with paintings. Enamoured of an artist's life, L. gave up the Church, and repaired to Ancona with the purpose of studying drawing; but while cruising about there one day with some gay companions in a skiff, he was seized by a Moorish vessel and carried off to Barbary, where he spent eighteen months in slavery. On returning to Italy he was employed in decorating many churches with frescoes and altar-pieces, and likewise contributed to the galleries of one or two of the Medici. Struck with the beauty of a nun of Santa Margherita's convent at Prato, named Lucrezia Buti, he offered to paint her portrait, and on gaining access to her, carried her off. He died (of poison) at Spoleto, 8th October 1469. Of his works, the best known are the 'Death of San Bernardo,' 'The Life of Stephen' ('The Disputation,' 'The Stoning,' 'The Death'), and 'The Annunciation.' His subjects are conventional, but vigorously treated.—His son, **Filippino L.**, broke loose from ecclesiastic trammels, and embellished his pictures freely with pagan accessories, making a special study of Roman antiquities. In his 'Peter Condemned to Death,' we are supposed to have his own portrait. On the commission of Lorenzo de' Medici he painted a chapel of Cardinal Caraffe, with a series of pictures illustrating 'Events in the Life of Thomas Aquinas.' His works are very numerous. F. died at Florence, 13th April 1505. See Vasari's *Lives of Painters*, and Lanzi's *History of Painting*.

Lipp'stadt ('Lippe town'), a town of Prussia, in the province of Westphalia, on the Lippe, 37 miles E. by N. of Dortmund by rail, has a large corn trade, and manufactures of machinery, beer, and brandy. Pop. (1875) 8160.

Liqueurs' are sweetened and aromatised alcoholic beverages. They are prepared in a variety of ways, and into some numerous aromatic and fruity constituents enter, and they vary widely in alcoholic strength. The L. which enter chiefly into British commerce are Chartreuse, Curaçoa, Copenhagen cherry brandy, Maraschino, Ratafia de cerises, Kümmel, and Noyau, which with others will be found noticed under their own heading.

The French, who excel in the compounding of L. divide them into numerous classes under the names *Ratafias, huiles, crêmes, baumes, eaux, extraits*, &c. L. may properly be regarded also as including gin and other sweetened spirits, cordials, and the various beverages which pass into use under the name of British wines. Bitters and unsweetened aromatised spirits, such as Absinthe, do not belong to the class of L.

Liq'uid is a fluid which tends to preserve a definite volume. There is no liquid but has been either condensed to a solid or volatilised to a gas, and the great majority of liquids can be subjected to both operations. The phenomena attending the transformation of a solid into a L., or of a L. into a gas under the action of *heat* have already been considered under that heading. Here it is unnecessary to consider the other important properties of liquids, which will be found discussed under CAPILLARITY, ELASTICITY, HYDRODYNAMICS, &c., while the peculiar properties of particular liquids, such as water, mercury, oils, ethers, &c., are to be found under their special headings.

Liquidam'bar, a genus of monœcious trees, now placed in the natural order *Hamamelidaceæ* or witch-hazel family. *L. altingia*, a lofty tree occurring in the mountains of India, &c., yields the fragrant balsam known as liquid storax. *L. Orientalis*, a native of Asia Minor, also yields the same balsam, which is vanilla-scented, containing much cumarin, and thus used for imparting scent to some sorts of tobacco and cigars, and for keeping moths from woollen clothing. *L. styraciflua*, or the sweet gum-tree, grows in morasses and like places in N. America. The crown of the tree attains vast dimensions; the stem is some 10 feet in diameter; the wood fine-grained; its terebinthine juice hardens on exposure to a resin of benzoin odour.

Liquidation by Arrange'ment. In England, a debtor unable to pay his debts may summon a general meeting of his creditors under the Bankruptcy Act of 1869, and the meeting may, by a special resolution as defined by the Act, declare that the affairs of the debtor are to be liquidated by arrangement, and not in bankruptcy; and that meeting, or a subsequent meeting, held at an interval of not more than a week, may appoint a trustee, with or without a committee of inspectors. The Act regulates procedure under L. by A.

Liq'uorice (*Glycyrrhiza*), a genus of herbaceous perennials, belonging to *Leguminosæ;* the popular name through the Latin, and the scientific one in the Greek, alike signifying 'sweet root.' The species from which the principal supply of L. of commerce is derived is *G. glabra*, a native of the S. of Europe, but now grown in various countries; in England, for instance, it has been cultivated for more than 300 years. The root—which supplies the extract—at a proper age for use is long, round, succulent, tough, and flexible, of a greyish-brown externally, yellow internally, odourless, with a sweet mucilaginous and slightly acid taste. For the manufacture it is sliced, and lightly boiled in water, the liquor after a time being strained, and allowed to evaporate until a residue is obtained of the proper consistence. That prepared in Spain and Italy is often formed into rolls of five or six inches in length, an inch or so in breadth, and is exported packed in bay leaves; this is the ordinary Spanish L. of the shops. Another species of *Glycyrrhiza*, named *G. echinata*, of more eastern range than the above, is employed in like manner in Italy and Russia; it yields a product rather less sweet. Refined L. is the common kind dissolved in water and again evaporated. The principal use to which L. is applied is by brewers to give 'a body' to porter.

Medicinal Properties of L.—L. is an excellent demulcent, and is used in catarrhal affections, and in irritation of the mucous membrane of the bowels and urinary passages. It is also used as an adjuvant to bitter decoctions, or irritating vegetable substances.

Li'ra (Lat. *libra*, 'a pound'), or **Lira Nuova**, an Italian silver coin of 100 centesimi, which, from being the unit of the N. Italian states, was extended in 1860 to all Italy. The L. is equal to the French Franc (q. v.).

Lir'ia, a town of Spain, province of Valencia, 15 miles N.W. of the town of Valencia, has considerable trade. Pop. (1870) 8500.

Lirioden'dron. See TULIP TREE.

Lis'bon, the capital of Portugal, and one of the most beautiful harbours in the world, in the province of Estremadura, on the N. shore of the Rada de Lisboa, the estuary of the Tagus, 4 miles broad, and 18 miles from the Atlantic. It lies on the slope of seven hills, which are grandly crowned by white cupolas and palatial buildings, while in the background rise the blue peaks of Cintra. The magnificent bay, which is 19 miles long and 6 broad, narrows opposite L. to a channel of 1½ miles. The entrance to the harbour is defended by several forts. L. is divided into four quarters, Alhama, the oldest and meanest, Rocio, Bairroalto, and Alcantara, besides several large suburbs. Alhama was spared by the great earthquake of 1755, but the other parts, which are more regular and elegant, have been built since; Rocio, stretching along the shore, is adorned with many fine buildings and squares. The principal squares are the Praço do Commercio, 565 by 520 feet, open to the Tagus and enclosed on three sides by the royal library, the exchange, custom-house, &c., and the Praço do Rocio or market-place, 1800 by 1400 feet, containing the immense statue of Don Pedro, and bordered by the monastery of St. Dominico, the old Inquisition buildings, &c. Further N. stretches the great public promenade; the business centre and one of the most beautiful streets is the Rua Augusta. L. has 64 churches, 200 chapels, and a large number of monasteries, now used for public purposes. The most notable buildings are the monastery (now a foundling hospital) of Belem (founded 1499), a structure of many styles in yellowish limestone, adorned with florid sculpture, and Pallisander-wood carving; the monastery of the Heart of Jesus (1770), with a splendid white marble cupola; the church of the Patriarchs, surmounted by a gigantic dome; the marble church of St. Roque; the basilica of St. Maria; the Gothic church of Carmo; that of Vincent de Flora (the largest in L.), containing the tombs of the Braganza dynasty; the palaces of Ajuda, of Nossa Senhora das Necessidades and Bemposta; the national theatre, formerly the palace of the Inquisition; the theatre of St. Carlos, the arsenal, custom-house, and museum of natural history, &c. L. receives its water through the Alcantara aqueduct, a splendid structure 18 miles long, and traversing the valley of Alcantara with thirty-five arches, of which the largest is 230 feet high and 107 in diameter. The Gallegos (*Galicians*) labourers and carriers of water from the numerous fountains, form a distinct corporation to the number of 30,000. The principal industries are in gold and silver wares, spinning and weaving, iron-founding, and the manufacture of chemicals, steel, soap, and paper. But the commerce is of greater importance. In 1875 the imports amounted in value to £2,880,295, and the exports to £1,839,507. There entered the port in 1876, 960 British vessels of 713,943 tons, and cleared 954 of 709,189 tons. Pop., including the suburbs of Belem and d'Olivaes, 224,063. L. is supposed to have been founded by the Phœnicians. By the Lusitanians it was called *Olisippo;* by the Romans, *Felicitas Julia*. On the fall of the Roman power the native name reappeared, and survives in the mod. Portuguese *Lisboa*. L. was seized by the Moors in 712, from whom it was recovered by Alfonso I. of Portugal in 1147. An archbishopric was founded here in 1390, and L. became the Portuguese capital in 1506. It has suffered much from earthquakes, that of 1st November 1755 destroying the greater part of the city and some 50,000 lives. (See EARTHQUAKE.) During the Peninsular War, the French held L. from 30th November 1807 till the battle of Vimeira, in which Sir Arthur Wellesley was victorious, 21st August 1808.

Lis'burn (formerly *Lisnegarrah*, 'gamesters' mount': the modern name is said to commemorate a conflagration which nearly destroyed the place), a town of Ireland, in the county of Antrim, on the Lagan, 9 miles S.S.W. of Belfast by rail. Its parish church is the cathedral for Down and Connor, and contains the tomb of Jeremy Taylor. It has also a market-house, linen hall, county infirmary, and manufactures of muslin, damask, diaper, and other fine linens. There is a weekly market and two yearly fairs. L. sends one member to Parliament. Pop. (1871) 9319. The town first owed its prosperity to a settlement of French Protestants.

Lis'ieux (the *Noviomagos* of Ptolemy, Lat. *Civitas Lexoviorum*), a town of France, department of Calvados, on the Touque, 28 miles E.S.E. of Caen, has a cathedral dating from the 6th c., a 17th c. bishop's palace, now used as the prison and courthouse, manufactures of linen (employing 10,000 hands; yearly

value, 13,000,000 francs), and of draperies (8000 hands; value, 20,000,000 francs), and some cotton-mills and tanneries. Pop. (1872) 12,152.

Liskeard' (Celt. 'the enclosure on the height'), a market-town of England, in the county of Cornwall, 16 miles W.N.W. of Plymouth by rail, has a fine 15th c. church (restored in 1862), a new town-hall (1859), a Roman Catholic chapel (1863), &c. Tanning and the manufacture of serge are the chief industries, and in the neighbourhood are rich tin, copper, and lead mines. L. returns one member to Parliament. Pop. (1871) 6499. Two miles S. of L. is the Well of St. Keyne, immortalised by Southey.

Lisle, Claude Christophe Rouget de, a French poet who by a single song, the *Marseillaise*, has won immortality. Born 10th May 1760, L. was an officer of artillery at the time of the Revolution. The song—both words and music—was composed at Strassburg in a single night, about the beginning of 1792. The author called it *Chant de Guerre de l'Armée du Rhin*. Everywhere it soon sent a fiery rapture through the volunteers of the Republic. When Barbaroux (q. v.) the Girondist leader, and deputy for Marseille, first introduced it to the Parisians, they being ignorant of its real authorship called it *Hymne des Marseillais*, by which name it has ever since been known. L. died near Paris, 26th June 1836. The *Hymne* is now the 'National Anthem' of France.

Lis'more (Gael. 'great fort' or 'enclosure'), an island of Argyleshire, in Loch Linnhe, 5½ miles N.W. of Oban, has an extreme length of 11, and an average breadth of 1½ miles. It is of great fertility, and possesses several interesting relics of antiquity. Auchindown Castle, the former residence of the Bishops of Argyle (*Episcopi Lismorienses*); Castle Rachal, an old Scandinavian fort; and a cathedral, the dean of which, James Macgregor, who flourished in the period immediately preceding the Reformation, was author of the *Dean of Lismore's Book*. See GAELIC.

Liss'a, a town of Prussia, province of Posen, 138 miles E.S.E. of Berlin by rail, manufactures woollens, linens, wax, and tobacco, and has a celebrated bell-foundry. L. was the chief seat of the Bohemian Brethren in the 16th c. Pop. (1875) 10,085, of whom 4000 are Jews.—**L.,** an island in the Adriatic, 30 miles S.W. of Spalato, belonging to Dalmatia. The fortifications of its two harbours rival those of Malta. It is specially strong on the E. side, near the small town of L. Area, 19 sq. miles; pop. 6800. The Austrians gained a great naval victory here over the Italians, 20th July 1866.

Lis'ton, John, an English actor, born in London in 1776. Originally a master in Archbishop Tennison's school, Leicester Square, he was expelled for acting with the boys. He then took to the stage, and displayed the happiest comic talent. In 1806 he obtained an engagement at the Haymarket Theatre. *Mawworm*, *Tony Lumpkin*, and *Bombastes Furioso* were among his best impersonations, but the greatest of all was his *Paul Pry*, first performed in 1825, the memory of which is evergreen. He retired in 1837, and died March 22, 1846. His wife (*née* Tyres) was a popular singer and actress.

Liston, Robert, a celebrated surgeon, was born at Ecclesmachan, West Lothian, Scotland, October 28, 1794. He studied medicine at Edinburgh, where he settled in 1817 as a surgeon and lecturer on anatomy. His skill as an operator soon secured him a wide reputation, and in 1835 he was offered the chair of Clinical Surgery in University College, London, which he accepted. He acquired an extensive London practice, was elected a member of the Council of the College of Surgeons in 1840, and appointed one of the Board of Examiners in 1846. He died suddenly, December 7, 1847. L.'s principal works are *Elements of Surgery* (1831) and *Practical Surgery* (1837), both of which have gone through several editions.

Liszt, Franz, the greatest living pianist, was born October 22, 1811, at Räding, near Pesth, in Hungary. He began to learn the piano at the age of six, his career being guided from the first by his father. His first performance was at Oedenburg in 1820, when he played Ries's concerto in Eb. Two noblemen at Presburg having guaranteed him an income for six years, he took lessons at Vienna, from Czerny on the piano, and from Salieri in composition (1821). In 1823 he reached Paris, after giving many concerts, and was for long the delight of the French public. He visited London in the spring of 1824 and 1825. About 1827 he abandoned music for a time, influenced partly by disappointment in love, partly by religious and political enthusiasm; but in 1831 he returned to his profession, and in 1835 was welcomed again in Paris. He spent 1837–39 in Italy, went next through Germany to London, and visited Russia in 1843, where he had an ardent and appreciative reception. After making tours to Spain and Constantinople, and conducting the Beethoven festival at Bonn (August 1845), he settled at Weimar as musical director to the Grand Duke. He left Weimar in 1861 for Athens and Rome, and in April 1865 took orders in the Roman Catholic Church as an 'Abbé.' In 1871 he went from Rome to Hungary, and in April 1875 became Director of the Hungarian Academy of Music. L.'s chief compositions are his *Symphonisch. Dichtungen für Orchester* (fourteen in number), and the oratorios *Die Heilige Elisabeth* and *Christus*. Among his writings are *Friedr. Chopin* (Eng. trans. Boston, 1872), *Rob. Franz* (Leip. 1872), and *Wagner's Lohengrin and Tannhäuser* (Leip. 1851).

Lit'any (Gr. *litaneia*, 'entreating,' used first of all kinds of public prayers; Lat. *supplicationes, rogationes*), was originally a series of intercessions to be used in the Eucharistic service, a special feature of it being the pleading of the work of Christ in behalf of his Church. This explains its customary use on Sundays, which is a carrying out of the command in 1 Tim. ii. 1. The earliest use of litanies in the West was in Gaul, where it was a special custom to invoke God's mercy by processional supplications; and after the 5th c. the use of them became the distinguishing ceremony of Rogation Days (q. v.). Gregory the Great instituted a new L. for St. Mark's day (590), to be chanted by the clergy and laity going in procession in seven classes:—the clergy, laity, monks, virgins, married women, widows, the poor and children. The litanies of the Church have been divided into three classes:—(1) the Roman or Western L.; (2) the Greek; and (3) the Ambrosian or Moz-Arabic, of which the second is regarded as the standard. 'The L. of the Church of England is not an exact transcript of any ancient form, though composed of materials of very ancient date. It differs essentially from the Romish litanies by containing no invocations to angels and departed saints.'

Litch'i, an excellent fruit, the produce of *Nephelium litchi*, an evergreen tree, native of S. China, Cochin-China, and Philippine Isles, but now commonly grown in India, Ceylon, and Mauritius, and belonging to natural order *Sapindaceæ*. The fruit is eaten in either a fresh or dried state, and is occasionally imported into Britain. An allied species (*N. longan*), also a native of China, yields an edible fruit called longan; it has a sweet subacid flavour, but is smaller than the L.

Litharge'. See LEAD.

Lith'ia. See LITHIUM.

Lith'ic A'cid Diath'esis is the term used to designate the condition in which there is an excess of lithic acid either free, or in combination, or both, in the system. The urine of persons who have the L. A. D. is bright, of a dark golden or coppery colour, like brown sherry, is more acid than the urine of health, contains an unusual amount of urea, has a high specific gravity, feels pungent in the urethra in passing, and is generally scanty. The lithic acid, which is not often deposited before the urine is voided, appears as fine sand, a coarse roundish grain, but consists of separate crystals, or minute concretions of crystals, which do *not* disappear when the urine is warmed, and which do *not* render the urine turbid when it is shaken, as the lithates of ammonia, lime, magnesia, or soda do. The lithic acid crystals are readily discriminated by means of the microscope. The L. A. D. is accompanied by a tendency to feverish and inflammatory complaints, gout or rheumatism, transient and twinging pains in the limbs, and when a paroxysm of nephritic pain occurs it is generally caused by a concretion of lithic acid. Those of the L. A. D. are generally indolent, luxurious, or intemperate in their habits. Adults are peculiarly liable to it after the age of forty, but children up to puberty are liable also, and such deposits indicate a tendency to gravel disease. There is no possibility of cure but by removing the exciting causes, and the lengthened continuance of general hygienic treatment. See *The Urine and its Derangements*, by Dr. Harley (Lond. 1872).

Lith'ium (symbol, L; atomic weight, 7), a comparatively rare metal, found in the minerals lepidolite, petalite, and spodumene. It is silvery white in colour, tarnishes rapidly in the air, and is readily drawn into a wire on account of its softness. It is the lightest known solid, melts at 180° C., and burns at a high temperature, with an intense white flame. Like potassium and sodium, it oxidises rapidly when floated in water; but does not melt or take fire. The principal compounds are the oxide *Lithia* (L_2O, or LHO), which is a powerful base, forming salts similar to those of the other alkali metals, and the *chloride* (LCl), which when fused may be decomposed by electrolysis, the metal appearing at the one pole.

Medicinal Properties of Lithia.—The carbonate and citrate of lithia are the only preparations used therapeutically, and both act as powerful diuretics. When urate of soda is liable to be deposited in the tissues, resulting in gouty inflammation, the salts of lithia are the most useful in eliminating excess of uric acid, for the urate of lithia is very soluble. The *carbonate* of lithia, a white powder consisting of minute crystalline grains, may be given in doses of from 3 to 6 grains, in 3 or 4 oz. of ærated water. The *citrate* of lithia, a white, deliquescent, amorphous powder, may be given in doses of from 5 to 10 grains, largely diluted. *Liquor lithia effervescens* contains of *carbonate* of lithia 5 grains to the 10 oz., and may be given in doses of from 5 to 10 oz.

Lithog'raphy (Gr. *lithos*, 'a stone', and *graphē*, 'writing'), the art of printing from stone a design drawn upon it or transferred to it, was invented by Aloys Senefelder, a Munich musician, towards the close of last century. The stones used in L. consist of limestone of a close even grain, susceptible of a high polish. Those obtained at Solenhofen, near Pappenheim in Bavaria, are most esteemed; inferior qualities are found in England, France, America, and elsewhere. The stones are ground and polished according to the style of work to be executed; for chalk drawings a grained surface is required, while for works in ink, a smooth polished face is communicated to the stone with fine pumice stone and water. L. depends upon the property of limestone to absorb grease and to imbibe water, upon the affinity of the former for like compounds, and upon the mutual repulsion existing between grease and water. If a grease mark be made upon a clean lithographic stone and the rest of the stone be wetted, a roller charged with printing-ink passed over the stone will only deposit ink upon the grease, and its form may then be obtained on paper by pressure. Crayons or ink are employed for tracing the design on the stone. The crayons are composed of fine wax, tallow, soap, shellac, and a small quantity of lampblack, and in addition to these ingredients, mastic and Venice turpentine enter into the ink, which is solid, and, for use, is rubbed down in water, a fine lithographic pen or hair-pencil being employed in sketching with it. Instead of drawing directly on the stone, designs are frequently executed with ink more viscid than the foregoing, on paper specially prepared with isinglass, starch, and gamboge. The stone with the paper laid on it is passed through the press, the paper is damped and removed, and the paste still adhering to the stone is washed off, leaving the ink. The first operation after drawing and transferring, is that of 'etching' with a weak solution of nitric acid in gum water. The acid fixes and sharpens the drawing, and slightly lowers the surface of the stone unprotected by grease. The stone is next washed with water, and afterwards rubbed over with turpentine, which removes the lampblack of the crayon or ink. The stone is now ready to be printed from. The surface is damped with a wet sponge, and on the application of a roller charged with printing-ink, the drawing re-appears. Paper is then laid on the stone, and an impression is obtained by the friction of a fixed scraper or roller having a backward and forward movement. Before the ink is applied for each impression the stone is always wetted, and when the printing is stopped for a time, the ink is washed off with turpentine and the acid and gum solution applied. Fresh impressions of steel engravings, woodcuts, &c., in transfer ink, may be readily transferred to and printed from stone.

Litholint is a process of preparing a drawing on stone by a series of washes of lithographic ink applied with a brush; it is now rarely practised on account of uncertainty in printing.

Engraving on Stone in the production of maps, plans, &c., is performed by scratching lines with steel points of varying degrees of thickness through a ground of gum and lampblack to the clean face of the stone beneath. Oil or printing-ink is then applied to the incised design, which, after the black ground is washed off, is fixed as already described.

Chromolithography (Gr. *chroma*, 'colour'), or printing in colours from stones, is a branch of L. that of late years has expanded very much. It is devoted to the reproduction of water-colour and oil paintings. As many stones are required as there are colours in the picture. Each stone receives an impression of the subject in outline, and the particular part that is to be printed is then skilfully prepared with crayons and tint-ink. Regard is paid to the proper gradations of tone and the effect of the superposition of colour, so that the combined impressions from the stones, taken in proper order, may produce a faithful and harmonious picture. Gold and silver effects in L. are obtained by dusting the metallic powders on varnish, and burnishing them when dry.

Lithol'ogy (Gr. *lithos*, 'a stone') is a subordinate section of geology, dealing with the structure and constitution of rocks, without regard to their positions.

Lith'omarge is a compact clay, consisting of a hydrated silicate of alumina. It has a fine smooth texture, is very sectile, and is variously coloured white, gray, blue, yellow, and red. It occurs generally associated with magnesian minerals.

Lith'ophane (Gr. *lithos*, 'a stone,' and *phainō*, 'I show, or I give light'), a trade name for a thin translucent porcelain plaque with an impression of a picture, sunk into it while soft by means of plaster of Paris blocks engraved in relief. L. pictures are produced largely in Germany, and are employed to decorate lanterns and windows.

Lithot'omy (Gr. *lithos*, 'a stone,' and *tomē*, 'cutting'), the technical name for the surgical operation of *cutting* for *stone* in the bladder. Unmistakeable evidence of the existence of stone in the bladder can be obtained only by sounding, or exploring the bladder by means of a metallic instrument. L. was practised by the Greek and Roman surgeons, and the earliest mode is known as *Celsus' method*, or *cutting on the gripe*. By this method, the stone, after being fixed by the pressure of the fingers in the anus, was cut upon directly and extracted, a knife and hook being the only instruments used. At a later period Marianus attempted to improve upon this method by making as small an incision as possible, and dilating the aperture, but the dilatation was due to laceration, and was more fatal than the ancient method. In 1697 Frère Jaques, a priest, introduced the lateral method, which is essentially the method now in use, he having learned it from a provincial surgeon named Pierre France. The operation, as now generally practised in this country, is essentially that introduced by Cheselden, and modified more or less according to the peculiar views of particular surgeons, as regards the direction and extent of the incision, and the instruments employed. By this mode of operating, a free opening, large enough to admit of the extraction of the stone, is made into the bladder, without laceration of the parts or injury to the rectum. An instrument, curved or rectangular, with a groove upon it, is passed into the bladder. If the staff used be curved, an incision about an inch and three-quarters in front of the anus is made, deep enough for the operator, on the introduction of the forefinger of the left hand, to feel the groove on the staff. The knife is then passed along the groove, dividing the membranous portion of the urethra and the edge of the prostate. Through this opening the left index finger is passed along the line of incision till it reaches the calculus, and the opening in the prostate may be dilated if necessary. A pair of forceps is then slid along the index finger into the bladder, and the finger withdrawn, when a gush of urine will usually take place, carrying the stone within the blades of the forceps; but, if not, the stone must be searched for, grasped in the forceps, and extracted. By the rectangular method, introduced by Professor A. Buchanan of Glasgow, the preliminary incision is unnecessary, the groove at the angle of the staff being cut upon directly. The danger of operation is principally due to unavoidable constitutional complications, or to previously existing morbid processes in connection with the formation of the calculus, or to disease processes excited by the action of the calculus on the structure of the bladder and adjacent parts.

Lithot'rity (Gr. *lithos*, 'a stone,' and *tribō*, 'I grind') is the operation of breaking up the calculus into small fragments that

they may be expelled through the urethra. Between 1817 and 1820, Civiale, followed by Amussat, Leroy, and others, began constructing instruments for crushing the calculus in the bladder. By the labours of Civiale and Amussat in France, and of Brodie, Liston, and Thompson in Britain, the system has been brought to a high state of perfection. The *lithotrite* may be briefly described as a curved forceps, small enough to be passed through the urethra, and strong enough to crush the stone. It consists of two blades, worked by a rack and pinion, or by a screw. The operation may be performed at one or more sittings, and after each the bladder is washed out by injecting tepid water through a double-current catheter. See Sir Henry Thompson's *Practical Lithotomy and L.*, and *Clinical Lectures on Diseases of the Urinary Organs* (Lond. 1876).

Lithua'nia, a former grand-duchy of Poland, comprising the territory now occupied by the Russian governments of Vitebsk, Vilno, Mohilev, Grodno, and Minsk, and the Prussian circle of Gumbinnen, had an area of upwards of 100,000 sq. miles; was watered by the Düna, Niemen, Dnieper, and Bug; and consisted of L. proper (*Litwa*), the duchy of Samogitia, and the four wojwodships of Lithuanian Russia. The earliest mention of L. occurs in the Chronicle of Quedlinburg (1009), from which and later Russian chronicles its inhabitants seem to have been a poor and barbarous people, tributary to Russia, and worshipping Perkunas, the god of thunder. Shaking off the Russian yoke in the 12th c., L. was formed into a grand-duchy by Ryngold (1235); embraced Christianity under Mindog (1252); under Ghedymin (1315) wrested from Russia Volhynia, Kief, and Tchernigov; whilst under Olgerd (1328) it threatened Moskow in 1368, 1370, and 1373. The accession of Jagello (q. v.) to the throne of Poland in 1386 united L. with that kingdom, along with which it was partitioned between Russia and Prussia in 1772, 1792, and 1793. The Lithuanians of Kovno, Vilno, Courland, and Grodno, with those of Königsberg and Gumbinnen, and with the Samogitians (Lith. *zemajtej*, 'a comer from below,' *i.e.*, the sea) of Kovno and Augustovo, make up an estimated total of 1,620,000; while the Letts, a kindred race, scattered over Courland, Western Livonia, Vitebsk, Kovno, and Pskov, are reckoned at 980,000. For the ethnology and language of the Lithuanians, see LETTIC.

Lit'mus, a purplish-blue colouring or dyeing material obtained from the lichens which yield Archil (q. v.) and Cudbear (q. v.). L. differs from these substances only in being prepared with potash or soda, and in being moulded into cakes. The blue colour of L. is instantly reddened by acids, and again restored by alkaline solutions, and owing to these properties it is in constant use by chemists and others for testing liquids, for which purpose it is now indeed principally prepared. L. paper or test paper consists of paper coated with L., and for use is prepared in books of small strips.

Li'tre, the French standard measure of capacity in the metric system. It is a cubic decimetre, and contains 61.027,052 cubic inches; 4½ litres very nearly equal 1 gallon.

Little Falls, a town of New York, U.S., on an acclivity that rises abruptly for 500 feet above the Mohawk River, 22 miles E. of Utica by rail. It is the largest cheese-market in the United States, and has woollen and cotton mills, and two public parks. Pop. (1870) 5612.

Little Rock, the capital of Arkansas, U.S., on the S. bank of the Arkansas river, 250 miles from its mouth, and 125 miles S.W. of Memphis by rail. It is named from its position on a cliff, 50 feet over the river; the Big Rock begins 2 miles up the river, and is a range rising precipitously to a height of 500 feet. The city has fifteen churches, a state capitol, an arsenal, a public library, a state library of 12,500 vols., two daily and four weekly newspapers, &c. Pop. (1870) 12,380.

Littleton, Sir Thomas, a famous English lawyer of the 15th c., was the son of a Devonshire gentleman. After receiving a good education, he entered the Inner Temple, and in 1455 was appointed king's serjeant. Edward IV. made him a Judge of Common Pleas in 1466, and in 1475 he was created a Knight of the Bath. He died August 23, 1481. The fruits of L.'s judicial experience were embodied in a work upon *Tenures*, which, with Coke's *Commentary*, long held the first place among legal text-books. A new edition was published by Roscoe in 1823.

Littori'na, a genus of *Gasteropodous* mollusca, including the Periwinkle (*L. littoralis*), and a nearly allied species (*L. rudis*), &c. The genus L. forms the type of a special family, *Littorinidæ*, in which the mouth of the shell is entire (*holostomatous*). The shell itself is spiral, of depressed shape, and the *operculum*, or plate developed on the foot, is of horny nature.

Littré, Maximilien-Paul-Émile, the greatest philologist of the French tongue, was born at Paris, February 1, 1801, studied medicine, and was received into the hospitals, but at the same time devoted himself to history and philology. In 1828, along with Royer-Collard and others, he wrote for the *Journal Hebdomadaire de Medicine*, founded (in 1837) a medical journal, *L'Expérience*, all the time, and until 1851, contributing articles to the *National* upon themes of democratic interest. From 1857 to 1859 L. applied with conspicuous success the positive method of M. Comte to the historical study of the French language, and in the latter year published his *Paroles de Philosophie Positive*. In 1862 appeared his *Histoire de la Langue Française;* in the next year was begun his *Dictionnaire* (completed 1873; with a supplement, 3d *livraison* 1877), which attained so immediate a reputation for exhaustive scholarship and precise definition of terms, that more than 40,000 copies had been sold by 1877. A new review, called *La Philosophie Positive*, was established by him in 1867. In 1871 he was appointed by M. Gambetta Professor of History and Geography in the Polytechnic School at Bordeaux, and on December 30, of the same year, was chosen member of the French Academy. The University of Leyden conferred upon him the honorary degree of Master of Philosophy and Doctor of Literature in February 1875. For exact, profound, philosophic knowledge of language, L. has in his own department no compeer among the present generation of Frenchmen.

Lit'urgy (Gr. *leitourgia*, the translation in the LXX. of the Heb. *abodah*, which denoted the service rendered in the Tabernacle and the Temple by the priests and Levites, *cf.* Numb. vii. 5, &c.; Luke i. 23; Heb. ix. 21) is the form, order, or office for the celebration of the Eucharist. The original form is of course found in the institution of the rite by Christ himself (Matt. xxvi., Mark xiv., Luke xxii.). To those familiar with the old Passover ritual the words and actions of Christ would doubtless form a new ritual, and the fact of the Church complying with the injunction of Christ to 'break bread' and 'give thanks,' implies that a certain form of L. was used. Tradition asserts that the apostles arranged a L. before they separated for their labours, but it was of a very simple kind, if what St. Gregory says be true, that they 'used the Lord's Prayer only in consecrating the Holy Oblation.' The Apostle Paul gave a definite form in his First Epistle to the Corinthians (xi.), but it is considered by some that his words 'the rest will I set in order when I come' (xi. 34), indicate that he was to give them a fuller and more perfect L. afterwards, the details of which even may be made out from his writings. As it was a recognised principle at a very early period that each bishop had authority to settle the ritual of his diocese, it is clear that the liturgical system of the Church could not have been settled at once. However, four principal forms can be traced to very early times, from which have sprung all the liturgies at present in use. These were composed for the churches of Palestine, Alexandria, Rome, and Ephesus, and bear the names of St. James, St. Mark, St. Peter, and St. John respectively. From the first has been derived, through the Syriac L. of St. James, the present L. of the Monophysites, and through those of St. Basil and St. Chrysostom the present L. of the Eastern Church. From the second is derived the present L. of the Egyptian Church. From the third is derived, through the Ambrosian L., the present L. of the diocese of Milan, and through the Sacramentaries of St. Leo, of Gelasius, and of St. Gregory, the present L. of the Church of Rome. From the fourth is derived through the L. of Lyons, the Mozarabic or Spanish L., and the L. of Britain, which was the same as that of Tours; and from the latter, through Augustine's revised L. of Britain, and the missals of Salisbury, York, &c., the present L. of the Church of England; from which again are taken the liturgies of the Scotch and American Episcopal churches. The last three differ little from each other, and are all derived from the ancient Latin L. of the Anglican rite through the 'Order of Communion' of 1547, and the Prayer-Book of 1548-52. See Blunt's *Dictionary of Doctrinal and Historical Theology*

Liturgy, Jewish. Prayer is so often referred to in the Old Testament as to show that it formed part both of the public and private religious exercises of the Jews from time immemorial. But it was at the time of the Babylonish Captivity that the frequent and regular use of prayer began to take the place in Jewish worship which it afterwards occupied. Assemblies of the captives seem to have gathered regularly 'by the rivers of Babylon,' and, besides reading of the Law, in fixed forms of prayer to have 'set their faces unto the Lord their God,' to seek that he would hear and forgive, hearken and do for his own sake (Dan. ix. 3, 19). Prayer was substituted for their morning and evening sacrifice and incense, or was practised oftener (*cf.* Dan. vi. 10). After the return these assemblies were continued in the Synagogue (q. v.). At first it was left to the conductor of each meeting to regulate the service of the synagogue, but soon a regular order was established; and at the time of Christ the L. both for the Temple and the Synagogue was as follows. 1. The Temple. First, before the offering of the sacrifice, the officiating priest called upon the people to go to prayers, which they did in a certain form. After this they recited the Ten Commandments, and then their Phylacteries (q. v., Heb. *tephillin*), or four portions of the Law (Ex. xiii. 3–10, 11–16, Deut. vi. 4–9, xi. 13–21). Afterwards, at the time of offering incense, three or four prayers more were offered. Next the priests with uplifted hands blessed the people in the words of Num. vi. 24–26. After the meat and drink-offerings were made, the singing of psalms and music began; the fixed and constant psalms for the days of the week throughout the year being Psalms xxiv., xlviii., lxxxii., xciv., lxxxi., xciii., xcii., for the first day to the seventh respectively, although additional psalms and hymns were sung on certain days (*e.g.*, the songs of Moses, Deut. xxxii., and Ex. xv. on the Sabbaths), especially the Feast-days. 2. The service of the Synagogue consisted entirely of (1) Prayers, (2) Reading of the Scriptures, and (3) Expounding and Preaching. Of the forms for the prayers the oldest were eighteen (called *Shemoneh Esreh*), said to have been appointed by Ezra and the Great Synagogue. For the Reading of the Law the five books of Moses were divided into as many portions as there are weeks in the year, one of which was read every Sabbath, and half of the same every Monday and Thursday.* See Lightfoot's *Temple Service* (Works, 1684), Bingham's *Ants. of the Christ. Church* (1710–22).

Liut'prand was born about 920 at Paris, became (932) one of the pages of the great French baron Hugh, 'Duke of the French,' father of Hugh Capet, and later on a deacon of the cathedral of his native place. In 948 he was sent upon a diplomatic mission to the Byzantine court, where he remained for two years studying Greek, and on his return to Italy he was obliged to take refuge with Otto I. At the German court he remained eleven years, and (958) began to write a contemporary history. In 962 L. became Bishop of Cremona, in 968 he was sent to Constantinople to negotiate a marriage with Theophano for the son of Otto, and (971) he returned upon the same mission. The next year he died, leaving behind him *Antapodosis*, *De Rebus Gestis Ottonis Magni Imperatoris*, and *De Legatione Constantinopolitana*, works which form one of the most important sources of information for the history of the 10th c. See Köpke, *De Vita et Scriptis Liutprandi* (Berl. 1842).

Livadia. See TROPHONIUS.

Liv'er, a large gland in the bodies of vertebrate, and of many invertebrate animals, devoted to the secretion of bile. In the lowest vertebrate—the little fish known as the *Amphioxus* or lancelet—the L. exists as a mere saccular appendage to the stomach, while in many invertebrata (*e.g.*, crab and lobster) the L. is large and of tubular structure. In the lower animals it may be represented (as in sea-anemones, sea-squirts, &c.) by cells investing the stomach. In man, the L. weighs from 3 to 4 lbs. Its transverse diameter is 10 or 12 inches; its upper surface is convex, and lies in contact with the under surface of the *diaphragm* or *midriff*. The upper surface is divided by a fold of the *peritoneum* or lining membrane of the abdomen into two lobes (right and left) of unequal size. The under surface is concave, and lies in contact with the stomach and duodenum or first portion of the intestinal canal; this latter surface being divided by a longitudinal fissure into a large right and a small left lobe. Behind, the L. is broad and of rounded conformation, and is in contact with the aorta and with the *vena cava* and the *crura* or projecting portions of the diaphragm. Anatomically regarded, the L. may be said to lie in the regions of the abdomen known as the *right hypochondriac* and *epigastric* regions; whilst it also projects into the space known as the *left hypochondriac* region. The *position* of the organ varies with the posture of the body. When at rest either in the sitting or standing posture, the L. recedes behind the ribs to a considerable extent. In a deep inspiration it descends below the ribs, whilst in expiration it ascends to its normal level. When the intestines are empty the L. lies low in the abdomen, but is pushed upwards and backwards when the intestines are distended. The L. is kept in its place by ligaments of various kinds.

The *ligamentum teres* or *round ligament* of the L., appears as the remains of the umbilical vein of the fœtus; the *longitudinal*, *broad*, or *falciform* ligament is attached by one margin to the under surface of the midriff, and arises from the gland from the notch on its anterior border, extending in its course to the hinder margin of the L. Two *lateral ligaments* exist, and the *coronary ligament* serves to attach the gland to the posterior border of the diaphragm. On looking at the under surface of the L. five lobes are seen, resulting from the separation of its substance by as many fissures. The longitudinal fissure thus divides the L. from its anterior to its posterior body; this fissure being often bridged over at its front and deeper portion by a portion of L.-substance. The fissure of the *ductus venosus*, is the name given to the hinder part of the longitudinal fissure, from the fact that the ductus venosus of early life lies therein. The *portal* or *transverse fissure* runs at right angles to the longitudinal fissure, and measures about 2 inches in length. The large *portal vein* enters the L. at this point, and other large vessels (*hepatic artery* and *hepatic duct*), and the hepatic nerves are contained within this fissure. The remaining indentations in the L.-substance are the *fissure for the gall bladder* lying on the under and anterior surface of the right lobe, and the *fissure for the vena cava*. The lobes of the L. are named the *right* and *left* lobes; the *Lobus quadratus*, *L. spigelii*, and the *L. caudatus*. The right lobe, as already remarked, is larger than the left. It lies in the right hypochondrium, and is somewhat square-shaped. The left lobe is of flatter form than the right; its hinder border infringing on the cardiac or upper extremity of the stomach. The lobus quadratus is also square-shaped, and is placed in the under surface of the right lobe; whilst the L. spigelii exists at the hinder part of the right lobe, and on the under surface of the latter.

The investigation of the *structure* of the L. shows each of its lobes to be made up of *lobules*, each measuring from $\frac{1}{15}$th to $\frac{1}{10}$th of an inch in diameter. The lobules are in turn composed of many sided or polygonal cells, which vary in size from the $\frac{1}{1000}$th to the $\frac{1}{3000}$th of an inch in diameter. Within each cell, one or two *nuclei* may be contained; while the contents consist of yellow particles, the biliary colouring matter, and oil or fat-globules. They are connected by thin surfaces, and are arranged from the centre radially or towards the circumference of the lobule. The cells are the essential parts of the L., and are the sole agents in the secretion of bile. Each lobule of the organ, in addition to the cells, possesses as integral parts of its substance, numerous *biliary ducts*, minute branches of the *portal vein*, and of the *hepatic vein*, and minute *arteries*, together with *nerves* and *lymphatic vessels*. The hepatic artery is the nutrient vessel of the organ, whilst the hepatic vein returns the venous blood from the gland. The *portal vein*, on the contrary, which ramifies through its substance, is the vessel which brings a due supply of blood to the L. for the manufacture of *bile*. The latter fluid in vertebrate animals is thus manufactured from *venous* blood; the portal vein being formed by the union of four large veins (*mesenteric* (*sup.* and *inf.*), *gastric*, and *splenic*) returning venous blood from the stomach and other digestive viscera. The *gall bladder* is a sac, attaining a length of 4 inches, and a cubic capacity of from 8 to 10 drachms. It serves as a reservoir for the bile, and lies on the under surface of the right lobe of the L. The ducts which lead from the L. are three in number. The *hepatic duct* is thus formed by the two trunks proceeding from the right and left lobe respectively. This duct

* A nineteenth prayer was added to the *Shemoneh Esreh*, a short time before the destruction of Jerusalem, it is thought against the Christians. After the Dispersion, almost every country and city had their own L.

unites with the *cystic duct* in that which proceeds from the gall bladder, the two forming by their junction the *ductus communis choledochus*, or common duct, by which the bile is conveyed into the intestine. The common duct opens into the duodenum, a little below the middle of that portion of the intestinal tube. The *work of the L.* illustrates what is meant by *secretion* and *excretion*. Bile is thus manufactured or secreted by the hepatic cells, and as in this process venous blood is utilised, the conversion of this blood into bile also illustrates excretion of a waste product of the economy. Each hepatic cell is thus a minute bile-manufactory. Its contents are discharged into the minute ramifications of the hepatic duct which exists within the lobules of the L., and as the smaller branches unite to form the larger ducts, the bile secreted from the various lobules is thus duly collected, and finally passes from the L. by the main or terminal duct already noticed. An *analysis* of human bile shows it to consist of 859·2 parts of water, and 140·8 parts of solids in 1000. The solids consist of a substance known as *bilin* (91·5), *fat* (9·2), *cholesterin* (2·6), *mucus and colouring matters* (29·8), and *salts* (7·7). The *function* of bile would appear to be chiefly that of assisting in the digestion of *fatty foods*, and it is also probable that this secretion delays the decomposition of food as it passes along the intestines, and also facilitates the *absorption* of fatty matters through a peculiar action of the intestinal mucous membrane. The L. appears to be continually engaged in secreting bile. From thirty to forty ounces are secreted daily, but the quantity is subject to great variations, and is effected, amongst other conditions, by the amount of food, and by exercise, &c.

Diseases of the L. are so numerous and complicated that nothing more can be attempted than an enumeration of some of the more definite morbid states expressed by functional disorders, lesions of texture, or of both combined. *Congestion* of the L. may be due to over-secretion causing engorgement of the bile-ducts; to passive congestion of the hepatic or portal veins, or to active congestion, involving the arterial capillaries. The most frequent causes are valvular disease of the heart, sudden chills, fevers, alcoholic intemperance, and inter-tropical heat. *Inflammation* of the L. or *Hepatitis* (q. v.) occurs in various forms, and results in several consequences. *Inflammation* of the *capsules* of the L. and of *Glisson's capsule* is marked by pain or pressure, motion or deep inspiration. *Glandular inflammation* usually results in abscesses, or induration and cirrhotic degeneration, and is frequently caused by fevers and pyæmia. The *chronic*, or *diffuse form* of *inflammation* is expressed by simple or granular induration of the substance of the liver, sometimes called *cirrhosis*, *hob-nailed*, or *gin-drinker's* L. The hepatic cells undergo fatty degeneration; the connective tissue is increased and altered in character; the vascular system undergoes great changes, and the bile-ducts are destroyed. The disease is chiefly due to the specific action of alcohol, to syphilis, and occasionally to repeated attacks of malarial fever. *Suppurative inflammation* of the L. is always limited to one or more isolated patches, and is rare in temperate climates. It is caused by contusions; metastatic or pyæmic inflammation; inflammation and ulceration in the gastro-intestinal canal, and in the stomach, gall-bladder or gall-ducts. *Increased secretion* and *elimination of bile* is chiefly caused by certain kinds of food or drink, but more especially by exposure to unusually high ranges of temperature, as in summer and autumn, and is generally associated with bilious diarrhœa. The *degenerations* of the *substance* of the L. are the *Amyloid* (q. v.), the *Fatty* (q. v.) and the *pigmentary* which can only be recognised by post-mortem examination; and the symptoms, which are obscure, are indicated by general ill-health, expressed by *marasmus*, *anæmia*, or *dropsy*, in some cases associated with diarrhœa, vomiting, and cardiac systolic murmur; and in cases where the health is impaired, by *ulceration* of *bones*, *syphilis*, *tuberculosis*, or *malarial fevers*. *Jaundice* (q. v.) comprehends a group of diseases. *Acute* or *yellow atrophy of the* L. is expressed by violent constitutional disturbance, pyrexia, delirium, hæmorrhages from various parts, and finally coma, and the L. shrinks to one-half or one-third its normal size. The chief causes are, dissolute habits, syphilis, drunkenness, miasmata, and pregnancy. Disease of the L. is also caused by the presence, development and multiplication of living organisms which have reached it through the circulation. See Murchison's *Clinical Lectures on Diseases of the L., Jaundice, and Abdominal Dropsy* (Lond. 1877).

Liver-Fluke, the *Fasciola hepatica*, or *Distoma hepaticum* of naturalists, which infests the liver of sheep, and causes in that animal the disease known as 'rot.' The L.-F. belongs to the order *Trematoda* (q. v.), a division of the class *Scolecida* (q. v.). See FLUKE.

Liv'erpool, the greatest seaport, and next to London the largest, wealthiest, and most populous town in Great Britain, is situated in Lancashire, on the right or E. bank of the Mersey, 5 miles from the Irish Sea, three-quarters of an hour by rail from Manchester, five hours from London, six from Edinburgh, and eight by steamer from Dublin. It is faced by the thriving town of Birkenhead (q. v.), and lies on five hills, sloping towards the river, which is crowded with shipping, and bordered by the grandest range of docks in the world. The estuary is here three quarters of a mile wide, and a system of steam ferry-boats keeps up a constant communication day and night between the two shores. L. now contains an unusual number of splendid buildings, but partly on account of the inequalities of its site, is rather wanting in long, broad, stately streets. In the fashionable E. end there are several fine large squares, and on the outskirts of the town are five public parks, the Prince's, the Botanic Gardens, the Sefton (opened 1872), Stanley, and Newsham, and it has been proposed to connect these by a continuous belt of boulevards. The finest street architecturally is Lime Street, in the very heart of L., on one side of which stands St. George's Hall, the principal building in the city. A combination of law courts, assembly rooms, and Walhalla, St. George's Hall (built 1836–54; cost, £329,659), is a grand Corinthian building, with an extreme length of 500 feet, and columns 40 feet high, containing a great hall 166 feet by 75, and 85 feet high from the floor to the magnificently painted and gilded ceiling. It contains one of the finest organs in the kingdom by Willis, and statues of Sir Robert Peel, Lord Derby, Mr. Gladstone, &c. In the broad space in front are equestrian statues of the Queen (1870) and Prince Consort (1866), which, together with the adjoining Wellington monument, are far above the average of British sculpture. Other notable buildings are the Western Hotel (1869–71), Lime Street, in French Renaissance style, with towers 157 feet high; the Town-hall (1749), with a fine portico and dome; the Exchange, transformed from an older one at a cost of £600,000, containing a news-room, 57 feet high and 30,000 sq. feet in area, and enclosing three sides of a square ('the Exchange Flags'), with the Town-hall on the fourth, and the Nelson monument in the centre; the municipal offices (1867) in Corinthian style, covering an area of 43,512 feet, and surmounted by a tower and spire 210 feet high; the new offices of the Gas Company, a beautiful building in the Renaissance style; the new central station of the Midland Company in Ranelagh Street. Among the many intellectual institutions are the Free Library and Museum (1857–60), presented to L. by Sir W. Brown, at a cost of £40,000, containing Mr. Mayer's collection of antiquities, valued at £100,000; a Free-Reading Room, cost £14,000, with a noble chamber, 120 feet long by 50, and 48 high, the gift of Mr. Picton; an Art Gallery, cost £25,000, the gift of Mr. A. B. Walker; the L. Library, founded in 1758, and containing (1877) 40,000 vols.; the Athenæum Library, founded by William Roscoe; the Royal Institution, founded in 1817, attached to which there is a permanent art gallery; a Medical Institution and Library, dating from 1779; a Botanical Garden, occupying eleven acres; an Observatory, since 1766; a Polytechnic Institution, established in 1838; an Architectural and Archæological Society (1848); an Historic Society of Lancashire and Cheshire, founded (1838) by Mr. Mayer; L. Academy of Fine Arts; a Naturalists' Field Club; a Chemists' Association; philomathic, law, photographic, numismatic, geological, and medical societies, &c. The Sailors' Home, comprising a library, navigation school, savings' bank, &c., is the residence of some 8000 sailors every year. There are (1877) in L. and out-townships 262 places of worship—105 belong to the Church of England, 43 to Roman Catholics, 80 to Baptists, Congregationalists, Wesleyans, Unitarians, &c., 12 to English and Scotch Presbyterians, 1 church and 17 Dissenting chapels in which the service is conducted in Welsh, 1 Catholic Apostolic and one Greek church, and 2 synagogues, one of which is among the finest structures in the town. Only a few of the modern churches can boast of any architectural beauty. The parish church of St. Nicholas, originally 'dedicated' in 1362, was rebuilt in 1774, and its tower and lantern in 1815. Of the eight cemeteries, the only one within the town

is James's. Though without any grammar-school of old foundation, L. has two schools of a high class—the secular one of the Royal Institution, with 'high' and 'commercial' divisions, and the L. College, founded in 1840 on a distinctly religious basis. The L. Institution comprises several educational departments, a large library, a fine lecture-room, and a gallery of ancient and modern sculpture. It has a high school preparatory for the universities, and a commercial school intended for the sons of tradesmen. L. is specially munificent in its charities. Of these, the chief are the Bluecoat Hospital, maintaining and educating (1877) 350 children, the Orphan Asylum, the Seamen's Orphan Asylum in Newsham Park (1874), containing about 400 boys and an equal number of girls, Schools for the Blind and the Deaf and Dumb, Industrial Schools, the Royal Infirmary (1870, in-patients 220, out-patients 3643), the Northern and Southern Hospitals (the latter opened in 1872), Lying-in, Homœopathic, Eye and Ear Institutions, and Children's Infirmary. There are six theatres, and high-class concerts are held in St. George's and the Philharmonic Halls. The lower or maritime parts are disgraced by a species of Ratcliff Highway, riotous with singing and dancing rooms. L. has six daily and seven weekly newspapers, and four literary periodicals, besides the *Daily Telegraph and Shipping Gazette* and the *Journal of Commerce*. Three railway lines run through the town to the docks in tunnels under the houses; the Lancashire and Yorkshire Railway is carried above the houses on a splendid viaduct to Tithebarn Street Station. The Midland has a handsome station; but the London and North-Western (Lime Street), when finished, will be not only the largest in L., but one of the largest in the world. The great feature, however, of L. is the docks, extending (1877) over an area of 255½ acres of water, and comprising 18¼ miles of quays. They present to the river an unbroken line of over 6 miles, terminating in the N. in the Canada, and in the S. in the Herculaneum Docks, and flanked by the Custom House, one of the finest in the kingdom, and by the tall row of the Albert Dock warehouses, erected at a cost of £358,000. There are 54 docks and basins, and all these save four have been constructed chiefly under the superintendence of Mr. Jesse Hartley, since 1812. The Canada and Herculaneum Docks are devoted exclusively to timber, the King's to tobacco, and the Queen's to cotton, dye-woods, jute, and other E. and W. Indian products; the George's is mainly used for export purposes; the Victoria, Clarence, and Trafalgar by steamers engaged in the Irish trade, while the Nelson, Salisbury, and Bramley Moore Docks are occupied by steamships trading in the W. Indies, the Pacific, Mediterranean, and to Dutch and German ports. The Corn Docks, capable of holding the largest vessels in the grain trade, are provided with a range of splendid warehouses, to hold 165,000 tons of corn, 10 stories high, with water-tight and rat-proof cellars, and elevation machinery worked by hydraulic power able to transfer from the ships 250 tons per hour. In 1875 the 'quantities' of timber imported were—of yellow pine, 2,060,000 cubic feet; of Quebec oak, 1,058,000; of birch, 431,000; of pencil cedar, 66,850; of mahogany, 7,000,000; of spruce deal and boards, 84,222 'standard' (of 165 cubic feet apiece); from the Baltic, 646,000 cubic feet of fir logs, and 391,400 of pitch pine. About four-fifths of all the traffic between N. America and Great Britain is carried on through L., which has also a large share of the Eastern and Australian trade. The greatest cotton market in the world, L. in 1873 received 1,807,584 bales of the 2,840,981 exported from the U.S.; 12,570,632 cwts. of the total 13,639,252 imported into England. L. is also the second largest wool market in the country. In 1873 the exports of British manufactures and produce amounted in value to £93,925,396. The chief items were cotton manufactures (£34,794,989); cotton yarn (£4,631,045); woollen manufactures (£11,299,679); linens (£4,648,362); iron (£11,350,312); hardware and cutlery (£2,626,994); haberdashery and millinery (£2,282,083). In 1875 (a bad year) there entered the port 13,424 vessels, of 6,252,267 tons; and cleared, 12,631, of 6,028,089 tons; the gross receipts of customs were £2,919,419. To the port belonged 1866 sailing vessels of 990,867 tons; and 563 steamers of 412,464 tons. Besides its enormous trade, L. has a vast passenger-traffic, no fewer than eight lines of steamers communicating hence with New York and other N. American ports, in addition to various lines for the Pacific, Mediterranean, India, &c. The Cunard Company alone has 49 vessels, of which 24 are employed in the Atlantic service. Other celebrated lines are the National (with 12 large steamers), the White Star (6), the Inman (12), the Guion (6), the Dominion (12), the Allan (20), and the Anchor (6). There is also an extensive local steam-packet service daily to Dublin and Belfast, twice or thrice weekly to Cork, the Isle of Man, Glasgow, &c. The great centre of the passenger traffic is the famous Landing Stage, a vast pontoon dominating the Mersey, from which tenders convey their complement to the large steamers lying out in the river, and where there is a constant bustle about the steam ferryboats. This structure had just been renewed at a cost of £250,000 when it was completely destroyed by fire, 30th July 1874; a more convenient one has since taken its place, little short of a mile in length. The industries of L. are great, unless compared with its commerce. There are extensive sugar-refineries, shipbuilding yards (29 vessels of 31,806 tons were built in 1873), iron and brass foundries, engineering works, rice, flour, and saw mills, cigar factories, and manufactures of chain-cables, anchors, cordage, chemicals, soap, glass, spirits, nautical instruments, &c. The market accommodation of L. is superior even to that of the metropolis. General markets are St. John's (183 yards by 43), St. James's, St. Thomas's, and St. Martin's; there are also a cattle-market, a fish-market, and various fancy bazaars. L. sends three members to Parliament. In politics it is strongly Conservative, and has been so for at least a century and a half with but very brief intervals. A strong Irish and alien element exists; nowhere, unless perhaps in Manchester, is Orangeism advocated more ardently. The merchant princes are, as a rule, men of old family, not only long connected with L. itself, but claiming descent from the landed families of Lancashire. Pop. in 1800, 77,708, in 1831, 205,572, in 1861, 443,938, in 1871, 493,346 (including W. Derby and Birkenhead, 650,510). The first part of the name L. has been the subject of endless conjecture. A traditional theory is that the place received its name because the 'pool' was haunted by the 'Liver' or 'Lever,' a bird of which next to nothing is known, but which is identified with the one figuring in the town's armorial bearings. The true origin is probably the Welsh *Llyr-pwl* ('the sea pool'). Such at least is the form of the name in the first authentic charter of the place, which was granted by Henry II. in 1173. In 1313, when the ports contributed to the navy, L. is at the bottom of the list with one bark and six men. Two centuries later Leland says, 'Lyrpole *alias* Lyverpoole, a paved town, hath but a chapel,' although 'is smaule custom payd that causit marchaunts to resort.' In 1565 it had only 138 householders and cottagers. During the Civil War L. suffered three sieges, and by the end of the 17th c. its population had increased to 5714. With the opening of the 18th c. a great change took place. By 1709 the shipping had grown to 84 vessels of 6000 tons, and with the construction of the first dock by the excavation of the ancient 'pool' began the foreign trade. In 1757 the first stage coach to London was started, performing the journey in four days. The pop. increased from 25,700 in 1760 to 77,708 in 1800. The staple commerce of the town during the latter part of the 18th c. was what is euphemistically called 'the African trade,' in other words the slave trade. The rapid advance of L. in later times has been in great measure due to the development of the trade in cotton, and the revolution consequent upon the application of steam-power in the industrial arts. L. is the birthplace of W. Roscoe, the historian, and of Mrs. Hemans, and the adopted town of John Gibson, the sculptor. See Picton's *Memorials of L.* (enlarged ed. 1875).

Liverpool Plains, a pastoral district in the N. of New South Wales covering an area of 16,900 sq. miles. Discovered by Oxley in 1818, they were by him named after Lord Liverpool. Water is scarce, and the land consequently ill adapted for tillage, but it supports immense flocks of sheep.

Liverpool Ranges, in New South Wales, is an offshoot of the great Australian Cordillera (see AUSTRALIA), to which it runs nearly at right angles. The length of the L. R. is 150 miles, and its average height 3000 feet, culminating in Mount M'Arthur (5000 feet). The range is exceedingly precipitous, but its most remarkable feature is Mount Wingen, which, though not a volcano, is in a state of constant combustion, caused by the spontaneous ignition of beds of coal which lie beneath the surface.

Liv'ery (Fr. *livrée*, Lat. *liberatio*), a term originally applied to the costumes worn on state occasions by the retainers of the Frankish kings, now signifies the peculiar dress by which the servants of a particular gentleman are distinguished. L., indeed, in feudal times, included whatever money, victuals, or

clothes were periodically *delivered* by a lord to his officials or domestics, but principally denoted outward tokens of distinction, as the '*roba æstivalis*' and '*hiemalis*,' mentioned in the Wardrobe Book of Edward I. as worn by the servants of the Court. The wearing of L. by the general adherents of an individual, which had long contributed greatly to the maintenance of private feuds, was restricted to menials by statutes of Edward III. and Richard II.; but the wearing of L. by all fraternities and '*les gents de mestere*,' or trades of the cities throughout the kingdom, was expressly sanctioned by a statute in the seventh year of Henry IV. Under the second and third Edwards a distinctive L. was adopted by each of the craft-gilds of the City of London that had obtained a charter and the enrolment of its ordinances in the Mayor's Court. The *Livery Companies*, as these were hence called, acquired at that time an influence that proved lasting, for till the Reform Act of 1832 the freemen of the ninety-one trade-guilds of London were the sole constituents of the members of Parliament for the City.

Livery of Seisin, in English law, is a delivery of possession of lands or tenements. In Scotch law, see INFEFTMENT.

Liv'ingston, Edward, an American jurist, was born at Clermont, New York, May 26, 1764. His father was judge of the Supreme Court of New York. He graduated at Princeton College in 1781, and began practice as an advocate in New York in 1785. He sat in Congress 1794–1801, and became district attorney and mayor of New York in 1801. In 1803 embezzlements having been made from the state funds under his charge, he resigned the office, handed over all his property, and removed to New Orleans. Here he obtained much success as a jurist. He revised the civil code of Louisiana in 1823–24, and drew up a criminal code in 1826, which was published in Philadelphia in 1833. The latter, though not adopted anywhere in its entirety, has had great influence on the penal legislation of many countries. L. sat in Congress 1823–29, was Secretary of State, 1831–33, and Minister at Paris 1833–35. He died at Rhinebeck, New York, May 26, 1836. See L.'s Life, by C. H. Hunt (1864), and his *Complete Works on Jurisprudence* (2 vols. New York, 1873).

Liv'ingstone, David, M.D., LL.D., the great missionary traveller, was born at East Kilbride, in Lanarkshire, 19th March 1813. Employed in early youth as a 'piecer' at the Blantyre cotton-mills, he acquired some knowledge of classics at an evening school, and later by hard work in summer was enabled during several winters to study medicine and theology at Glasgow. In 1838 he was admitted a licentiate of the Faculty of Physicians and Surgeons, and in 1840 was ordained as a medical missionary, and sent by the London Missionary Society to Port Natal, where he became acquainted with the Rev. Robert Moffat, whose daughter he married subsequently. In the earliest years of his service as a missionary in the Bechuana country he sent much valuable information to Petermann's *Mittheilungen* and the London Geographical Society. He made his essay as an explorer by the discovery of Lake Ngami, 1st August 1849, and later crossed the continent in his 'great journey' from the Zambezi to the Congo, arriving at Loando in June 1854, after eighteen months travelling. In September following he began to retrace his steps, proceeding by Linyanti, the Portuguese settlement of Zete, and the course of the Zambezi, arriving at its mouth, 20th May 1856. The Victoria gold medal of the Geographical Society had been awarded to him in 1855, and on his return to England the publication of *Missionary Travels and Researches in S. Africa* (1857) gained him a European renown. In 1858 he returned to Africa, and with Mr. C. Livingstone, Dr. Kirk, and Mr. Rae, aided by the Governments of England and Portugal, he started on an expedition which lasted five years, and during which he explored the Zambezi and Shiré, and discovered Lakes Shirwa and Nyassa. On his return to England he published *A Narrative of an Expedition to the Zambesi* (1865; new ed. 1875). Setting out for the last time under the auspices of the Geographical Society, and accredited as Her Majesty's Consul to the chiefs of the interior, L. devoted himself to the discovery of the sources of the Nile (q. v.). Striking the Rovuma river, he rounded the S. end of Nyassa, crossed the river Loangwa, touched the S. end of Tanganyika, explored Lake Moero (q. v.), discovered Bangweolo (q. v.), and fell back to Ujiji in greatly impaired health. A rumour meantime had reached England of his having been killed by natives, and an expedition, under Mr. Edward D. Young, went out in a search for him that was fruitless. Later, however, letters were received from L. dated May 1869. Amid terrible hardships, aggravated by repeated illnesses, and the desertion of all his men save three, L. made his way roughly by the course of the Luamo river to the Lualaba, as far N. as the Bagenya country, but was unable to procure canoes, and returned to Ujiji prostrated and despondent. Here he was found by Mr. Henry M. Stanley, representing the New York *Herald*, in the autumn of 1871. After a voyage together round the N. of Tanganyika, in an unrewarded search for the outlet, L. accompanied Mr. Stanley on his return as far as Unyayembe, and then alone resumed the search for the Caput Nili. Returning by Tanganyika to Bangweolo, which he meant to explore, he traversed the N. and E. shore, and crossed the Chambeze. But the terrible journey through the marshes was too great a strain, and after a severe illness he died at Chitambos village, Ilala, 4th May 1873. A relief expedition sent out by the Geographical Society under Lieut. Cameron was only in time to meet the party returning with the embalmed body at Unyayembe, 16th October. The body was taken to England, and interred in Westminster Abbey, in April 1874. Besides having unusual power of observation and endurance, L. showed great tact and resource in dealing with savage, refractory natives. A cool, sensible man of business, he was nevertheless animated by a high Christian spirit, and a noble desire to put down slavery, which he called 'the great open sore of the world.' The immense value of his additions to our knowledge of Central Africa is a little apt to be underrated on account of his unimpassioned, though lucid narrative. See his *Last Journals*, edited by Rev. H. Waller (2 vols. Lond. 1874); and Stanley's *How I Found L.* (Lond. 1873).

Liv'ius, Ti'tus, was born at Patavium (Padua), B.C. 59. He spent most of his life at Rome, but returned to his native city before his death in A.D. 17. He was married, and had at least two children. He enjoyed the favour of Augustus, and his reputation was so high, that a Spaniard travelled from Cadiz to Rome for the sole purpose of beholding him. He commenced his career as a rhetorician, and wrote on rhetorical subjects; but his great work is the *Annales*, or *History of Rome*, extending from the foundation of the city to the death of Drusus, B.C. 9. It occupied 142 books, of which 35 (the first 10, and 21–45 inclusive) have come down to us, along with *Epitomes*, or summaries of the whole, with the exception of two, framed shortly after the appearance of the history itself. After the 5th or 6th c. the history was divided into *decades*, or groups of 10 books each —books 1, 21, and 31 opening with a brief preface, and severally marking the commencement of an important epoch. The first, third, and fourth decades are entire, and also one half of the fifth. Of the remainder, we possess nothing but inconsiderable fragments. The first decade embraces the period from the foundation of the city till B.C. 294. The second, which is lost, embraced the period from B.C. 294 to 219, and comprised an account of the extension of the Roman dominion over the whole of Southern Italy and a portion of Gallia Cisalpina; of the invasion of Pyrrhus; of the First Punic War, &c. The third extends from B.C. 219 to 201, and comprehends the whole of the Second Punic War, and the contemporaneous struggles in Spain and Greece. The remaining extant portion extends from B.C. 201 to 167, and traces the progress of the Roman arms in Cisalpine Gaul, Macedonia, Greece, and Asia, ending with the triumph of Æmilius Paullus. Niebuhr is confident that L. did not begin his historical labours till he had attained the age of fifty, and had not completed his plan when he died. In the earlier portions of his work his authorities were chiefly Ennius, Fabius Pictor, Cincius Alimentus, and Calpurnius Piso; and from the commencement of the third decade he depends almost exclusively on Polybius. He aimed, not at a critical history of Rome, but an interesting and attractive story of the Roman state. He was accused by Asinius Pollio of *Patavinitas*, or provincial peculiarities of expression, but this cannot now be detected. His style is almost faultless. It flows on in 'a calm, strong, clear, sparkling, deep, and unbroken current; the diction shows richness without heaviness, and simplicity without tameness.' L. was deficient in knowledge of the world, of military art, jurisprudence, political economy, and geography. He owes his great fame as a historian, not to industry or accuracy, intellectual insight or philosophic breadth, but to the nobility of his theme,

and to the marvellous power and skill with which he wielded the Roman tongue. The best editions of L. are, text only—Madvig (8 parts 1866); Weissenborn (6 vols. Teubner, 1871); with explanatory notes—Drakenborch (7 vols. 1746; reprinted, 15 vols. Stuttg. 1828); Weissenborn (10 vols. 1867). Seeley's edition of Book I. (Macmillan, 1871) contains an excellent historical introduction.

Liv'ius Androni'cus, the earliest Roman dramatist and poet, was a native of the Greek colony of Tarentum, and flourished about 240 B.C, in which year his first drama was exhibited. He was for some time a slave at Rome, engaged in the instruction of his master's children, but was afterwards restored to freedom. The titles and fragments of at least fourteen of his dramas have come down to us. They all treat of Greek subjects, and are to a great extent imitations of Greek dramas. L. wrote also a Latin Odyssey in Saturnian verse and hymns.

Liv'ny, a town of Russia, government of Orel, 253 miles S. of Moscow by rail, has six churches, and considerable trade in corn and cattle. Pop. (1870) 12,975.

Livo'nia (Ger. *Livland*, or *Liefland*), a government of Russia, and one of the Baltic provinces, is bounded N. by Esthonia, E. by Lakes Peipus and Pskov, S. by Witebsk and Courland, and W. by the Gulf of Riga. Area 18,150 sq. miles; pop. (1870) 1,000,876. Lakes occupy one-fifteenth, and forests five-elevenths, of the surface, which along the coast is flat and sandy, but inland rises in fertile and well-wooded uplands, Munna-Mäggi ('egg-mountain'), attaining an elevation of 1057 feet. The Aa and Embach are the chief rivers. Rye, barley, hemp, flax, and linseed yield good crops; chalk, gypsum, alabaster, marble, and flint are extensively quarried; and there are numerous brick-kilns, glass-houses, and saw-mills. The government includes the islands of Oesel, Mohn, and Runö. Riga (q. v.) is the capital. Seventy-three per cent. of the inhabitants are Protestants, and fifteen per cent. belong to the Greek Church. Russians, Poles, Swedes, and Germans occupy the towns; Esthonians (about 410,000) the N., and Letts (360,000) the S. A remnant of the aboriginal Livonians (some 2000) still lingers in N. Courland. They belong to the Finnic family, and their language, retained in considerable purity, has been fully treated in Sjögren's *Livische Grammatik und Wörterbuch* (2 vols. Petersb. 1861), and was first made known to Western Europe by shipwrecked Bremen merchants (1158), and in 1201 Bishop Albrecht founded at Riga the Order of the Sword (*Schwertritter*), associated (1237) with the Teutonic Knights (q. v.). L. formed with Esthonia a Swedish province (1660–1721), and was ceded to Russia by the Peace of Nystadt. See Eckardt's *Livland* (vol. i. Leips. 1876), and Anders' *Beiträge zur Statistik Livlands* (Riga, 1876).

Li'vre (Lat. *libra*), an old French coin, valued at twenty sous, now superseded by the franc.

Lixivia'tion (from Lat. *lix*, 'ashes'), in chemistry, is the separation by washing of the soluble ingredients in a mixture from the insoluble.

Lixu'rion, a town of Cephalonia, one of the Ionian Islands on the W. shore of the Gulf of Argostoli, 38 miles N.W. of Zákyntho, has manufactures of coarse carpets and cottons, and considerable trade and shipping. Pop. (1870) 5031.

Liz'ard (Fr. *lézard*, Lat. *lacerta*), a name given to all the species of *Lacertilia*, in the class *Reptilia*. In this order the halves of the lower jaw are united by bone, the limbs are well developed, though in a few genera one or both pairs may be absent. The body is covered with scales. The vertebræ of the back are concave in front and convex behind, and the heads or *capitula* of the ribs are simple. The sacrum may be unrepresented; when present, its vertebræ do not exceed two in number. The teeth—save in some extinct lizards—do not spring from sockets. A urinary bladder exists, and the aperture of the *Cloaca* (q. v.) is transverse. Movable eyelids exist in the majority of the lizards, and a distinct breast-bone is developed. The *classification* of the L. is still a matter regarding which various opinions exist. Some authorities simply divide the order into families, others subdividing the group in a primary manner by the structure of the teeth or tongue. Thus the *Pleurodont* lizards are those in which the teeth are set in ridges on the sides of the jaw-bones; the *Acrodont* lizards being those in which the teeth are attached to the upper surface of the jaws. By the conformation of the *tongue* the lizards are divided into *Brevilinguia*, in which the tongue is short and thick, and capable of protrusion only when the mouth is open; and into *Fissilinguia*, or those in which the tongue is cleft at its tip and protrusible through the jaws. *Fossil lizards* first occur in the Middle Permian rocks, and many singular extinct forms are known. The genus *Lacerta* includes the most familiar species of L., the sand L. (*L. agilis*), and green L. (*L. viridis*), the former common in Britain, and the latter in Jersey, belonging to this group. The viviparous or scaly L. (*Zootoca vivipara*), also common in Britain, retains the eggs within the parent body until the young are hatched. It is olive-brown above and orange below. Black spots vary the colour of the male. The *L. ocellata*, or eyed L., is found in S. Europe. Its colour is bright green, a series of azure spots adorning the sides. The green L. is of a uniform green hue, and the sand L. is brown above and white beneath.



Lizard.

Lizard Point, the most southerly headland of England, in Cornwall, 19 miles S.E. of Penzance, and on the E. side of Mounts Bay. It is the *Promontorium Damnonium* of the Romans, presents bold serpentine cliffs to the sea, and supports two lighthouses, each 222 feet high, with fixed lights visible for 20 miles. Off the coast are the Stags and other rocks.

Llama (*Auchenia*), a genus of Ruminant quadrupeds belonging to the family *Camelidæ* or Camels (q. v.), but distinguished from the latter by the absence of humps, and by the toes being separate. The L. inhabits S. America, the best known form being the *A.* or *L. Paco*—the Alpaca (q. v.) of commerce. Other three kinds of llamas, known respectively as the vicugna, Guanaco (q. v.), and yamma, are known, but it is highly doubtful if they are to be reckoned distinct species. The L. attains a length of 4 or 5 feet. Its neck is very long, but its head closely resembles that of the sheep. It has the curious habit of ejecting a quantity of acrid saliva when irritated in any way. The yamma is brown, has slender legs, and was formerly used as a beast of burden by the Spaniards in S. America. The vicugna has a very delicate fur. It is a wild wary animal, and of all the species appears to be least susceptible of domestication.



Llama.

Llandaff' ('the Church on the Taff'), a city of S. Wales, in Glamorganshire, beautifully situated on the Taff, 3 miles N.W. of Cardiff by rail. Though called a city on account of its giving title to a bishop and having a fine cathedral, it is only a straggling village with 700 inhabitants.

Llandud'no ('Church of St. Tudno'), a watering-place of N. Wales, in Caernarvonshire, a little S. of Great Orme's Head, at the estuary of the Conway, 40 miles W.S.W. of Liverpool by rail. The Welsh Brighton, it is handsomely built with terraces, parades, &c. Pop. (1871) 2762. A walk of six miles skirts the grand limestone cliffs of the Great Orme (Welsh *Gogarth*), round which a carriage drive was being constructed in 1875. The vicinity is rich in beautiful scenery and quaint antiquities. See *Handy Guide*, by J. Price, M.A. (1875), and Smith's *Archæology of the Great Orme's Head* (1875).

Llanell'y ('church of Elian'), a seaport of S. Wales, in Caermarthenshire, 10 miles W.N.W. of Swansea by rail, at the

confluence of the Lliedi with the Burry estuary, was a mere village at the commencement of the present century. It is now a rapidly increasing place, with a town-hall, custom-house, floating basin, and four docks, one of them capable of admitting ships of 500 tons. In 1875 there entered 1155 vessels of 98,478 tons, and cleared 1501 of 135,292 tons; and there were 91 ships of 13,313 tons belonging to the port. The customs revenues were £2993, and the value of exports (coal, iron, &c.), £70,797, the chief import being copper ore from Cornwall. The Cambrian Copper Works, with iron, tin, and lead foundries, and an extensive pottery, employ a large proportion of the inhabitants. L. joins with Caermarthen in returning one member to Parliament. Pop. (1871) 15,281.

Llangoll'en ('St. Collen's church'), a market-town of N. Wales, in Denbighshire, 9 miles S.W. of Wrexham by rail, on the Dee, which is here crossed by a four-arched bridge of the 14th c., has manufactures of flannel and woollen, breweries and collieries, iron-works and limestone quarries in the neighbourhood. Pop. (1871) 5987. The beautiful *Vale of L.* contains the ruins of Caer Dinas Brân, on a conical hill 910 feet high, and of Vale Crucis Abbey; the Pillar of Eliseg, the oldest inscribed British monument; and the Cysylltaw Aqueduct, with nineteen arches, 126 feet high and 1007 long, constructed by Telford (1808) to carry the Ellesmere Canal across the Dee.

Llanidloes ('Church of St. Idloes'), a market-town of N. Wales, in Montgomeryshire, on the Severn, 12 miles S.W. of Newtown by rail, has flannel and woollen manufactures, and in the neighbourhood are slate and stone quarries and twenty lead mines. L. joins with the five other Montgomery boroughs in sending one member to Parliament. Pop. (1871) 3428.

Llanos (Sp. 'plains,' from Lat. *planus*, 'level'), the name given to the northern and western parts of the great Orinoco plain in S. America, which is only 192 feet above the level of the sea. There is little wood in the L., though Mauritia palms and some shrubs are found along the rivers, where cotton, silk, and tobacco have now been introduced. The tropical climate renders the region in one season a barren desert, in another a field of rich, waving grass, like the savannas of N. America.

Llere'na, a town of Spain, province of Badajoz, 55 miles N. of Seville. It has linen, woollen, and leather industries. Pop. 6000. Near L. Lord Combermere routed a French force, 11th April 1812.

Lloren'te, Juan Antonio, a Spanish author, born 30th March 1756 at Rincon-del-Soto (Aragon), educated at Tarragona and Saragossa, and became a priest in 1779. In 1782 he was appointed vicar-general to the Bishop of Calahorra, and during this period composed a number of indifferent dramas. In 1785 he became one of the dignitaries of the Inquisition, and in the course of the next few years turned his attention chiefly to historical study. Driven from court for political reasons for a number of years, he only recovered his place in 1806, when he was appointed canon of the church and chancellor of the university of Toledo. L. hailed the French invasion of Spain with enthusiasm, and upon the abolition of the Inquisition (1809), and the suppression of the monastic orders, he was appointed in the first instance to examine the historical archives, and in the second to look after the confiscated property. In 1817 he took up residence in Paris and published his greatest work, *Historia crítica de la Inquisicion de España* (4 vols.), which along with his *Portraits Politiques des Papes*, secured his expulsion from France in 1822. He died at Madrid, 5th February 1823. The works of L. are of enduring interest, owing to the opportunities which he enjoyed for examining historical documents, but though written with sufficient clearness, they have been condemned for an absence of precision and conscientious accuracy. See L.'s *Noticia Biografica, o Memorias para la Historia de su Vida* (Par. 1818).

Lloyd's, the merchants' and underwriter's subscription rooms on the first floor of the London Exchange, so called from Lloyd's coffee-house, formerly the head-quarters of underwriting. The underwriter's association is managed by a committee of twelve. It is in constant communication with agents all over the world, who report arrivals and departures of ships and casualties. About £40,000,000 is annually insured here. The subscription varies with the different classes of members. *Lloyd's List* (founded 1716, published daily since 1800), contains the latest shipping news. *Lloyd's Register of British and Foreign Shipping* is an annual and valuable publication, issued at Lloyd's Register Office of British and Foreign Shipping, 2 White Lion Court. The admirable organisation of L.'s intelligence department has virtually made it 'the focus and centre of the world's sea-borne trade and commerce.' Several kindred societies have been established on the Continent. The Austrian Lloyd's was founded in Trieste in 1833 by C. L. von Brück. It is the agency for the Mediterranean and Levant steamers; and, in addition to the insurance business, has a literary or scientific department with printing and publishing works. The journal *Giornale del Lloyd Austriaco* was begun in 1835. The North German Lloyd's (*Nord-deutscher Lloyd*) at Bremen is important in connection with American steamers and emigration. See F. Martin's *History of Lloyd's and of Marine Insurance in Great Britain* (Lond. 1876).

Loach (*Cobitis*), a genus of Teleostean fishes, belonging to the family *Cyprinidæ* or that of the carps. The body is somewhat long, and the scales small. The skin has the power of secreting and exuding a glutinous secretion, similar to that seen in the eels and blennies. The head is small, and the teeth are deficient. The common L. is the *Cobitis barbatula* of naturalists. Its average height is 4 or 5 inches, and its colour is a greyish-yellow, variegated with brown. It is a bottom-feeder, and appears to subsist on worms and insect-larvæ. The Scotch name of 'beardie' and the specific name *barbatula* have reference to the barbules or filaments which depend from the mouth. Another species is the *C. fossilis* or lake L., found in many European lakes and rivers.

Loading. Under the contract of affreightment, the shipmaster and owner are bound to see that due preparation is made and care taken of the goods in loading and unloading. Tackling must be supplied, sufficient to guard against injury.

Loadstone, or **Magnetic Iron Ore**, a black coloured mineral having the composition Fe_3O_4, and possessing magnetic properties. See IRON and MAGNETISM.

Loam (Ger. *lehm*, allied to Lat. *limus*, and Eng. *slime*), is a variety of soil consisting of from 20 to 50 per cent. of clay intimately mixed with sand, limestone, and organic matters. Such soils lack the tenacity of clay, are much more fertile than sand, and are peculiarly adapted in virtue of their loose texture for the cultivation of crops.

Loan. The Roman law draws a distinction in the contract of L. between *mutuum* and *commodate;* the former being applied to the L. of subjects which are perishable, or which may be estimated by weight, number, or measure; such as grain or fruit; the latter applies to a L. which must be individually returned to the owner, as a horse or a picture. In *mutuum*, if the subject be destroyed or injured, the loss falls on the borrower. In *commodate*, the property remaining with the lender, loss or injury to the subject falls on him. See BORROWING.

Loan Societies. These are regulated by the Act 3 and 4, Vict. c. 110. Persons desirous of forming a loan society, or who have formed one for making loans to the industrious classes, must have the rules certified by the barrister appointed to certify the rules of saving banks. The rules are to be entered in a book kept by the officer of the society.

Loando. See SÃO PAULO DA LOANDO.

Loan'go, a state of W. Africa, extending from the Okanda or Ogowai river near the equator to the river Congo. The coast is low-lying and fertile, but is flanked by the terraced ranges of the Sierra Complida, rising out of vast forests. The government is despotic, polygamy prevails, and the religion consists of rude superstitions. There is some trade in ivory, wax, palm oil, &c. In the towns and villages slight industries are carried on in basket-working, grass-cloth weaving, mat-dyeing, and canoe-making.—**L.**, the capital, lies near L. Bay, 135 miles W. of the Congo, and has a pop. of 15,000.

Loasa'ceæ, or the **Flowering Nettle Family**, consists of about seventy known species of small shrubs or herbs, and sometimes twining climbers, all restricted to the warm parts of America. The order does not include any plants of special qualities beyond those possessing stinging hairs, but several have been brought into cultivation for their showy flowers, such as species of *Blumenbachia, Loasa, Illairea.*

Lö'bau (Wend. *lubi*, 'low-lying'), a town in the kingdom of Saxony, 12 miles E.S.E. of Bautzen by rail, has three churches,

a fine *rathhaus*, an iron tower (erected in 1854 on the Löbauer Berg), mineral baths, dye-works, and a considerable trade in cloth, linen, hosiery, and 'L. diamonds,' a kind of rock crystals. Pop. (1875) 6226.

Lobe'lia, a genus of perennial herbs, belonging to *Campanulaceæ*, and named after Mathias L'Obel, a Flemish botanist. It includes about 200 acknowledged species, widely spread over the greater part of the globe, but chiefly abundant in N. America, S. Africa, and Australia. There are also several species within the tropics both in the New and in the Old World, but none in Northern Asia, and the few that reach Europe are strictly Western or Mediterranean. The British flora contains two; one subaqueous in mountain lakes, the other limited to a single English locality. A considerable number are highly ornamental, and are much cultivated both under glass and in the open air, as *L. cardinalis* and *L. splendens*, whilst *L. Erinus*, a low-growing trailing species, is in high repute as a bedding plant. The acrid qualities of the genus are most strongly represented in *L. inflata*, a N. American species sometimes called Indian tobacco, its flavour and the symptoms following its administration, through the phases of violent vomiting, stupor, convulsions, and death, being somewhat similar to those effected by tobacco in equivalent doses. An ether tincture is employed by the medical faculty as an antispasmodic, and is in vogue among homœopathists.

Lo'bos Islands (Span. *lobo*, 'a seal'), three islets in the Pacific Ocean, 12 miles off the coast of Peru, to which country they belong. They abound with seals, and contain valuable deposits of guano.

Lob'ster (Old Eng. *loppestre;* allied to the Lat. *locusta?*), a name given to various genera of Crustacea (q. v.), belonging to the order *Decapoda* (q. v.), and to the section *Macroura* ('long tailed') of that order. The common L. (*Homarus marinus*), the most familiar example of this group, attains the length of a foot or more, and is of a deep bluish black colour, finely mottled with lighter markings. Twenty segments or joints exist in the lobster's body; these being disposed so as to give six to the head, eight to the thorax or chest, and six to the abdomen. The head and chest are united, as in all crustacea, to form a *cephalothorax*. Every segment of the body bears appendages; those of the head being modified to form eyestalks, feelers, and jaws; those of the thorax to form walking-limbs, and *maxillipedes* or 'jaw-feet.' The rudimentary feet belonging to the abdomen or tail, are used by the female for carrying the eggs. The female when laden with eggs—or 'in berry'—has many thousands of developing eggs attached to the tail. The eggs are placed in this position by the L. bending the tail so as to receive the eggs as they pass from the generative apertures. The latter exist in the female at the base of the last pair of walking-legs; those of the male, at the base of the third pair of legs. The sexes may be distinguished thus: the male has the appendages of the first joint of the tail in the form of horny filaments; the female, in the form of soft filaments. The young L. does not undergo a *metamorphosis* in passing from the egg to the adult state, like the young crab. Nearly allied to the common L. is the spiny L. (*Palinurus vulgaris*), also known as the sea crayfish, in which the claws and feet are smaller than in the L.; and the colour a purple brown mottled with white spots. The shell bears many prominences and angularities. Both of these lobsters are captured in great quantities around the British coasts; the spiny L. being more common on the S. coasts of Britain. The Norway L. (*Nephrops Norvegicus*) attains a length of 8 or 9 inches, and is of more slender make than the common L. It is of a beautiful light brown hue, mottled with bright red markings. See Dr. A. Wilson's *Zoology* (Edin. 1877).

Lob'worm (*Arenicola piscatorum*), a species of marine worms, belonging to the family *Arenicolidæ*, and to the order *Enantia*. It is also known by the name of 'Lug-worm,' is much used by fishermen for bait, and is common around the British coasts. It burrows into the sand as the tide ebbs, passing the *debris* of its burrow through its body, and throwing out the material thus excavated on the surface of the sand in the form of the well-known rope-like coils. The L. resembles a large earth-worm, with a rounded and enlarged head-extremity. It has a few bristles along the sides of the body; and eyes and jaws, so prominently seen in some marine worms, are both wanting. The colour is a dark-brown. The gills occur in the form of thirteen tufted organs along the sides of the body.

Lo'cal Author'ity is the Scotch *nomen juris* indiscriminately applicable to the sanitary local authorities of Scotland in districts whether rural or urban. According to the English Act of 1872, which is incorporated with the Consolidation Act of 1875, England is divided into districts called respectively (1) urban sanitary districts, and (2) rural sanitary districts, which are respectively subject to the jurisdiction of local authorities, called urban sanitary authorities and rural sanitary authorities. It was also enacted, as regards urban sanitary authorities, that (1) the authority for boroughs constituted such either before or after the passing of the Act, should be the mayor, aldermen, and burgesses, acting by the council; (2) the Improvement Commissioners should be the authority of Improvement Act districts constituted such before the passing of the Public Health Act of 1872, and having no part of its area situated within a borough or local government district; and (3) the local board should administer the sanitary laws in local government districts, constituted such either before or after the passing of the Act, having no part of their areas situated within a borough, and not coincident in area with a borough or Improvement Act district. Improvement Act districts are those districts where commissioners by local Acts are entrusted with powers of town government and rating. The English guardians of the unions are the sanitary rural authorities, as well as the administrators of the local poor law.

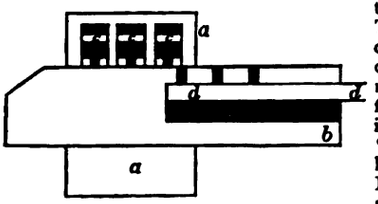
By the 5th section of the Public Health (Scotland) Act, 1867, it was provided that (1) the town-council should be the L. A. to execute the Act in places within the jurisdiction of any town council, and not subject to the jurisdiction of police commissioners or trustees; and (2) the police commissioners or trustees exercising the functions of police commissioners under any general or local Act, should be the L. A. within the places subject to their jurisdiction. By this provision the town councils of all royal and parliamentary burghs and the police commissioners of police burghs constitute, severally, the urban L. A. in Scotland. The municipal authorities also of those urban districts which have by a local Act provided for themselves a municipal government, are, in virtue of office, the L. A. By the same Act the parochial boards of the parishes of Scotland are the local authorities of their respective parishes, or of such parts thereof as are not under the jurisdiction of a town council, or police commissioners, or trustees exercising the functions of police commissioners. The special duty of the L. A. is the administration of the Public Health Acts, and the general supervision of all matters relating to the public health. See *Manual of Public Health*, by Michael, Corfield, and Wanklyn, edited by Ernest Hart (Lond. 1874); and *The Sanitary System of Scotland*, by Sheriff Spens (Edin. 1876).

Locha'ber Axe, an axe with a broad blade and long handle, which was the old weapon of the Scotch Highlanders.

Lock (Old Eng. *loc*), a well-known apparatus, used for fastening doors, drawers, &c., the essential part of which consists of a bolt intended to be shot backwards or forwards by means of a key. In some cases the bolt, when shot outwards, catches in a fixed staple; in others a staple enters the L., and is there retained by the bolt. Every one is familiar with the nature of a key; the stem is called the *shank*, and the projecting piece, which throws the bolt, the *bitt* or *web*. The shank is either hollow or solid; when hollow, the key slips on to and rotates round a *drill-pin* fixed to the lock-plate, and when solid, the shank is carried a little beyond the web, and the upper part of the key-hole in the inside plate acts as a socket for it. Solid shanked keys are only used in locks that open from either side.

The invention of locks is ascribed to the Egyptians, and it is singular that the same form of door-L. used in Egypt upwards of 4000 years ago, as testified by sculpture on a temple at Karnac, still obtains in Egypt and Turkey. It is wholly made of wood. The construction and principle of action will be understood from the accompanying cut. The body of the L. is seen at *a a; b b* is the bolt with a horizontal slot for the passage of the key, and three vertical holes for the reception of as many headed pins, *c, c, c*, which drop from the upper part of the body of the L. into the bolt, holding it fast, when pushed into its staple. To enable the bolt to be withdrawn, the key *d d*, a straight piece of wood with three pegs upon it corresponding in position to the

holes, is passed into the bolt-slot and pressed upwards. The pins are in this manner dislodged by the pegs of the key, which with the bolt may then be drawn back. The ancient locks of this style were often of huge dimensions, and the figurative passage in Isaiah (xxii. 22), 'the key of the house of David will I lay upon his shoulder,' probably alludes to the manner of carrying, on account of its size and weight, a key of the above description. Locks similar to the Egyptian kind are in use in the Faroë Islands and Cornwall.



Egyptian Lock.

In England the L. and key manufacture has its chief department in S. Staffordshire, where it has flourished since the 17th c. Wolverhampton, Willenhall, Wednesfield, Walsall, and neighbouring villages are each noted for special varieties of locks. In the simplest and cheapest form of English L., the bolt is thrown by the web of the key acting in the *talon* or semi-circular recess cut in the centre of the lower side of the bolt. At the end of the same side there are two notches with a convex junction, and between these the bolt travels on a stud, a rude spring on the upper side keeping the bolt in position when shut or open. In such a L. no protection is afforded against moving the bolt with any bent instrument. For this purpose *wards*, thin pieces of metal fastened edgewise to the lock-plate in concentric form around the drill pin or socket, are introduced, and the web of the key is cut with corresponding clefts to pass them. The Romans seem to have used wards in their locks, and the intricacy of those of mediæval age is remarkable. Additional security is obtained by the use, in conjunction with fixed wards, of a movable lever or *tumbler* with a projecting pin which falls into one or other of two notches cut on the upper side of the bolt, and prevents it being moved till the tumbler be raised by the key. The invention of the single-tumbler L. occurred in the 18th c. In 1778 Mr. Barron produced a L. with two tumblers which required to be raised together to a certain height before the bolt could be moved. This L. is the parent of the most secure English locks now made. The wards which were present in Barron's L. have been discarded, but his principle of the many tumblers has been retained, and, in the hands of Messrs. Chubb and other L.-makers of world-wide celebrity, it has been considerably improved and modified. In Barron's L. a slot was made in the centre of the bolt for the passage of the two tumbler-pins, but in the improved tumbler-locks a single *stump* is fixed to the bolt, and a *gating* is cut at unequal heights in the tumblers which are pressed down by springs. As the bolt cannot be moved unless the gating of all the tumblers coincide, making a clear passage for the stump, the bitt of the key is necessarily cut into irregular steps to lift the tumblers to different heights. When free to move, the bolt is thrown by the terminal step of the key. Chubb's *detector* L., the subject of several patents since 1818, contains a spring which renders inactive any tumbler that may be raised too high in an attempt to pick the L. This is instantly disclosed on an application of the proper key, and by simply turning the key as if to overlock the bolt, the tumbler comes into play again. Tumbler-locks admit of being enormously multiplied by varying the relative position of the tumblers, reducing the height at which the gating is placed, and by using drill-pins of different diameters. Bramah's L., patented 1784, is yet universally appreciated. Its peculiar feature is an inner rotating barrel with a stud at the back to throw the bolt, but which cannot be moved unless the *sliders* of different lengths, fitted in it, are adjusted to certain positions by slits in the key. A countless number of changes can be rung on the position of the sliders, and on this ground Mr. Bramah claimed that his L. could not be picked. It was long regarded as inviolable, but in 1851, Mr. Hobbs, an American locksmith, succeeded in picking it, as well as the locks of Chubb and other makers. This feat gave rise to a celebrated controversy by which English L.-makers greatly profited. For details of Mr. Hobbs and other American locks, Coterill's and Mordan's English locks on the Bramah principle, puzzle locks and the numerous other varieties, see Tomlinson's manual on *The Construction of Locks*, and E. B. Denison's (Sir E. Beckett) *Locks* (Edin. 1857) may be consulted with advantage. See also an interesting paper by Mr. Chubb in *Trans. of the Institute of Civil Engineers* (1851), and Mr. Price's treatise on *Safes, Locks*, and *Keys* (1856).

Lock, in internal navigation, is the part of a canal or river, included between two floodgates, by means of which a vessel may be taken from a higher to a lower, or from a lower to a higher level. By opening the upper gate, the water in the L. is brought to the same level as the water in the higher part of the canal. After the vessel is floated into the L., the upper gate is closed, the water in the L. lowered till it corresponds in level with the water in the lower part of the canal, and the lower gate is then opened so as to allow the boat to pass over. The first locks were constructed at Venice in 1481. In the beginning of the 17th c. the French applied them with success in the construction of canals, which now became a useful means of internal communication. The gates of locks are now very generally opened and shut by hydraulic machinery. See CANAL, DOCK.

Lock, in firearms, is the apparatus by which the powder is ignited. The earliest form was the matchlock, which first appeared towards the end of the 14th c., as an improvement upon the original method of lighting the powder in the touch-hole with a slow match held in the hand. The Nürnberg wheel-lock, which struck fire through the friction of a toothed wheel against a piece of flint or iron pyrites, was introduced in 1517, and was a decided improvement; but both it and the Spanish *snaphaunce* were superseded about 1690 by the *flint-lock*, which continued in general use till the introduction of the percussion caps of the present century. The percussion lock has undergone various modifications, especially in the application of the principle to breech-loading arms. See BREECH-LOADING ARMS, GUN, FIREARMS, &c.

Locke, John, an English philosopher, was born at Wrington, Somersetshire, 29th August 1632, educated at Winchester, and afterwards obtained a reputation for learning at Oxford, specially studying philosophy and physic. In 1665 he acted as secretary to Sir Walter Vane, on a mission to the Elector of Brandenburg; but during the greater part of his after life, though receiving several offers of diplomatic employment or church preferment, he remained a simple country gentleman, spending much of his leisure in the house of Lord Shaftesbury, whose life his medical skill had saved. In 1673 political persecution deprived him of a studentship at Oxford, and drove him to Holland, where was published the first of his admirable *Letters on Toleration*. He had no inconsiderable part in the secret preparations made in that country for the action of the Whig leaders at home. Returning to England after the Revolution, he twice occupied political posts for brief periods, but resigning all such duties on account of ill-health in 1700, he lived in retirement with Sir Francis and Lady Masham, at Oates in Essex, where he ended an upright, noble life on the 28th October 1704. L. in his *Essay concerning Human Understanding*—begun as early as 1670, published in 1690—laid the foundation of modern empiricism and materialism. Aroused to inquiry by the writings of Descartes, he was not long in becoming dissatisfied with that philosopher's conclusions. Descartes maintained the mind to be a thinking being independent of anything material: L. would almost grudge it the name of a faculty, a mere capacity for receiving sensations. His position is indicated in the well-known words, *Nihil est in intellectu quod non fuerit in sensu*, to which the equally celebrated rejoinder of Leibniz was—*Nisi intellectus ipse*. For L. there are no innate ideas: the appeal to universality as proving the existence of such is vain, for no principle indubitably admitted true by all has yet been discovered. If an idea be innate, the mind must recognise it; but does a child recognise, for instance, that 'it is impossible for a thing to be and not to be?' The mind is originally a blank sheet, wherein experience writes all we know. It gains all its ideas by means of *sensation* or *reflection*—either through perception of external objects by the special senses or by bestowing attention on its own internal operations. *Simple* ideas are received from elsewhere by a single sense (*e.g.*, the idea of sound), by several senses (*e.g.*, extension), by reflection (*e.g.*, idea of will), or by sensation and reflection together (*e.g.*, idea of unity). *Complex* ideas are combinations of simple. The qualities of external

bodies are *primary* or *secondary*. The first are such as are inseparable from the object, as extension, solidity, &c.; the second are merely powers of producing sensations in us by means of primary qualities. To this class belong colour, sound, &c. The notion of substance arises from the recognition of recurring simple ideas in certain fixed combinations. L. held ideas to be the only things immediately known, but the correspondence of these with external realities he failed to establish; for to be consistent with himself, he was bound to deny the possibility of comparison. By his preference for subjective reality over objective, it can easily be seen how he made way for the idealism of Berkley, and the scepticism of Hume. Of L.'s other writings the most considerable are *Treatises of Civil Governments*, *Thoughts Concerning Education*, *Reasonableness of Christianity*, *Examination of Malebranché's Opinion that we see all things in God*, *A Discourse of Miracles*, *Memoirs of Lord Shaftesbury*, *Of the Conduct of the Understanding*, supplementary to the *Essay*, and several vindications of his system from attacks of contemporaries, notably those of Bishop Stillingfleet. Several editions of L.'s works have been published; the best is that in 10 vols. (Lond. 1801 and 1812). Lord King, a descendant of L.'s sister, wrote a life of the philosopher from the family papers (Lond. 1829; new ed. 1858), but the first complete biography is that by H. R. Fox Bourne (2 vols. Lond. 1876).

Locked-Jaw. See TETANUS.

Lock'erbie ('the town of Loki,' a memorial of a Danish occupancy), a market-town of Scotland, in Dumfriesshire, and a junction on the Caledonian Railway, 10 miles E.N.E. of Dumfries. It has the largest and latest lamb fair in Scotland (second Thursday in August), at which as many as 40,000 lambs are occasionally on show. A weekly market is held on Thursday. Pop. (1871) 1960.

Lock'hart, John Gibson, an English author, was born in the manse of Cambusnethan, Lanarkshire, 1794. Educated at Glasgow university, he obtained a Snell Exhibition, took first-class honours at Balliol College, Oxford, in 1813, and was called to the Scotch Bar in 1816. At the bar he failed, and on the institution of *Blackwood's Magazine*, he joined the rank of contributors, writing wittily and wickedly on a variety of subjects. In 1820 he married Sir Walter Scott's eldest daughter. He wrote, along with Professor Wilson, *Peter's Letters to his Kinsfolk*, which give lively pictures of society of his time. In 1821 appeared his novel of *Valerius*, a Roman story, one of the finest of its class in English literature; in 1822 *Adam Blair*; in 1823 *Reginald Dalton*, and his spirited translation of *Ancient Spanish Ballads*. In 1825 he undertook the editorship of the *Quarterly Review*, into which his pen distilled bitterness for many years. His great work, the *Life of Scott* (7 vols. 1837-39), written with delicacy and accuracy, will live when people have forgotten that he had anything to do with politics. His other works are *Matthew Wald*, a novel (1824), *A Life of Burns* for Constable's Miscellany (1828; 5th ed. 1854), and *A Life of Napoleon* (1829). He died at Abbotsford, 25th November 1854. L. was highly cultured, and literary ardour sometimes flashed with rare brilliancy; but an unbridled passion for satire narrowed the range of his sympathies, and repressed the action alike of his imagination and his intellect. See Dr. R. Shelton Mackenzie's *Memoir of J. G. L.*, prefixed to an edition of the *Noctes Ambrosianæ* (New York, 1855).

Lock'port, a city of New York, U.S., on the New York Central Railway and the Erie Canal, 18 miles from Niagara Falls and 8 from Lake Ontario. It is named from its double tier of five canal locks, by which boats are passed up and down the 'mountain ridge,' a height of 60 feet. L. has a large trade in grain and fruit ($1,750,000 worth yearly of apples alone), and manufactures of 'holly waterworks,' engines, steam-dredges, lathes, patent medicines, &c. Near it are large quarries of blue limestone. There are three daily and six weekly (one German) newspapers. Pop. (1870) 12,426.

Lock'yer, Joseph Norman, F.R.S., a living astronomer and spectroscopist, was born at Rugby, May 17, 1836. In 1857 he entered the War Office, and in 1870 was appointed Secretary of the Royal Commission on Scientific Instruction and the Advancement of Science. In 1869 he became a Fellow of the Royal Society, from which he received in 1874 the Rumford Medal. As Director of the Government Eclipse Expeditions he visited Sicily in 1870 and India in 1871. As a physicist he is widely known for his discoveries in spectrum analysis. The most important of these, discovered about the same time by Jansen, is the method for observing the solar prominences without the aid of a total eclipse, which L. proposed in 1866 and applied in 1868. His chief works are *Elementary Lessons in Astronomy*; *Contributions to Solar Physics* (1873); *Spectroscope and its Applications* (1873); *Primer of Astronomy* (1874). He has besides published various papers and memoirs, and is the editor of *Nature*.

Locle, Le, a frontier town of Switzerland, canton of Neuchâtel, 38 miles N.N.E. of Lausanne, and 6 miles S.W. of La Chaux de Fonds by rail, has a very large manufacture of watches. Pop. (1870) 10,333.

Lo'cri, a people of ancient Hellas, divided into the three tribes of the L. Ozolæ, dwelling to the N. of the Gulf of Corinth, and the L. Epicnemidii and L. Opuntii, on the shores of the Euboean Sea. The two last claimed to be Autochthons, and are mentioned by Homer (*Il.* ii. 527-535); the L. Ozolæ first appear in history during the Peloponnesian War, but are believed to have founded L. Epizephyrii (683 B.C.), a town of Magna Græcia, on the S.E. coast of the Bruttian peninsula, 13 miles N. of the promontory of Zephyrium (*Capo di Bruzzano*), and 4 miles from the modern Gerace (q. v.). This city, famous as possessing the first written code of laws in that of Zaleucus (*circa* 660 B.C.), after a long alliance with Syracuse against Rhegium, submitted to Rome in the early part of the 3d c. B.C., but revolting to Hannibal (215) was not recovered by the Romans until 205. It existed as a *civitas* as late as the reign of Valentinian II. (A.D. 375-392), and was probably destroyed by the Vandals in the 5th c.

Lo'cus, in geometry, is the curve described by a point, or the surface generated by a line, moving in a given manner. Thus, if a point move so that its distance from two given points is the same, it describes a right line, which bisects perpendicularly the line joining the two fixed points. Similarly the ellipse is the L. of a point, the sum of whose distances from two fixed points is constant; and the hyperboloid of one sheet the L. of a right line which rests upon three fixed lines.

Lo'cus Delic'ti, an expression of criminal law, denoting the place where a crime was committed.

Lo'cus Pœniten'tiæ, a legal phrase denoting the time allowed to withdraw from a bargain. The general rule of law is that both parties are legally bound at the same time; and that, until the contract is finally ratified, either may retract. This rule may, however, be modified by *Rei Interventus*.

Lo'cust (*Locusta*), a well-known genus of *Orthopterous* insects, having simple and short antennæ, large wings and wing-covers, and no projecting ovipositor. They have been noted from the most remote antiquity for their powers of destroying vegetation. The most familiar form is the Migratory L. (*L. migratoria*), attaining a length of 2 or 2½ inches, and which occurs in S. Europe, Asia, and N. Africa, but especially in S. Africa. Vast multitudes of these insects pass over large areas, devastating the districts, and consuming the entire vegetation. They possess great powers of flight, and as the hinder legs are very long, they are able to take leaps of considerable extent. In the mouth, mandibles, and maxillæ, or larger and smaller jaws, adapted for biting, occur. Locusts undergo an incomplete metamorphosis, the young coming from the egg in a form closely resembling that of the perfect insect—this latter fact possessing a distinct bearing upon their rapid increase and development. The natives of S. Africa light large fires during the flight of locusts, and thus contrive to obtain great quantities of them, as they fall to the ground stifled by the smoke and heat. The young locusts, destitute of wings, are able to march swiftly over a large district, and cross small streams, and deep trenches, on the bodies of their drowned neighbours. Gordon Cumming, in speaking of the L.



Locust (*Locusta*).

says 'Locusts afford fattening and wholesome food to man, birds, and all sorts of beasts; cows and horses, lions, jackals, hyænas, antelopes, elephants, &c., devour them.'

Locust Tree is applied in different countries to various distinct species of Leguminosæ. The carob tree of the Mediterranean region (*Ceratonia Siliqua*) bears the name from its being supposed to be the 'locusts' used by St. John as his wilderness food, this supposition imparting also the further name of St. John's Bread. It is a small tree of 20 to 30 feet, with pale red wood, yellow flowers, and pods containing much sweet mucilage; they are now used largely as food for domestic animals, and are sold in small shops as sweets for children. The L. T. of the W. Indies (*Hymenæa Courbaril*), was so called by the early Spanish voyagers from a fancied likeness of fruit to the above. It grows to a colossal size, is of remarkable longevity, and yields excellent timber as regards hardness and weight. The seeds of the woody legume are enclosed in a sweet mealy pulp much relished by the natives. The false acacia (*Robinia Pseud-Acacia*) is the L. T. of N. America. It was early introduced into Europe, and in parts of the Continent is now as wild-looking as its ally the native laburnum. It is one of the best trees for improving poor ground. The strong, hard, and durable wood is useful for a variety of purposes, as axle-trees, tree-nails, for turning, &c. The Honey L. T. of America is a *Gleditschia*. It is also known as the Sweet L. and Black L. It is a native of the Alleghany valleys and the basin of the Mississippi, reaches a height of 75 feet, and has small greenish spiked flowers. The seeds are surrounded with a sweet pulp, from which sugar has been made.

Lode (from the verb to 'lead;' the form is also seen in lodestone and lodestar), a technical mining term for a metalliferous mineral vein.

Lodève' (anc. *Luteva*), a town of France, department of Hérault, 30 miles W.N.W. of Montpellier by rail, has manufactures of cloth, ropes, soap, &c., and a trade in wood, wines, dyestuffs, and wool. L. is the birthplace of Cardinal Fleury. Pop. (1872) 8791.

Lodged, in Heraldry, is applied to an animal of the chase, like *couchant* to a beast of prey, to signify that it is *lying down*.

Lodg'ers and Lodging Houses. 14 and 15 Vict. c. 34 is by the preamble 'to encourage the establishment of well-ordered lodging houses for the labouring classes.' With the approval of the Secretary of State, it may be adopted by any parish having a population of 10,000. The Act provides for the levying of rates for the construction of L. H., and for the constitution of councils and commissioners. A *Common Lodging* is defined by the Act to be a house (not being a licensed victualler's) let wholly or in part at a rent not exceeding 3s. 6d. per week. The keepers of these must register them, and they are liable to be inspected by an officer of the Board of Health. The law of LANDLORD AND TENANT (q. v.) applies generally to the relationship of householder and lodger. The furniture of any room let as a lodging is *hired* by the lodger. See HIRING.

Lodg'ing-Money, an allowance made to soldiers in certain cases in lieu of barrack-accommodation. The amount paid in this way in 1876 was £80,000 for the regular, and £90,000 for the reserve forces.

Lo'di (a corruption of the Rom. *Laus Pompeia*), a town of Italy, province of Milan, on the Adda, 20 miles S.E. of Milan by rail. It has a cathedral of the 12th c., other churches, rich in marbles, frescoes, and wood-carvings, industries in majolica, silks, linens, &c., and a great trade in Parmesan cheese. Pop. (1874) 19,088. After the passage of the long narrow bridge of L., under full fire of the Austrian batteries, Napoleon won the memorable victory that secured him the possession of Lombardy, 10th May 1796.

Lo'di, the name of the Mohammedan dynasty that preceded the Moguls at Delhi. It was of Afghan origin, and had previously established itself at Lahore in the Punjaub. In 1450, Belol L. drove the last of the Sayyids from Delhi; his brother conquered Behar; but his son, Ibrahim, was completely defeated and killed at the first battle of Paniput, in 1526, by Baber, the founder of the Mogul Empire.

Lodz' (Russ. *Lodzi*), a town of Russia, government of Petrokov, 87 miles S.W. of Warsaw by rail, called the 'Manchester of Poland,' has extensive manufactures of cotton and woollen cloth. Upwards of 15,000 operatives are employed in both manufactures. Fifty years ago L. had only a few hundred inhabitants; in 1870 its pop. was 34,328.

Loess' (Ger. *löss*, from *lösen*, 'to loosen'), a fluviatile deposit of fine arenaceous calcareous clay. The L. of the Rhine valley may be taken as a typical example. It is a yellowish grey unstratified loam, attaining in some places a thickness of several hundred feet, and abounding in terrestrial and freshwater shells. Similar deposits are found in the valleys of other great rivers in Europe, and the fine powdery structure of the L., which renders it very liable to be washed away, indicates that the whole valleys must have been covered with still water. It is more recent than any other rock in its neighbourhood, and near Basel caps hills 1200 feet above the sea. The central portions of Europe must then have been depressed at a comparatively recent geological period; and as the land rose, the L. became uncovered, and subsequently deeply cut by the rivers which now flow through the valleys. Consequently these L. deposits form in many places high banks on both sides of rivers. L. deposits fill the lower valleys of the Nile, Mississippi, and Missouri.

Lofo'ten, less correctly **Lofo'den**, the largest group of islands belonging to Norway, stretches 140 miles along the coast of Norway, from which it is separated by the Vestfjord. The surface is wild, with sharp cliffs, here forming frightful breakers on the shore, there towering in jagged peaks to the snow-line. Area, 212 sq. miles; pop. (1875) 22,000 (including Vesteraalen group). Owing to the cold climate, which changes little from summer to winter, trees are scarce, and tillage is only possible in a few spots. Cattle keeping is more successful, but the shoals of cod that yearly (especially in February and March) spawn on the coasts are the chief source of livelihood. Over 4000 boats and 20,000 men are employed in fishing. The average yield is 20,000,000 fish, worth £220,000.

Log is the apparatus used at sea for determining the rate of a ship's progress. It consists of a sector-shaped piece of wood, of 5 or six inches radius and a quarter of an inch thick, loaded round the rim so as to float perpendicularly with about two-thirds of its mass immersed, and its apex pointing upwards. To it is fastened one end of the *log-line*, which is wound round a reel in the stern part of the ship. When about to be used, the L. is flung overboard, and the length of line run out in a given time observed. This length is measured by knots placed along the line at such distances from each other that the number run out in half a minute gives at once the nautical miles or *knots* per hour. A ship's *L.-book* is the journal in which the various particulars regarding the vessel's progress, latitude, longitude, &c., are entered as often as they are ascertained.

Lo'gan, John, was born at Soutra, Midlothian, in 1748. After studying at Edinburgh University, he became for a time tutor in the family of the Sinclairs of Ulbster. In 1770 he edited the poems of his friend Michael Bruce, then three years dead, adding to these several original compositions. One of the poems in the volume was the well-known *Ode to the Cuckoo*, claimed by L., but by not a few ascribed to Bruce (q. v.). In 1774 L. was appointed minister of South Leith church. This charge he laboured in for many years with much success, preaching sermons whose effect, when ultimately edited and published by Blair (2 vols. 1790; 5th ed. 1807), was astonishing. In 1781 he produced his *Poems* and *Elements of the Philosophy of History*, and three years later a tragedy entitled *Runnimede*, which failed on the boards of the Edinburgh theatre. In London, whither he had gone to carry on literary work, he died, 28th December 1788. L. was a graceful and natural poet, and the finest sermon writer among the Scottish clergy of the 18th c.

Logan, Sir William Edmond, a celebrated Canadian geologist, was born at Montreal, 23d April 1798. He graduated at Edinburgh, and in 1818 went to London, where he entered the bank of his uncle. In 1829 he became director of copper-smelting works at Swansea, Glamorganshire, where he soon began to direct his study to geology. His researches among the coalfields attracted the attention of De la Beche, at that time the director of the English Geological Survey. In 1841 L. returned to Canada, and upon the formation of the Canadian Geological Survey was nominated its director. He began ope-

rations in 1843, and by his subsequent researches, especially among the ancient Laurentian deposits, established a world-wide reputation as a geologist. At the Paris Exhibition of 1855 he was presented with a gold medal, and the succeeding year was made a knight. L. died at Castle Malgwyn in Pembrokeshire, June 22, 1875.

Logania'ceæ, a small natural order of exogenous plants, consisting of a heterogeneous group of trees, shrubs, and herbs, ranging over the tropical regions of the New as well as of the Old World, with a few extra-tropical species in the southern hemisphere and in N. America. The species number nearly 200, several of which are highly poisonous. See STRYCHNOS, NUX VOMICA, IGNATIUS' BEAN, WOORALI, and UPAS.

Log'arithm. The L. of a given number is the power to which another given number must be raised in order that it may equal the former. Thus in the equation $N = a^x$, x is the L. of N to base a. By changing a, we change the value of the L. of the same N, and pass to a new system of logarithms with the new value of a for its base. Whatever the system, the L. of its base is unity, since $a = a^1$; and this is the definition of the base. For instance, let us take $a = 2$. Then from $1 = 2^0$, $2 = 2^1$, $4 = 2^2$, $8 = 2^3$, $16 = 2^4$, &c., we obtain at once 0 = log. 1, 1 = log. 2, 2 = log. 4, 3 = log. 8, 4 = log. 16, &c. In this way we may construct a rough table of logarithms, which evidently increase in arithmetical progression as the numbers increase in geometrical progression. Thus writing the natural numbers in a line, we may set underneath them the numbers of which, according to our present system, they are the logarithms :—

log.	0	1	2	3	4	5	6	7	8	9	10
num.	1	2	4	8	16	32	64	128	256	512	1024

These of course give the logarithms of a very few of the numbers; but they will be sufficient to indicate the practical value of logarithmic tables. All we can determine about the L. of any other number not in the lower line is between what whole numbers it lies. For instance the L. of 29 must be somewhere between 4 and 5, the L. of 1000 somewhere between 9 and 10. The great value of logarithms lies in their following properties; by their means we substitute addition for multiplication, subtraction for division, multiplication for involution, and division for evolution. For example, it is required to multiply 16 by 32. From one table we get the logarithms (4 and 5) of these numbers, then run one eye along the line of logarithms till we find the number (9) which equals the sum of these. Under 9 we find its corresponding number 512, which is therefore the product of 16 and 32. The various properties of logarithms are simple deductions from the law of indices, and may be generally proved thus. Let $M = a^m$, $N = a^n$, or $m = \log. M$, $n = \log. N$ to base a. Then $M \times N = a^m \times a^n = a^{m+n}$ or $(m + n) = \log. (M \times N)$; $M \div N = a^{m-n}$ or $(m - n) = \log. (M \div N)$; $M^p = a^m \times a^m \times a^m$ to p times $= a^{pm}$ or $pm = \log. (M)^p$. To all bases, log. 1 = 0 since generally $1 = a^0$; and log 0 = $-\infty$.

The theory of logarithms, and the methods for finding numerical values to any given base, depend upon the expressing of a^x in a convergent series of convergent powers of x. This series is as follows—

$$a^x = 1 + Ax + \frac{A^2x^2}{1\cdot2} + \frac{A^3x^3}{1\cdot2\cdot3} + \frac{A^4x^4}{1\cdot2\cdot3\cdot4} + \ldots.$$

where A is some determinate function of a. To find it, put $x = \frac{1}{A}$; then

$$a^{\frac{1}{A}} = 1 + 1 + \frac{1}{1\cdot2} + \frac{1}{1\cdot2\cdot3} + \ldots. = e$$ suppose a fixed finite quantity. Hence $a = e^A$ or $A = \log. a$ to base e. This base e, whose value is 2·718281 to the sixth decimal place, is the base of the natural system of logarithms. This system is also known as the Napierian, from the name of the discoverer and first tabulator of logarithms, Napier of Merchiston, near Edinburgh. It is the system which occurs constantly in the higher analysis; but as a system for calculation it is inconvenient. Our common logarithmic tables are constructed upon the system whose base is 10; so that 2 = log. 100, 3 = log. 1000, and so on. The formula given above for a^x may be written

$$a^x = 1 + x \log. a + \frac{x^2 \log.^2 a}{1\cdot2} + \frac{x^3 \log.^3 a}{1\cdot2\cdot3} + \ldots$$

where, it is understood, log. a is calculated to base e. From this series we can find the number of a given L., provided we know the Napierian L. of the base. Given the number to find the L. requires another formula, which is easily proved, and may be found in any ordinary text book of algebra. It is

$$\log. (1 + x) = M \left(x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} - \ldots \right)$$

where M is the modulus of the system. In the Napierian system it is unity; and for any other, is the reciprocal of the Napierian L. of the base. The *logarithmic curve* is a transcendental curve having the general equation $x = e^y$. The *logarithmic spiral* has the polar equation $r = e^\theta$. It has several remarkable properties, and is interesting as being the path which would be pursued by a body under the action of a central force varying inversely as the cube of the distance.

Loggia (Ital. 'lodge,' Fr. *loge*) a term applied, in Italian architecture, to a vaulted hall open on several sides, like the L. de' Banchi in Genoa or the L. de' Lanzi in Florence; to an open arcade along the side of a building, as the L. of the Vatican, adorned with the pictures of Raphael; or to a Belvedere (q. v.) built upon a flat roof.

Log'ic is the science of inference. Knowledge divides itself into two parts :—first, a part discovered immediately by direct consciousness; second, an indirectly known part, reached by proofs and reasons. With this second and larger part L. has to do. Inference is carried on by means of three statements, each of which contains two names and the verb 'is.' The names, or *terms*, coupled by the verb, make a *proposition*; and three propositions make an argument, or *syllogism*. These three italicised words indicate the parts of logical doctrine. If the process of inference consist in comparing two or more general propositions synthetically, and thus forming a third proposition or conclusion of less general import, it is named deductive reasoning; but if the process be one of generalisation, a passing from individual facts to laws, it is then named inductive reasoning. As having to do with the forms of reasoning upon every subject, L. has been defined as 'the science of sciences,' and the 'art of arts.' It is not merely speculative but practical; it teaches the true value of words, guarding against ambiguities of thought and expression, especially proving serviceable in the exposure of all fallacies. The father of L. is undoubtedly Aristotle. His six treatises entitled the *Organon* discuss what is now called formal L. under the name of Analytic, and applied L. under the name of Dialectic. The term 'L.' was not applied to the contents of these books till five hundred years after Aristotle's death. See DEDUCTION, INDUCTION, SYLLOGISM, &c.

Logog'raphers (Gr. *logographoi*, 'prose writers') was a name given by Thucydides to the early Greek historians from Cadmus of Miletus to Herodotus, and afterwards applied generally to the old chroniclers before Herodotus. The L. translated into unmetrical language the legends, genealogies, theogonies, and mythological fables of the Epic poets. These rude beginnings of historical writing displayed no logical connection, and were compiled less with a view to state truth than to give pleasure. The word meant also 'writing speeches,' and was applied, generally as a term of reproach, to those who lived by writing speeches for others to deliver. In Latin, it was applied to 'an accountant,' and logography is a method of printing in which a type represents a word, instead of forming a letter.

Logoma'nia, or Disease of the Faculty of Language. It frequently happens, in connection with cerebral lesions, that, although the ideas are clear and distinct, and the faculty of speech but slightly impaired, it is impossible to represent the ideas in words by their appropriate symbols. A patient, suffering from hemiplegia, understood thoroughly the nature of the questions asked, and the appropriate answers, and was able to articulate 'yes' and 'no' distinctly, but could not represent the idea by its appropriate symbol. Sometimes L. seems to depend on a defect in memory, variously represented. In some cases the defect is in regard to names or dates, in others to substantives, or to parts of words. Cerebral lesions, as the result of fever, or organic disease of the brain, may so affect the memory as to obliterate acquired languages, and it occasionally happens that the foreign or acquired language is used with greater fluency

than the native language. Cases of true L. are extremely rare, and they depend more frequently on functional disorder than on organic disease.

Log'os (Gr. 'word'). After the Captivity, the Jews finally abandoning their tendency to lapse into Polytheism and also their anthropomorphic notions about Jehovah, came to regard him as a pure, pervading spirit, between whom and the material universe there could be no direct contact. Hence in interpreting their old books, they began to personify his attributes as the instruments of this contact. God made the world, and communed with men by his Word (Memra), by his Angel or Messenger, by his Wisdom (*cf.* Prov. viii. 22–31). The Law was delivered 'by the disposition of angels' (*cf.* Acts vii. 53), or by one, the angel of the Law (*cf.* Gal. iii. 19), but the ordinary representative of God was the Memra or Divine Word. Meanwhile, according to Plato, the universe, which was the expression of the idea of God, was not fashioned by the supreme thinker, but by his active thought, the L., the Demiurge (q. v.). And while the Hebrew teaching proper held by the personification of the Divine Wisdom, the Greek conception of the L., as a subordinate deity, was incorporated with Hebrew thought at Alexandria, especially by Philo (q. v.). In the Platonic L. Philo found the means of reconciling the Jewish Scriptures with Gentile philosophy, toning down the Pantheistic conception of God held by the latter, and explaining away the narratives of the former, in which God is represented in form, thought, and action as a man. The L., according to Philo, was 'a second or delegated God,' 'the first-born son of the Eternal Father,' 'the express image of his person,' 'the word of God by whom the world was made.' There was, however, another current of thought among the Jews at this time, and that was the expectation of the Messiah (q. v.). At first this took the form simply (1) of the hope of entire deliverance from all foreign dominion, and the restoration of the nation to the position of power and prosperity which it enjoyed in the golden age of the reign of David. With the more spiritual-minded—*e.g.*, the Essenes—the expectation took (2) the form of looking for the fulfilment of the prophecy of Malachi, that the Lord himself would come to establish his kingdom; while the Philonic school (3) identified it with the L. idea. These different forms of the Messianic expectations are traceable in the four Gospels. The first two pervade the first three Gospels, and the third pervades the fourth, being most distinctly expressed in the introduction. Only the writer goes a step beyond Philo, and identifies the Divine Word with Jesus of Nazareth: in him 'the Word was made flesh' (John i. 14). See Milman's *Hist. of Christianity* (1840), Hunt's *Essay on Pantheism*, Works of Philo, Bryant's *Philo-Judæus* (1797), Liddon's *Bampton Lectures* (1867).

Logro'ño, a town of Spain, capital of a province of the same name on the Ebro, 60 miles E.N.E. of Burgos by rail. It is well built, has a theatre, several educational and literary institutions, and a brisk trade in wine, olive oil, and fruits. Pop. 11,239. L. is the *Julia Briga* of the Romans.

Log'wood, the wood of *Hæmatoxylon* (Gr. 'blood-wood') *Campechianum*, belonging to the natural order *Leguminosæ*. It is the most valuable and extensively used dyewood of commerce, and is obtained from the W. Indian islands and Central America. The tree attains a height of from 20 to 40 feet, with a diameter of 18 inches, but as only the heart-wood is of value for tinctorial purposes, the billets imported are about 3 feet long, and 6 to 8 inches in diameter. The heart-wood is exceedingly hard and dense, having a deep brown, but when freshly cut a bright red colour. In order to extract its tinctorial principle the wood is chipped or rasped down by powerful machinery. The colouring matter—Hæmatoxylin—is readily extracted either by alcohol or by boiling water. The infusion, obtained with boiling water, has a fine deep purplish-red colour, which may be varied by treatment either with acids or alkalines. L. is chiefly employed in calico printing, in which with appropriate mordants it yields a great number of shades of red, violet, lilac, grey, and a fine velvety black. It is also used in the dyeing of silk and wool, and both on account of its cheapness and the ease with which it can be worked, it is a favourite material with dyers. L. is also used in the manufacture of ink, both black and red.

Medicinal Properties of L.—L. is a mild, unirritating astringent, and is used in cases of atonic dyspepsia, passive hæmorrhages, chronic diarrhœa, and dysentery. *Decoction* of L. is given in doses of from 1 to 2 oz., and the *extract* in 10 to 30 grains.

Lohardugg'a, a small town in Chota Nagpur, Bengal, British India, 113 miles N.W. of Calcutta, has given its name to the *district* of L., which has an area of 12,044 sq. miles; pop. (1872) 1,237,123. The chief town is Ranchi, with a military cantonment at Dorunda—the home of the hill tribes of Coles and Oraons, who have formerly given trouble. There are two tea plantations and some coal-mining. The only manufacture is shell-lac and lac-dye; the staple crop is rice. The Anglican and German missions had obtained 27,511 converts in 1874.

Loigny, a village of France, department of Eure-et-Loir, 18 miles N.W. of Orleans, was the scene of a defeat of the left wing of the French army of the Loire, after severe fighting, by the Grand Duke of Mecklenburg, commander of the right wing of the army of Prince Friedrich Karl, 2d December 1870.

Loire (the *Liger* of the Romans), the largest purely French river, rises in the Cevennes, flows N.W. and W. through the centre of France to the Bay of Biscay, receiving from the right the Loir, and from the left the Allier, Cher, Indre, and Vienne. It is 700 miles long, has a rapid course, and is navigable for 450 miles. Shifting sandbanks, shallowness in summer and ice in winter, retard the navigation, and its lower course is provided with high embankments and a lateral canal (since 1838) to guard against inundations. The basin of the L. comprises one-fourth of 'the garden of France.' The river put a check to the German operations, and formed the basis of the French army to the close of the war of 1870–71.

Loire, a department in the S.E. of France, bounded N. by Saône-et-L. and Allier, S. by Haute-L. and Ardeche, E. by Rhône, and W. by Puy-de-Dôme. Area, 1838 sq. miles; pop. (1872) 550,611. It is traversed from S. to N. by the L. and by the Paris-à-Agen Railway, is watered in the W. by the Lignon, and touches the Rhône in the S.E. Bordered on the N.E. by the Monts du Lyonnais, and on the S.W. by the Monts du Forez, it has extensive iron and lead mines, and the richest coal-fields of France. There are also quarries of marble, porphyry, granite, and flint, and manufactories of silks, iron, and steel wares, flint-glass, &c. Some 355,000 hectolitres of wine are annually produced, almost entirely in the region of the Rhône. Of many mineral springs the chief are at St. Alban, Montbrison, Sail-les-Bains, and Roanne. The chief town is St. Etienne.

Loire, Haute, a central department of France, bounded N. by Puy de Dôme and Loire, S.E. by Ardèche, S.W. by Lozère, and W. by Cantal. Area, 1917 sq. miles; pop. (1872) 308,732. The surface is broken by three volcanic offshoots of the Cevennes, Mont Méyene in the S.E. attaining a height of 5763 feet, and is watered by the Loire and its tributary, the Allier. The climate is one of extremes, and agriculture is in a backward state, stock-rearing being the principal industry. There are manufactures of lace, silk, blond, paper, and cloth; and coal (1,140,000 tons yearly), marble, lead, building-stone, &c., are extensively raised. Three branch lines of the Paris-à-Lyon Railway traverse the department. The chief town is Le Puy.

Loire-Inférieure, a maritime department in the W. of France, bounded N. by Morbihan and Ille-et-Vilaine, E. by Maine-et-Loire, S. by Vendée, and W. by the Bay of Biscay. Area, 2654 sq. miles; pop. (1872) 602,206. The surface is flat and monotonous, marshy along the coast, and is watered by the Loire, with its tributaries the Erde (joined by a canal to Vilaine) and Sévre, and by several streams flowing into the Lac de Grandlieu (15 sq. miles). The climate is mild and moist, the soil fertile, but badly cultivated, one-half being under tillage, one-fifth heath, one-sixth in pasture, and the remainder vineyards (yielding annually 22,000,000 gallons of an inferior wine), oak-forests, &c. There are manufactures of cotton, linen, glass, leather, paper, &c.; extensive herring and sardine fisheries; and rich iron, coal, marble, and granite deposits. Three railways and two canals traverse the department. The chief town is Nantes.

Loi'ret, a central department of France, bounded N. by Seine-et-Oise and Seine-et-Marne, E. by Yonne, S. by Cher, and W. by Loir-et-Cher and Eure-et-Loir. Area, 2614 sq. miles; pop. (1872) 353,021. It is intersected in a N.W. direction by the Loire, and by the Plateau d' Orléans, a range of

hills nowhere exceeding 800 feet. The climate is mild, the soil fertile and well cultivated, one half of the surface being under crops (wheat, barley, maize, &c.), one quarter forest, and the remainder pastures and vineyards (yielding 5,300,000 gallons of wine annually). Cattle rearing is an important industry, and there are manufactures of sugar, vinegar, brandy, porcelain, &c., and a trade in grain, spirits, honey, cattle, and wool. Four canals and three lines of railway traverse the department. The chief town is Orleans.

Loir-et-Cher, a central department of France, lies on both sides of the Loire, and is bounded N. by Eure-et-Loir, S. by Indre, W. by Indre-et-Loire and Sarthe, E. by Loiret and Cher. Area, 2452 sq. miles; pop. (1872) 268,801. It is watered by the Loir in the N., the Cher in the S., and in the centre by the Loire and its tributaries. The surface is flat, and the soil singularly rich to the N. of the Loire, but in the S. are the partly sandy, partly marshy plains of Bologna. The products are wheat, hemp, wine (980,000 hectolitres, valued at ten millions of francs), fruits, and vegetables. The chief town is Blois.

Lo'ja, or **Loxa,** (1) a town of Spain, province of Granada, on the Xenil, 34 miles N.N.E. of Malaga, has considerable manufactures of wool and paper. On the hill above the town are the remains of a Moorish castle. Pop. 17,500.—(2), a town in the republic of Ecuador, S. America, 250 miles S. of Quito, near which are gold, quicksilver, and coal mines, marble quarries, and extensive woods of Cinchona trees, producing excellent Peruvian bark. Pop. 10,000.

Loke'ren, a town of Belgium, province of E. Flanders, on the Durme, an affluent of the Scheldt, 11½ miles E.N.E. of Ghent, and 25 miles W. of Malines by rail. It has an important corn trade, and manufactures of cotton, linen, damask, laces, &c. Pop. (1874) 17,971.

Lo'ki, in Scandinavian mythology, the representative of the evil principle, was born of a giantess, and was fair of face, with a deceitful soul. By the giantess Angurboda ('anguish-boder') he produced three monsters, Hel (q. v.), the wolf Fenrir ('ruin'), and the Snake of Midgaard. His ill deeds, especially the death of Balder, provoked the Æsir, who pursued him till they caught him in a waterfall. Taking his two sons, Vali and Narfi, they changed one to a wolf, which killed the other; then they bound L. upon three great stones with his son's entrails, which hardened to iron. Skadi hung a snake above him, whose venom should poison his face; but Sigyn, his faithful wife, according to the *Younger Edda*, stands over him, catching it in a basin. Whenever the overflowing drops touch him, he starts, shaking the world with earthquakes, till Ragnarök, when all chains shall break, and L. shall rise with the giants to fight the last battle with the Æsir on the plain of Vigridr.

Lokmân, an Arabian sage of unknown antiquity, whose name has been given to a collection of fables, commonly used as a text-book for students of Arabic. Of Indian origin—many of them appearing in the *Panchatantra*—these passed into Arabia through Greek and Syriac channels, probably in the 15th c. Tasteless in themselves, and corrupt in style, they have yet been translated into Latin by Erpenius (1615), into German by Olearius, French by Tannegney, Spanish by Ascensio, Danish by Rask, &c., while of countless editions may be mentioned those by Freytag (Bonn, 1823), Helot (Par. 1847), and Dernburg (Berl. 1850).

Lol'igo, a genus of *Cephalopoda* (q. v.), or Cuttlefishes, including those forms popularly named 'Squids,' and belonging to the family *Teuthidæ*. The L. has ten arms, two being longer than the others, and provided with suckers at their extremities only. The body is long, and has two triangular posterior fins. *L. vulgaris* and *L. media* are very common species.

Lol'ium. See DARNEL and RYE-GRASS.

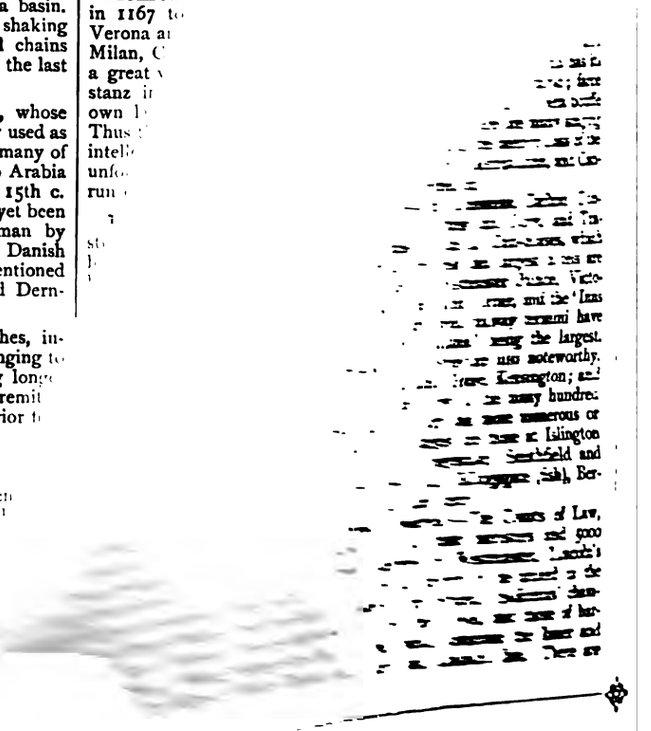
Loll'and, or **Laa'land** ('low land'), an island of Den lying in the Baltic, before the S. entrance to the Great B of Seeland, E. of Langeland, and W. of Falster. Area miles; pop. 63,953 (including the neighbouring isle surface is low and flat, with great forests of oak and b willow fences. The chief town is Nakskov.

Loll'ards were a religious sect wh ning of the 14th c. at Antwerp.

from the Low-German *lollen* (comp. Eng. *lull*, i is supposed to denote mumblers or chanters of spread quickly both in Germany and the N their name covered a great religious move which lasted for more than a century. In the name L. got mixed up with a native wo 'loungers,' 'idle vagrants,' and was used men as a term of scorn and insult for th Hence the Wiclifites sometimes threw b assailants, declaring them to be the real *the Shipman's Prologue*, l. 1173. Ske Press Series, 1874.) In 1382, with J the heretics of this name were imp Church of England the doctrine o royal writ ordered the instant bar Wiclif. His death was a great blo ceased to be an organised movem mass of opinions which bore the faith gradually evolved itself, a the Bible as a source of relig (1395) a petition, which repre bore strong denunciations aga of disbelief in priesthood, Under Richard II. the L Henry IV. and Henry V. Lollardism been extingu touches upon religious r tionary population' (145 smouldered there all th into something like a p of Ayrshire in the ye *Kyle*, see John Knox

Lom'bard Arch construction, is the architecture in Ital Switzerland, but Modena (1099–11 churches of St. A Ambrogio in M of the 12th. vaultings, by classical orna and are usua

Lomba in 1167 t Verona a Milan, C a great stanz i own l Thus intel unfo run



till Autharis, son of Cleph, was chosen king (585–90). He established a constitution placing the old Roman population and the L. under equal laws, and leaving the cities essentially independent. His widow, the Bavarian princess Theodelinda, married Duke Agilulf of Turin, who died in 615. She was devoted to Gregory the Great, and did much to spread Catholicism among the L. Ariovald (died 636) and Rothari (died 652) were the next kings, the latter famous for the system of laws promulgated (22d November 643) by him under the title 'Edictum,' which, as developed by his successors, was long after the foundation of the revived study of law in the Middle Ages. A series of Catholic kings begins with Aribert (died 663), nephew of Theodelinda, whose line (except from 662 to 671, when Grimoald, Duke of Beneventum, ruled), held the throne till 702. After a ten years' struggle Liutprand (q. v.) became king (713–44), but when his successor Aistulf (749–56) sought to follow out his plans, he was forced by Pippin the Short to yield the conquered Exarchate. (See EXARCH.) Desiderius (756–74) ravaged Romagna and advanced against Rome, when Pope Adrian I. called for help on Karl the Great, who took Pavia, put Desiderius in a convent, and made Lombardy a part of the Frankish kingdom, retaining its former laws. A rebellion of certain Lombard dukes in 776 led to their deposition and the establishment in their stead of counts (Comites). In S. Italy the Lombardic principalities, Beneventum, Capua, and Salernum survived the northern kingdom for 200 years. The L. soon mixed with the other inhabitants, forming a Romance people, and in the 10th c. their Teutonic dialect had disappeared, without leaving any literary traces. The kings of the L. wore the famous Iron Crown (q. v.). See Flegler, *Das Königreich der L. in Italien* (Leips. 1851); Abel, *Der Untergang des Lombardenreichs in Italien* (Gött. 1858).

Lom'bardy, a territory of N. Italy, between the Alps and the Po, including eight provinces (see ITALY), and bounded W. by Lago Maggiore and the Ticino, which separate it from Piedmont, and E. by Lago di Garda and Venetia. Area, 8940 sq. miles; pop. (1875) 3,553,913. The N. is an Alpine mountain-land with beautiful valleys, affording fine pasturage; the S. an exceedingly fertile and well-cultivated plain, drained by the Po, with its affluents the Ticino, Lambra, Adda, Oglio, and Mincio, and provided with a complete system of artificial irrigation. Wheat, maize, rice, and millet are the prevailing crops; and wines, olives, melons, oranges, citrons, figs, and peaches are much cultivated. The dairy farms yield yearly 'Parmesan' cheese and butter to the value of £935,000, while the silk produced is worth as much as £3,500,000 per annum. In 1875 the cattle in L. numbered 626,058; sheep, 157,959; goats, 82,491; swine, 120,691; horses, 80,943; mules, 12,793; and asses, 5,890. The cottons manufactured are worth £950,000 annually; linens, £320,000; and hardware, £240,000. L. was part of the kingdom of the Franks from their conquest of the Lombards (q. v.) in 774 to 888, from which date it was mainly in the possession of the German emperors till the rise of the Republic of Milan (q. v.) in 1150. Two powerful leagues (see LOMBARD LEAGUE) were formed by the cities, the first of which worsted Friedrich Barbarossa in 1176, the second Friedrich II. in 1225; and after their dissolution the importance of Milan was still considerable under the Viscontis and Sforzas (q. v.). In 1535 it came under Karl V., and after the Spanish War of Succession fell to Austria in 1713. In 1797 it became part of the Cisalpine Republic (q. v.), in 1805 of the kingdom of Italy, and in 1815 again fell under the hated domination of Austria; but by the Peace of Zürich (10th November 1859) L. was ceded to Napoleon I., and by him to Sardinia.

Lombards, in the middle ages, was the name applied to the Italian bankers and brokers (chiefly of Lombard origin), whose influence was at its height in the 12th c. Lombard Street in Paris was once the financial centre of France, as Lombard Street in London still is of England.

Lombok', one of the Sunda Islands, in the Malay Archipelago, between Bali and Sumbawa. Area 1850 sq. miles, pop. 250,000, mainly Mohammedans. The coasts are lined by volcanic mountains, enclosing a low, fertile, interior plain, in which cotton and rice are extensively cultivated. The capital is Mataran; the seaport Ampanam, much frequented for provisions.

Lo'mond, Loch (Gael. *Leoman* or *Leamhan*, 'the loch of the elm'), the largest lake in Scotland, lies between Dumbarton, Perth, and Stirling, is 24 miles long, 22 feet above the level of the sea, and has an area of 45 sq. miles. The narrow N. end is singularly grand, over-shadowed by Ben Lomond, Ben Vorlich, and lesser mountain masses, while the widely expanded southern extremity (7 miles broad) is famed for its rich beauty, fairy archipelago, and woody banks. The loch receives the Endrick and many smaller streams, and is drained by the Leven into the Clyde.

Lom'za, a government of Poland, Russia, is marshy in the N., but mountainous in the S., and is drained by the Bug (its S. boundary), with its affluent the Narev. Area, 4667 sq. miles; pop. (1870) 456,429.—L., the capital, on the Narev, 76 miles N.E. of Warsaw, was once one of the chief towns of Poland and the seat of the Diet. Pop. (1870) 10,340.

Lon'don, the metropolis of the British Empire, the most populous and wealthy city in the world, lies on both banks of the Thames, about 50 miles from the sea, in lat. 51° 31′ N., and long. 0° 6′ W. About three-fourths of L. is in the county of Middlesex, the remainder being chiefly in Surrey, but portions are also in Kent and Essex. In addition to the cities of L. and Westminster, the metropolis comprises the parliamentary boroughs of Marylebone, Chelsea, Finsbury, Hackney, Tower Hamlets, Lambeth, Southwark, and Greenwich, each of which returns two members, the City returning four. The City of L. proper stands on one square mile of ground, is divided into 108 parishes, and has a night population of 70,000, mainly composed of those who take care of the great public offices and warehouses, and their families. During the business hours of the day its population is about 1,000,000. It is governed by the Lord Mayor (chosen annually), twenty-five aldermen, four sheriffs, and 268 common councilmen. The election of the Lord Mayor is vested in some 7000 liverymen, the members of the eighty ancient city guilds. The revenue of the corporation in 1875 was £655,319, and its expenditure £592,244. The city of Westminster is nominally governed by the dean and chapter, but virtually by a high steward and high bailiff chosen by them. The remaining districts of L. are governed by local officers, all attempts to substitute a great central administration for the entire metropolis having hitherto failed. The main thoroughfares run like the river from W. to E. One continuous road extends from Shepherd's Bush by Bayswater, Oxford Street, Holborn, Cheapside, and Whitechapel and Mile-End Roads to Stratford-le-Bow, a distance of 12 miles. Nearly parallel to it, but joining it at Cheapside, is the great thoroughfare from Hammersmith and Kensington, receiving tributary streams of traffic from Fulham, Brompton, and Chelsea, by Hyde Park, Piccadilly, the Strand, Fleet Street, and Ludgate Hill. The longest continuous line of streets from N. to S. is one of 10 miles from Stamford Hill by the Kingsland Road and Bishopsgate Street, across L. Bridge by the Borough and Clapham Roads to Balham. Many of the streets in the older parts of the town, in Spitalfields, Clerkenwell, and Holborn, are narrow, mean, straggling, and irregular; others, particularly those in the W. and S.W. districts—Mayfair, Tyburnia, Kensington, and Belgravia—spacious, regular, and stately. In the city is a greater proportion of stone buildings than elsewhere, and its streets are massive and imposing. The houses are mainly built of brick, originally light in colour, but which soon become discoloured by the all-pervading smoke. Many of them are consequently painted and plastered, and stuccoed. The monotonous regularity of Bloomsbury and Marylebone is relieved by a variety of handsome squares and crescents. Among the more important lines of traffic is the City Road from the Bank to Islington, the extensive northern district, and thence westwards by the New Road to Paddington. Several wide thoroughfares extend from the line of Oxford Street to the N., of which the more important are the Edgware Road, which leads to Hendon, and the Tottenham Court and Hampstead Roads, which extend to the suburbs of Camden and Kentish Town. The entire outer circle of the Metropolis beyond the ugly lines of dingy streets is covered with fine villas, the suburban population being a very large portion of the inhabitants. To the N. lie the suburbs of Kilburn, Hampstead, Highgate, Holloway, and Dalston; to the W., Hammersmith, Brompton, and Chelsea; to the S., Clapham, Brixton, Camberwell, Sydenham, and Blackheath; to the E., Bromley, Bow, and Stratford.

Streets, Bridges, &c.—Among the finest streets are Queen Victoria Street, Cornhill, and King William Street in the City;

and, in the West End, Regent Street, Bond Street, and Oxford Street—the fashionable shopping streets—Whitehall with its stately architecture, and Piccadilly and Pall Mall of Club-house fame. The most handsome street of dwelling-houses is Portland Place, a broad continuation of Regent Street towards Regent's Park. Some of the open spaces, such as Belgrave, Eaton, Eccleston, and Grosvenor Squares, and Lincoln's Inn Fields, the home of lawyers, are large and airy, and lined with noble buildings. The chief centres of traffic are the spaces in front of the Royal Exchange and the General Post-Office in the City; Charing Cross, Oxford Circus, and Hyde Park Corner in the West End; the Angel at Islington in the N., and the Elephant and Castle, where the main roads from the river bridges meet and again diverge in all directions, in the S. From January to December the traffic of the City is incessant; but W. of Temple Bar the influence of the London season asserts itself; and in May, June, and July, when the noble and wealthy residents invade it by thousands, the West End presents its liveliest appearance. Under the direction of the Metropolitan Board of Works, which consists of thirty-six members, gigantic changes are continually taking place in street geography. Holborn Viaduct, and the magnificent Thames Embankment, a wide river-boulevard now completed on the N. from Blackfriars to Westminster, and from Albert Bridge to Chelsea Hospital, and on the S. from Westminster to Lambeth, are among the latest and greatest of these improvements. With the two splendid approaches from Charing Cross and the City, the Embankment has already cost £4,000,000. New thoroughfares from Oxford Street to Shoreditch and from Tottenham Court Road to Charing Cross, sweeping away miles of old lanes and alleys, are in projection. The river is crossed by L., Southwark, Blackfriars, Waterloo (the longest, 2456 feet), Westminster, Lambeth, Vauxhall, Chelsea, Albert, Battersea, and five railway bridges. No stream in the world in an equal space is spanned by such colossal and magnificent structures. E. of L. Bridge communication is effected by numerous ferries, and the Thames Tunnel at Wapping. The Thames Subway, from Tower Hill to Tooley Street, 25 feet below the bed of the river, was opened in 1870, and two additional Subways are in course of construction. An agitation is now being carried on for the formation of a great new bridge in the E.

Public Buildings, &c.—L. is full of superb public buildings, a list or description of which would occupy enormous space. On account of the excessive flatness of the ground, and the density of their surroundings, they are much obscured from public view, and few show to the best advantage. Among them are the royal residences—Buckingham, Kensington, and St. James's Palaces—the Houses of Parliament at Westminster, a 'dream in stone,' built from Barry's design, 1840, at a cost of £2,000,000, the largest Gothic building in the world; the Foreign and other Government offices in Whitehall; Somerset House, a spacious quadrangular building with 3600 windows (built 1776) in the Strand; the new Law Courts in progress (1877) at Temple Bar; the Bank of England (covering eight acres); Guildhall (built 1411–31, restored 1789 and 1866), and the Royal Exchange (opened 1844) in the City. Near the Docks are the Mint, Custom-House, and the historic Tower (built 1078). Of the 600 Episcopal churches, the most famous are St. Paul's Cathedral (q. v.), Westminster Abbey (q. v.), St. Bartholomew's, Smithfield (founded 1102, restored 1865), the Temple Church (built 1185), and St. Saviour's, Southwark. Several of the new Ritualistic churches are ambitious and handsome. There are about 1000 Dissenting chapels, among the largest of which are the Tabernacle (Baptists) at Newington Butts (holds 4400 people), the City Temple, Holborn (Congregational, opened 1874), and Christ's Church, St. George's Road, Lambeth (Congregational, opened 1876). There are 100 Roman Catholic churches, the principal being St. George's Cathedral in St. George's Fields, but a much grander cathedral is projected at Westminster. The Jews' synagogues number twenty-five. There are about 100 hospitals and infirmaries, including St. Bartholomew's, St. Thomas' (a palatial building), Guy's, The L., the Middlesex, Charing Cross, and the Foundling Hospital, and about 1000 charitable institutions are maintained at an annual cost of £6,000,000. Bethlehem Hospital (Bedlam) for the insane is in St. George's Fields, Surrey. Enormous Lunatic Asylums are at Colney Hatch and Hanwell. Medical schools are attached to all the great hospitals. The College of Surgeons, with its fine Museum, is in Lincoln's Inn Fields, the College of Physicians in Pall Mall, East. Chelsea Hospital is for army pensioners. Greenwich Hospital, formerly for naval pensioners, was converted in 1873 into a Royal Naval College.

Schools, Museums, &c.—In December 1876 there were, besides upwards of 700 Endowed Schools and Collegiate Institutions, 225 'Board' Schools with accommodation for 146,074 pupils, and 894 'Voluntary' Schools with accommodation for 287,116 pupils. The School Board is composed of fifty-one members. Westminster, St. Paul's, Merchant Taylor's, and the City of London Schools, and Christ's Hospital (revenue £65,000, accommodation for 1200 Blue-coat boys) are historically famous. The University of L. is the subject of a separate article. The British Museum, Great Russell Street, Bloomsbury (founded 1753, built 1823–50), is the great literary and antiquarian storehouse of the nation. The Museum of Science and Art at South Kensington (opened 1858), with a branch at Bethnal Green (1872), forms the nucleus of national, technical, and artistic education. There are some 50 large public libraries. A National History Museum is in course of construction at Kensington. The National Gallery in Trafalgar Square (founded 1824, enlarged 1876) has, besides many fine works by foreign masters, the finest collection of paintings of the English school. There are 44 public and private galleries. At Burlington House, Piccadilly, the Royal Academy Exhibitions are held. Soane's Museum of Pictures and Curiosities is in Lincoln's Inn Fields. The Grosvenor Gallery, New Bond Street, was opened in 1877 for annual exhibitions. The collections at Dulwich Gallery and Hampton Court are very interesting.

Places of Amusement.—The finest concert rooms are St. James's and Exeter Halls. The first is splendidly decorated, and is used for classical and orchestral concerts. At the latter (which holds 4000 people), the oratorios of the Sacred Harmonic Society are given. It is also used for religious meetings. The Royal Albert Hall, Kensington (opened 1871), holds 10,000 people. Miscellaneous entertainments take place at the Crystal Palace, Sydenham (of world-wide celebrity), the Alexandra Palace, Muswell Hill, and the Royal Aquarium, Westminster (opened 1876). There were forty-five theatres in 1877, about half of which were in the neighbourhood of the Strand. At the Royal Italian Opera, Covent Garden, and Her Majesty's Theatre in the Haymarket, operas are produced during the season with unsurpassed magnificence. A new Opera-House, to which it is proposed to attach a National Training School for music, is in course of construction on the Thames Embankment. The old legitimate stage of Drury Lane is now chiefly used for spectacular pieces. The Haymarket, Prince of Wales, Vaudeville, and Court are among the best comedy theatres. Melodrama has its home at the Lyceum, Adelphi, Princess, and Olympic; farce and burlesque at the Strand, Criterion, and Folly; opera bouffe at the Opera Comique and Alhambra. There are many singing saloons or 'music halls.' Notwithstanding the inferior class of the performances, several, such as the Oxford, Metropolitan, and Canterbury, are fitted up with much splendour.

Clubs, Hotels, Markets, &c.—The Athenæum, Carlton (Conservative), Reform (Liberal), The Army and Navy, and Travellers, are a few of the finest of the L. Club-houses, which numbered 91 in 1877. Among the best and largest hotels are 'The Langham,' Portland Place; 'Westminster Palace,' Victoria Street; 'The Alexandra,' Hyde Park Corner, and the 'Inns of Court,' Holborn. Most of the great railway termini have hotels attached to them, 'The Midland' being the largest. Those at Charing Cross and Canon Street are also noteworthy. Stafford House, Green Park; Holland House, Kensington; and Montagu House, Whitehall; are a few of the many hundred splendid private residences. No city has more numerous or extensive markets. Some of the largest are those at Islington (cattle), Covent Garden (fruit and vegetable), Smithfield and Columbia (meat), Thames Street (coal), Billingsgate (fish), Bermondsey (leather), and Mincing Lane (corn).

Courts of Law, Prisons, Cemeteries.—The Courts of Law, which give employment to about 3000 barristers and 5000 solicitors, are at present scattered in Westminster, Lincoln's Inn, and the City, but are all shortly to be united in the great new Palace of Justice in the Strand. Solicitors' chambers are chiefly about Lincoln's Inn Fields, and those of barristers in the Inns of Court, which comprise the Inner and Middle Temples, and Gray's and Lincoln's Inn. There are

about fifteen police courts throughout the Metropolis, and the police force exceeds 10,000 men. There are fifty-three stations in connection with the fire brigade, which is worked with great efficiency. The chief prisons are at Newgate (where executions take place), Millbank (the largest), Pentonville, Holloway, and Horsemonger Lane in the borough. There are on an average 100,000 paupers (indoor and outdoor) connected with the various workhouses. The largest cemeteries are at Highgate, W. Brompton, Kensal Green, Norwood, and the Necropolis at Woking.

Parks and Public Monuments.—In the beauty and number of its public parks and gardens London is unapproached. Hyde Park and Kensington Gardens together are 600 acres in extent. The former contains the Serpentine, an ornamental sheet of water, and Rotten Row (*Route du Roi*), an excellent drive from Apsley House to Kensington Gardens, where, during the season, the largest and most brilliant display of equipages in the world is to be seen. Regent's Park (472 acres) contains the fine gardens of the Royal Botanic and Zoological Societies. Those of the Horticultural Society, famous for flower shows, are at S. Kensington. The other parks in the W. End are St. James's (91 acres), and the Green Park (60 acres). In the S. lies Battersea Park (180 acres, with beautiful gardens), and Southwark Park; in the N. Finsbury Park, and in the E. end Victoria Park (290 acres). The suburbs boast of many delightful parks and recreation grounds, such as Greenwich, Richmond, and Bushey Parks, Hampstead and Putney Heaths, Clapham and Tooting Commons, and Kew Botanical Gardens. The public monuments of L., though numerous, are not as a rule striking or highly artistic. 'The Monument,' near L. Bridge (202 feet high), was erected in 1667 in commemoration of the Great Fire of L. Next to it the most lofty columns are the monuments to the Duke of York and Lord Nelson. The Guards (Crimea) Memorial in Waterloo Place is a fine work. The Albert Memorial in Hyde Park, though somewhat marred by excessive gilding, is an elaborate, beautiful, and finely-proportioned structure. See Cole's *Royal Parks and Gardens of L.* (1877).

Trade, Commerce, &c.—Besides its political pre-eminence, L. is also a grand commercial emporium. In 1877, 142 public and private banks had their head offices here. The magnitude of their transactions may be estimated from the weekly returns of the Clearing House, often amounting to £100,000,000, and having reached £160,000,000. There are some 1250 stock-brokers, 80 head life-assurance offices, and about as many fire offices. The warehouse trade of L. is most extensive, and only equalled by Manchester. The chief articles of manufacture are watches, jewellery, ironmongery, furniture, carriages, and instruments of all sorts; but to a greater or less extent every manufacture of the kingdom is carried on. The ale and porter breweries are numerous and enormous. Printing and publishing has here its unrivalled seat. About 300 weekly, fortnightly, and monthly newspapers are published. According to the census of 1871 the book trade employed 35,000 persons, the building trade 106,000, and the production of articles of dress 230,000. There were 50,000 Government officials, including civil, army, and navy services, 6000 clergymen, 10,000 physicians and druggists, 27,000 authors and students, 16,000 artists, musicians, and actors, 20,000 teachers, and 253,000 domestic servants. The food and drink of the public was supplied by 2500 bakers, 1700 butchers, 2600 grocers, 2000 wine merchants, and 6700 publicans. The Royal Arsenal at Woolwich occasionally employs as many as 14,000 hands. For the conveyance of the inhabitants, besides private carriages, 8000 cabs and 1500 omnibuses are in constant use. Hundreds of little steamers ply continually on the river. There are 16 great termini of the leading railway lines, and nearly 200 minor railway stations. The underground lines of the Metropolitan and District Railways form a complete circle of the centre of the Metropolis. In 1875 they carried 44,000,000 passengers. Numerous tramway lines extend towards the suburbs in all directions. There are 28 wet docks which enclose about 350 acres, the principal being the London, St. Catherine's, E. India, W. India, Victoria, and St. Catherine's on the Middlesex side, and the Commercial and Grand Surrey in Surrey.

In 1875, 43,995 ships of 8,804,000 tons entered the port, and 17,817 ships of 5,233,000 tons cleared. In the same year the exports were £57,923,927, or more than one-fourth of the entire exports of the United Kingdom. The custom duties were £9,940,139, exceeding one-half of the total of the United Kingdom, and being more than three times greater than those of Liverpool. The value of the merchandise stored in L. has been estimated to exceed 500 millions sterling. The current prices of many commodities are cheaper than in other towns, but the luxurious ideas of a wealthy community render L. a most expensive place of residence for the middle classes who court society. House rents and the proportionate taxes are exceptionally high.

The healthiness of L., its death rate in 1875 (23·7 per 1000) being less than that in any of the ten next largest towns in England, is partly due to favourable conditions of climate and situation, but also in great measure to its admirable sanitary arrangements. In 1858 a vast scheme for interceptive drainage over an area of 117 sq. miles was introduced at a cost of £5,000,000. The length of sewers is 82 miles. The water supply, to the extent of 130,000,000 gallons daily, is obtained from the New River, the Thames, and the River Lea. Twenty companies supply about 20,000,000 cubic feet of gas per diem. The town is well paved and the wooden and asphalt pavements now so general have greatly lessened the noise in the streets. The soil is mainly composed of clay. Less rain falls than in most parts of England. The wind is most frequently from the S.W. The most objectionable characteristic of the weather is the L. fog, which hangs about the city periodically during the winter in dense black masses, and occasionally turns day into night.

History.—L., the *Colonia Augusta* of Tacitus, was an important place in the time of the Romans. Its name is derived from the British *Llyn-Din*, the 'fort on the marsh,' or lake, which was Latinised into *Londinium*. Originally the chief town of the Trinobantes, it became after the Teutonic invasion the capital of the kingdom of the East Saxons. Since the building of the Tower by William the Conqueror, at least, it has been the metropolis of England. Throughout its history L. has suffered many and dire disasters. The plague often visited it with terrible severity. 50,000 of its citizens are said to have died from this scourge in 1348, 30,000 in 1407, 30,000 in 1603-4, and 100,000 in 1665. In 962 and 1087 great fires desolated the city, and in 1666, when 13,200 houses were burnt and 200,000 people rendered homeless, it was literally reduced to ruins. But on each occasion a new and fairer city has sprung from the ashes of the past, and its prosperity has increased till it has become the most stupendous city in the annals of the world. Its history is in a great sense the history of the English people. Here their kings have reigned, their statesmen ruled, their poets lived, their martyrs bled. And its greatness must continue to run parallel with the greatness of the empire. Not depending like other towns upon one or a few sources of prosperity, it could bear almost imperceptibly the decay of its most important manufacture, the failure of its most lucrative trade. Nothing short of tremendous national disaster can injure it. During the last century the increase in size and population has been enormous. The inhabitants in 1801 numbered 864,845. In 1871 the Registrar-General's District of 122 sq. miles showed a pop. of 3,251,804, and the Metropolitan Police District of 687 sq. miles a pop. of 3,883,092. In 1877 the latter was estimated at 4,200,000. The number of inhabited houses is about 550,000, and the annual value of property £20,000,000. See Stow, *Survey of L.* (1598, enlarged by Strype, 1720); Allen, *History of L.* (4 vols. 1829); Timbs, *Curiosities of L.* (1855); Norton, *History and Constitution of L.* (3d ed., 1869); W. J. Loftie, *In and Out of L.* (1876); James Thorne, *Handbook to the Environs of L.* (1876).

London, a city and port of entry in the Dominion of Canada, province of Ontario, on the river Thames and the Great Western Railway, 114 miles W.S.W. of Toronto, and 61 E. of Sarnia. It lies in a fertile, well-wooded district, is the seat of the Anglican bishop of Huron, and of a Roman Catholic bishop, has seventeen churches, a hospital, a lunatic asylum, two daily and six weekly newspapers, and several benevolent and educational institutions, including Hellmuth and Huron Colleges. L. is a great railway centre, and there are large machine-shops, breweries, oil-refineries, foundries, &c. Many of the streets and squares are named after those of the city's great namesake. A Westminster and a Blackfriars' Bridge cross the Thames. Pop. (1871) 15,826.

London, Laws of. The city of London is under the jurisdiction of its municipal corporation. The right to elect aldermen (see ALDERMAN) and common councilmen for the several wards

is by statute declared to belong to every freeman of the city occupying a house of the yearly value of £10. The liverymen of London are so called because they formerly wore liveries or badges peculiar to each company. They are chosen from among the freemen of the different guilds or incorporated trades. 30 and 31 Vict. c. 134, provides for the better regulation of the traffic in the city and liberties, and makes provision for the greater security of persons passing along the streets. Cattle are not to be driven through the streets between ten in the morning and seven in the evening, except by permission of a commissioner of police. The metropolis, for the purposes of police and registration, includes the cities of London and Westminster and borough of Southwark, with suburban parishes to the distance of 6 miles from the central point of St. Paul's Cathedral. The metropolitan police district extends to any place within the limits of the Central Criminal Court, that is 10 miles from St. Paul's, or 15 miles from Charing Cross. The Metropolis Water Act, 1871, makes further provision for supplying London with water.

London Clay, the highest subdivision of the Lower Eocene formations, is a dark-coloured clay containing nodules of iron-stone. It is very persistent over a large area at and around London, attaining its maximum thickness in Kent and Essex, where it exceeds 450 feet. L. C. abounds in fossils, plant and animal, including birds, reptiles, and fishes, chiefly *ganoid*. The fruits, which occur in rich variety, indicate a sub-tropical climate.

London Conferences. Plenipotentiaries of the Great Powers have met in London in conference as follows :—

In 1826—On the Affairs of Greece.
„ 1830—On Disputes between Belgium and Holland.
„ 1840—On Disputes between Turkey and Egypt.
„ 1864—On the Schleswig-Holstein Question.
„ 1871—On the Black Sea Treaty of 1856.

Protocols were signed in London in 1851 (*re* Schleswig-Holstein), and in 1877 (Eastern Question). The 1877 protocol became invalid almost immediately after signature, by the outbreak of war between Russia and Turkey.

London University was founded February 11, 1826, by the exertions of Lord Brougham, Thomas Campbell, and others, and the building in Gower Street was opened October 1, 1828. The name of this institution was altered to University College by royal charter, November 28, 1836, on which date the University of London received a charter as an examining body, with a chancellor and thirty-six fellows appointed for life. New charters were granted in 1837, 1858, and 1863, with supplement, 1867. King's College (incorporated 1829, opened 1831), was originally a rival establishment, but is now in connection with L. U. The early charters empowered the University to grant degrees to students of University College, King's College, and various minor schools; but since 1863 its examinations in art, medicine, law, surgery, music, and literature have been open to all comers, and it also grants certificates to women. The charter of University College was annulled by Act of Parliament in 1869, whereby the College was re-incorporated with additional powers, and divested of its proprietary character, its principal purpose being to qualify students for the L. U. degrees. It had forty-six professors in 1877. Medical schools are attached to King's College (hospital founded 1829), and University College (hospital founded 1833). The government of the University is vested in the Senate, which consists of the Chancellor, the Vice-Chancellor (elected annually), and the thirty-six Fellows. The Convocation is composed of the graduates of two years' standing and upwards. The University has returned one member to Parliament since 1868. The first examination took place in Somerset House in 1838, from which time till 1876, 16,152 candidates had undergone, and 9743 had passed the matriculation examinations which are necessary before a candidature for any degree. These examinations are held in January and July, and last five days. The subjects are classics, modern languages, English history and literature, geography, mathematics, natural philosophy, and chemistry. In 1876, 486 candidates out of 1071 passed the matriculation examinations, 59 obtained the degree of B.A., 11 M.A., 22 B. Sc., 5 D. Sc., 13 L.L.B., 23 M.B., and 11 M.D. The total number of candidates for all the examinations was 1977, the largest in the history of the University. The new building at Burlington House, containing the Examination Hall, was opened by the Queen in 1870. The senate of the University resolved (July 1877) to take steps to obtain a new charter to admit ladies to all the degrees.

Lon'donderry, a county of Ireland, province of Ulster, is bounded N. by the Atlantic and Lough Foyle, S. by Tyrone, W. by Donegal, and E. by Antrim and Lough Neagh. Area, 522,315 acres; pop. (1871) 173,906. It has a cliffy coast-line, except towards Lough Foyle, and is hilly, save in the vale of the Bann, which drains Lough Neagh, and forms the eastern boundary. The greatest heights are in the S., as Sawel (2236 feet), White Mountain (2000), and Slieve Gallion (1800). Besides the Foyle and Bann, the chief rivers are the Roe and Faughan. The prevailing rocks are mica, slate, and primitive limestone, and those E. of the river Roe are overlaid by a deeper tract of basalt, similar to that in Antrim, but with a reverse dip. Despite the broken nature of the surface, agriculture is more advanced here than in more favoured parts of the country. In 1876 there were 189,212 acres under crop (oats, wheat, potatoes, and turnip), 219,200 under grass, 6588 in plantation, 97,781 waste, bog, and water. L. had (1876) 114,252 cattle, 45,102 milch cows, 21,680 horses, 34,291 sheep, 38,058 pigs, and 4894 goats. There is some salmon-fishing. Great quantities of eggs are exported, and the leading industry is the manufacture of linen, now mainly carried on in large works. L. sends two members to Parliament. The capital is L., and other towns are Coleraine, Newton-Limavady, Magherafelt, Portrush, and Derry. The territory, anciently in great part the possession of the clans O'Loughlin and O'Neill, was, on the English occupation, granted to and is still retained by the corporation of London, with the exception of certain portions assigned to city companies.

Londonderry, capital of the preceding county, is finely situated on the left bank of the Foyle, at its outlet in Lough Foyle, 176 miles N.N.W. of Dublin, and 94½ N.W. of Belfast by rail. The four leading streets radiate from the square called the Diamond, and the city has extended greatly beyond the old walls, which now form a pleasant promenade. The notable buildings are the cathedral (1633), on a hill, with a spire 179 feet high, a modern Roman Catholic cathedral, the town-house, surmounted by a cupola, the court-house, with an Ionic portico, and the free grammar school or Foyle College. The Bishop's Gate, a triumphal arch (1789) commemorates the raising of the siege of 1689, and a Doric column 90 feet high supports a statue of the Rev. George Walker, governor of the city during the siege. L. has a county infirmary, a lunatic asylum, other benevolent institutions, Gwyn's School, and Magee College, founded in 1865. An iron bridge 1200 feet long connects L. with the large suburb of Waterside. New quays and graving docks have been constructed at a cost of £160,000. In 1875 there entered the port 1429 vessels, of 273,392 tons, and cleared 905, of 204,249 tons. Steamers ply to America, Liverpool, Fleetwood, Glasgow, &c. The main industries are flax-spinning, distilling, brewing, flour-milling, iron-founding, tanning, and shirt-making. Flax markets are held every Thursday. L. has one weekly and three bi-weekly newspapers, and returns one member to Parliament. Pop. (1871) 24,328. *Daire-Calgaich* ('the oak wood of Calgach,' *i.e.*, 'the fierce warrior') was the pagan name used long before St. Columba erected his monastery here in 546. It lingered on till the 10th or 11th c., when it began to be superseded by *Derry Columkille*, which continued till the time of James I., whose charter, granted to a company of London merchants, imposed its present name. (See Joyce's *Irish Names of Places*, 1st series, 1869.) During the Revolution the gates were closed against James II., who in person for a time conducted the siege that began on April 18, 1689. The miserably weak walls, defended only by a few old guns and destitute even of a ditch, sheltered a host of Protestant fugitives, who died in the streets of hunger and fever, while the general cry was 'No surrender.' The defence was conducted with such stubborn heroism that Hamilton, the king's general, at last turned the siege into a blockade. After upwards of 100 days had elapsed, and when only two days' food remained, an English ship with supplies broke the boom across the river (28th July), and the besiegers withdrew.

Londonderry, Robert Stewart, second Marquis of, was born at Mount Stewart in County Down, June 18, 1769, educated at Armagh and St. John's College, Cambridge, entered the Irish Parliament in 1791, became member of the English Parliament (1794), and Lord Castlereagh (1796), when his

father was raised to the Marquisate of Londonderry. In 1798 L. was nominated Chief Secretary for Ireland, and during his period of office the Catholic insurrection was repressed without mercy. He supported the proposal of union between Great Britain and Ireland with great eloquence. When Addington succeeded Pitt (1801), L. became President of the Board of Control. In 1805 he was War and Colonial Minister; in 1807 in the Cabinet of the Duke of Portland; he was again War Minister in 1809, on account of the Convention of Cintra and the Walcheren expedition he was attacked by Canning, and the affair ended in a duel between the two ministers. In 1812 L. was Foreign Secretary, represented England at the Congress of Vienna (1814), at Paris (1815), at Aix-la-Chapelle (1818). In 1821 he became Marquis of L., but committed suicide in a fit of madness at his country seat in Kent, 12th August 1822. L. would have been a great diplomatist, owing to his personal attractions and his capacity for business. As a statesman he failed to win either the gratitude or respect of the majority of his countrymen, because of his obdurate narrowness in the direction of a repressive governing system. See his *Memoirs and Correspondence* (8 vols. 1848), edited by his brother, Charles W. Stewart Vane, third Marquis of L.

Long, George, an English scholar of note, was born at Poulton, Lancashire, in 1800, educated at Macclesfield School and Trinity College, Cambridge, graduated B.A. 1822, was elected a Fellow, and accepted a professorship in the University of Virginia, U.S. In 1833, having returned to England, he began to superintend the issue of the *Penny Cyclopædia*, in 1837 he was called to the bar, after which he delivered a course of lectures on Jurisprudence and Civil Law, and became Professor of Greek and Latin in the University of London. Besides important contributions in the field of antiquities, law, and geography, L. is the author of a *History of France and its Revolutions* (1849); *Decline of the Roman Empire* (1864–74); edited *Cicero, Cæsar*, and *Sallust*, and has written several translations of conspicuous merit, of which the most important are his *Selections from Plutarch's Lives*, and the *Thoughts of the Emperor Marcus Aurelius Antoninus*. L., on the recommendation of Mr. Gladstone, was elected to receive £100 a year from the Civil List (1873).

Long, Loch, a narrow inlet with steep shores, which stretches first N. by W., then N.N.E., from the Firth of Clyde to Arrochar (18 miles), separating Argyle from Dumbarton.

Long'an (*Nephelium Longan*). See LITCHI.

Long'fellow, Henry Wadsworth, born at Portland, Maine, U.S., February 27, 1807, graduated at Bowdoin College, and after spending a few months in his father's law-office, became Professor of Modern Languages in Bowdoin, with the privilege of spending three preparatory years in Europe. After studying in France, Spain, Italy, and Germany, he began his professorate in 1829. He was appointed Professor of Modern Languages and Literature at Harvard in 1835, and spent the following year in European travel and study, cultivating a knowledge of early Scandinavian literature. Resigning his chair in 1854, he travelled in Europe 1841–42, and 1868–69, on the latter occasion receiving the degree of D.C.L. from Oxford University. His first contributions to literature appeared in the *United States Literary Gazette* and the *North American Review*. In 1833 he published an *Essay on the Moral and Devotional Poetry of Spain*, in 1835 *Outre Mer*, in 1839 *Hyperion* and *Voices of the Night*, in 1842 *Ballads* and *Poems on Slavery*, in 1843 *The Spanish Student*, a play; in 1845 *The Poets and Poetry of Europe*, in 1847 *Evangeline*, in 1849 *Kavanagh*, in 1850 *Seaside and Fireside*, in 1851 *The Golden Legend*, in 1855 *The Song of Hiawatha*, in 1858 *Miles Standish*, in 1863 *Tales of a Wayside Inn*, in 1866 *Flower de Luce*, 1867–70 his translation of *Dante*, in 1869 *New England Tragedies*, in 1871 *The Divine Tragedy*, in 1872 *Three Books of Song*, in 1874 *The Hanging of the Crane*, and in 1875 *The Masque of Pandora and Other Poems*. L. has also edited *Poems of Places* (2 vols. 1877), a collection illustrative of the scenery of England and Wales, for the Golden Treasury series. In the promise of youth, L. was hailed as the national poet; but the title must wait for a greater man. He has written much that will endure; some of his lyrics are perfect; and all his poetry is brimful of life, and love, and truth. It lacks, however, that intellectual vigour and subtlety without which imagination cannot attain its highest flights. His prose style is sensitive and delicate. *Hyperion* has no plot and little incident, but is filled with brilliant, ever-shifting pictures and fine reflections cast in a poetic mould. *Kavanagh*, its companion volume, a love story, is written with exquisite simplicity and purity.

Long'ford, an inland county of Ireland, province of Leinster, is bounded N. by Leitrim and Cavan, E. and S. by Westmeath, and W. by Roscommon. Area, 421 sq. miles; pop. (1871) 64,501. Between the Clonhugh range (912 feet) in the N. and Slieve Gauldry (650 feet) in the S. extends the valley of the Camlin (20 miles), a tributary of the Shannon, which, 7 miles below the point of junction, enters Lough Ree. The climate is mild and damp; the soil, a deep loam, overlying clay-slate in the N. and stratified limestone in the S. In 1876, there were 72,853 acres under crop (oats and potatoes), 130,678 in grass, 3391 in plantation, and 50,215 waste, bog, mountain, &c. L. had (1876), 6497 horses, 2993 asses, 59,995 cattle (19,228 milch cows), 33,223 sheep, 22,279 pigs, and 8076 goats. Grazing and dairy-farming, with some linen and woollen manufactures, are the staple industries. L. is traversed by two branch railways and by the Royal Canal. It returns two members to Parliament, and the chief towns are L., Ardagh, and Granard. Among the antiquities are the ruins of a round tower, seven castles, and fifteen abbeys.

Longford (Irish Gael. *Long-phort*, 'the fortress'), the chief town of the preceding county, on the Camlin, 76 miles W.N.W. of Dublin by rail, has a fine Roman Catholic cathedral, with an Ionic portico and a tower 200 feet in height, the jail and courthouse of the county, barracks (occupying the site of the ancient castle of the O'Farrells), and a Protestant Hall (1862). L. has tanyards and breweries, and carries on a trade in corn, bacon, butter, &c. Pop. (1871) 4375.

Longicor'nes, a group of Beetles or Coleoptera, in which the antennæ or feelers are very long. There are four joints in the tarsi, whence these beetles are included in the *Tetramerous* section of the order. The L. are represented by many typical genera and species. They are chiefly plant-eaters, and attain their largest size in S. America. The genera *Cerambyx* and *Trachyderes* exemplify this sub-order.

Longi'nus, Dionys'ius Cass'ius, the greatest philosopher of his age, was born about A.D. 213 at Athens, where his education was specially cared for by his uncle Phronto, a teacher of rhetoric. From an early age L. visited many countries in company with his parents, and he was for a long time the pupil of Ammonius Saccas and Origen at Alexandria. On his return to Athens, he devoted himself with the utmost zeal to the work of teaching in the departments of philosophy, criticism, rhetoric, and grammar; and the most distinguished among his many pupils was Porphyrius, the celebrated antagonist of Christianity. After spending much of his life in this manner at Athens, L. went to the East, where he became the Counsellor of Queen Zenobia of Palmyra, whom he advised to throw off the Roman yoke. This advice cost him his life; for when Aurelian took and destroyed Palmyra, A.D. 273, he put the old philosopher to death. L. was highly distinguished for his extensive knowledge—Eunapius called him a 'living library,' and a 'walking museum'—but still more so for his critical insight, and sound judgment. He had drunk deeply of the spirit of Plato; and, though a pagan, his amiable disposition kept him from hostility to the new faith. He was the author of numerous works, of which a considerable part of the treatise *On the Sublime*, conspicuous in ancient literature for its excellent style and exquisite criticism, alone has come down to us. The most recent editions of it are those of Weiske (Leip. 1809), and Egger (Par. 1837).

Longipenna'tes, a group of Natatorial or swimming birds represented by the gulls and terns (*Laridæ*), petrels (*Procellaridæ*), &c. The wings are of great length, and the hinder toe is free. The front toes are united by a web. The bill is strong and often hooked.

Longiros'tres, a group of *Grallatores* (q. v.) or wading birds, represented by the snipes, woodcocks, ruffs, &c. The bill is long, slender, highly sensitive, and grooved for the protection of the nostrils. Its entire structure adapts the L. for groping in shallow waters in search of food.

Long Island, the detached south-eastern portion of New York State, is bounded N. by Long Island Sound, E. and S. by the Atlantic, W. and N.W. by the Narrows, New York Bay, East

River, and Hell Gate. Area, 927,900 acres; pop. (1870) 540,225. It is 118½ miles long from the Narrows to Montauk Point in the E., and 23 in extreme breadth, is indented in the E. for 22 miles by Peconic Bay, and along the S. shore for 90 miles by a series of inlets from 2 to 5 wide, which are partly within sandy spits, and afford supplies of scale and shell fish and seaweed for manure. A central range of hills (384 feet) extends nearly the whole length of the island, but the rest of the surface is mostly level, as in the Great Hempstead Plains. The soil, though in great part sandy, is easily cultivated and productive. L. I. has forests of oak, hickory, chestnut, and in the sandy tracts, of pines. It is traversed (1876) by 422 miles of railway. There are many bathing-places, and the chief towns are Brooklyn, Flushing, Hempstead, Huntingdon, Oyster-Bay, and Brookhaven. Discovered by the Dutch in 1609, it received from them its name of 'Lange Eylandt.' Actual settlements began about 1640, and the territory passed to the English with New Amsterdam in 1662. By the Battle of Brooklyn, or of L. I., the first pitched battle in the War of Independence, Washington was forced to evacuate the island by a greatly superior English force, 26–28th August 1776.

Long Island Sound, an arm of the Atlantic separating Long Island from Connecticut, is 115 miles long and about 25 in extreme width. A chain of small islands stretches across its seaward entrance. With valuable fisheries, it is a great thoroughfare for steamers and coasting vessels. The improvements at Hell Gate (q. v.) are designed to make the Sound a safe, ready channel to New York for the largest vessels.

Lon'gitude. See LATITUDE AND LONGITUDE.

Long'ton, a town of England, in Staffordshire, on a small branch of the Trent, 2 miles S.E. of Stoke by rail. It is in the district of the Potteries, and has extensive manufactures of china and earthenware. A place of recent growth, it was incorporated as a municipal borough in 1865. Pop. (1871) 19,748.

Long Vaca'tion, in Law, a period during which judicial proceedings are intermitted, extending, at common law, from August 10 to October 24, in Chancery to October 28.

Loni'go, an old town in N. Italy, province of Vicenza, on the Frasine, 12 miles S.W. of the city of Vicenza. It has a large trade in horses and grain; at the yearly March fair there are sometimes as many as 2000 horses. Pop. (1874) 9185.

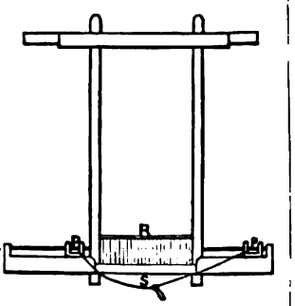
Lons-le-Saunier, the chief town of the department of Jura, France, on the Vallière, 60 miles S.E. of Dijon by rail. It is picturesquely girt by high mountains, the lower slopes of which are clad with vines. There are copper and iron foundries, and a trade in horses, cattle, grain, cheese, &c. The celebrated salt-springs yield 20,000 ctr. yearly. Pop. (1872) 9427. L. is the ancient *Ledo Salinarius*.

Loo-Choo, Lu-Tchu, or Lieu-Kieu, a group of thirty-six islands stretching from Japan to Formosa, in 26°–27° 40′ N. lat., 126° 10′–129° 5′ E. long., and tributary to Japan. The largest, Tsju San ('middle island') is about 60 miles long and 12 broad; others are Sannan in the S. and Sanbok in the N. Nawa, the chief port of Tsju San, is open to foreign commerce. The islands enjoy a magnificent climate, and are highly cultivated and very productive. Among the productions are tea, rice, sugar, tobacco, camphor, fruits, and silk. The principal manufactures are cotton, paper, porcelain, and lacquered ware. The people, who are small, seem a connecting link between the Chinese and Japanese.

Loodia'na (*Lúdhiána*, from the Lodi tribe of Afghans), the chief town of the district of the same name in the Punjaub, British India, on the S. bank of the Sutlej, but 8 miles from the present bed of the river, and a station on the railway, is 1102 miles N.W. of Calcutta. Mohammedans are exceptionally numerous, consisting partly of the court of an exiled Afghan monarch, and partly of weavers from Cashmere. There are large manufactures of shawls, including the Rampoor chuddar scarves, stockings, and gloves; the carpentry also is famous. Besides these articles there is a large trade in grain. The principal building is the fort, where the Europeans took refuge when the mutineers in 1857 were for a short time in possession of the town. Pop. (1868) 39,983.—The *district* of L., which is bounded N. by the Sutlej, has an area of 1368 sq. miles; pop. (1868) 583,245. The soil is neither fertile nor well irrigated. Wheat, gram, millet, and Indian corn are the staple products; but cotton and sugar-cane are also grown. The trade is considerable, being valued at about £360,000 both for exports and imports.

Looking-Glass, See MIRROR.

Loom (Old Eng. *lôma*, furniture). A machine with which weaving is performed by interlacing two sets of threads or yarns, one, the *warp*, running lengthwise, the other, the *weft* or *woof*, transversely. In plain weaving, the essential operations successively performed at the L. are the raising of the alternate threads of the warp and the depression of the others, the conveyance of the weft through the decussation or *shed* so made, and beating home the weft thread to the web. The European hand-L., which to a large extent during the present century has been displaced by the power-L., has a rectangular framework of four upright posts, strengthened by cross ties. In the middle of the opposite ends of the frame two rollers are placed; round one, the *yarn-beam*, the warp is wound; while the other, the *cloth-beam*, is made to take up the fabric as it is woven. The warp is extended between these two beams, and to preserve a proper degree of tension, the former is converted into a friction roller, by means of a weight attached to a cord, which is wound several times round the beam, and the latter is provided with a ratchet-wheel. On passing from the yarn-beam, the warp is crossed by two or three rods, which preserve the *lease* or plane of separation of the threads. Through loops in the middle of vertical cords, called *healds*, the warp threads are next drawn. In plain weaving, two healds are employed, and are suspended one in front of the other from a pulley by a single cord. Each heald is connected with a separate treadle, and since the threads passed through one heald alternates with those passed through the other, the shed of the warp is readily effected. Close to the healds an oscillating frame, called the *lay*, *lathe*, or *batten* is suspended. Its form and parts are shown by the annexed diagram. R is called the *reed*, and between its dents the warp-yarn passes from the healds; S is a kind of shelf, called the *shuttle-race*, for the passage of the shuttle from one side of the warp to the other; and PP are pieces of wood, called *pickers*, which are connected by a cord having a peg attached, and which by a sudden jerk of the cord are caused to travel along wires, and impart a rapid motion to the shuttle. The shuttle, as here illustrated, is a wooden implement with pointed ends, and running on rollers, and in an oblong cavity in its upper surface is placed a bobbin surrounded by weft yarn. As the shuttle travels along its race, the yarn is given off freely by the revolving bobbin through a hole in the side. Previous to 1738 the shuttle was thrown by hand. In that year J. Kay, of Bury, invented the picker contrivance, besides improving the shuttle race, and modifying the shuttle, which attained so great a speed through these improvements, that it received the name of 'fly-shuttle.' The producing power of the hand-L. was more than doubled by Kay's invention. When the shed of the warp is made by depressing one of the treadles, a smart pull at the picking peg causes one of the pickers to drive the shuttle with great velocity to the opposite end of its course; the weft given off during its passage is then beaten home to the web by pulling the batten forward. The depression of the other treadle reverses the shed, the shuttle is made to retrace its course, and the shot weft is again beaten home; by a repetition of these movements the cloth is woven, and as it is wound on its beam, pins projecting from the ends of two pieces of wood called *temples* take hold of the selvages of the cloth and keep it stretched to its proper width.

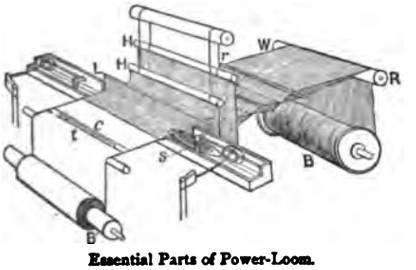


Lay.


Shuttle.

The invention in 1785 of a power-L. by Edmund Cartwright, an

English divine, eventually led to the successful adaptation of machinery to weaving. His invention clearly demonstrated the practicability of mechanical weaving, and the energies of other practical minds being enlisted in the enterprise, several improvements and additions followed, and thereupon weaving by power became a reality. The principal parts of a power-L., divested of its framing and motive parts, are shown in the accompanying cut. The warp W wound round the beam B passes over a roller



Essential Parts of Power-Loom.

R, and partly over and partly under the rod *r* (two of which are seen); the yarn is then carried through the healds H, H, which make the shed, and allow of the shuttle S being driven along the shuttle-race by a sort of hammer actuated by a lever moving through a small arc of a circle. L. is the upper bar of the lathe with the reed below, and the cloth *c* is stretched by the temples *t*, and then wound on its beam B'. It will thus be seen that the power-L. embodies the same principles as the common hand-L., and in addition to the actions of raising and depressing the warp, throwing the shuttle, beating home the weft, unwinding the yarn, and taking up the cloth, the power-L., by a beautiful contrivance, instantly throws the parts out of gear when the weft thread breaks or runs out. See WEAVING.

Loon. See DIVER.

Lo'pe de Vega. See VEGA.

Loop'holes, in Fortification, are small openings in walls, stockades, &c., through which muskets may be fired.

Lo'phius, a remarkable genus of Teleostean fishes, of which one species the *L. piscatorius*—popularly known as the 'sea-devil,' 'wide-gab,' or 'fishing-frog'—is frequently cast up on British coasts after storms. This genus is included in the special family *Lophiidæ*, which forms one of the subdivisions of the *Acanthopterous* fishes. The L., which varies in length from 2 to 4 feet, has an immense head, and wide mouth. The pectoral fins are well developed, and a very large gill-opening is also seen. The head is provided with three or more filaments said to be used by the fish in the capture of prey, L. burying itself in the mud, and imitating the movements of worms by moving the filaments so as to attract smaller fishes to the spot. No scales are developed, and the colour is brown above and white beneath.

Lopholran'chii, a subdivision of Teleostean fishes, represented by the *Hippocampidæ* or sea-horses, and by the pipe-fishes (*Syngnathidæ*). They have gills in the form of tufts borne on the branchial arches, and the gill chamber is covered in by the *operculum* or 'gill cover,' which is attached to the head save at one point, where an aperture exists to permit the escape of the water used in respiration. The scales are of the 'ganoid' type, and exhibit a hard and horny consistence, but the skeleton is imperfect, being chiefly composed of cartilaginous material. An air-bladder exists, but it possesses no 'pneumatic duct' or outlet. See also SEA-HORSES and PIPE-FISH.

Lophor'nis, a genus of Humming-birds, of which the *L. ornatus*, or tufted coquette of N. Brazil, is a familiar example. The spangled coquette is another species, known scientifically as the *L. Reginæ*; others are the *L. Gouldii* and the *L. Helenæ*. These birds have a most brilliant plumage.

Loquat is the adopted Chinese name for the fruit of *Eriobotrya Japonica*, a tree of considerable size, closely related to the Medlar. It is native of Japan and S. China, whence it has been imported for cultivation into India, and now for a long time past has been grown in S. and W. Europe; it has also reached Australia. The fruit is oval, about the size of a plum, and produced in clusters. The flavour is subacid—something like that of a sharp-tasted apple.

Lorantha'ceæ, or Mis'tletoe Family. See MISTLETOE.

Lor'ca (anc. *Illurcis*, 'the town with fine water,' from the two Basque words *illia*, 'a town,' and *ura*, 'water,'), a city of Spain, province of Murcia, on the Sangonera, 50 miles W. of Carthagena. It has an old Moorish castle, and manufactures of silks, soap, dye-stuffs, leather, paper, &c. Near L. are important lead mines. Pop. 40,000.

Lord (Old Eng. *hlâf-ord*, from *hlâf*, 'loaf,' and either *ord*, 'origin,' or *weard*, 'warder'), and **Lady** (Old Eng. *hlæfdige*, either 'she who looks after the loaf,' or a corruption of *hlâf-weardige*, the fem. of *hlâf-weard*), 'honorable apellations with which our ancient and yet continued custome, that our *Lordes* and *Ladyes* doe vse to carue and serue their guests at the table, which in other countries is altogether strange and vnusuall, doth well accord and correspond' (Verstegan, *Restitvtion of Decayed Intelligence*, 1628). See COURTESY TITLES.

Lord Advocate. See ADVOCATE, LORD.

Lord Mayor's Procedure Act. See MAYOR'S COURT OF LONDON PROCEDURE ACT.

Lord of the Manor. See MANOR.

Lord Ordinary. See COURT OF SESSION.

Lord's Day. By 29 C. II. c. 7, no person, under a penalty of 5s., is allowed to *work* on the Lord's day, except the work be one of necessity or charity, nor to use any boat, nor to expose any goods for sale, except meat in public houses, and milk and mackerel at certain hours. There is also an unrepealed statute of Charles I., prohibiting certain amusements on Sunday. One of William IV. prohibits the killing of game on Sunday or Christmas-day. By 34 and 35 Vict. c. 87, no prosecution for an offence under 29 Charles II. c. 7 can be instituted except by written consent of the chief police officer of the district, or of two justices of the peace, or of a stipendiary magistrate, having jurisdiction in the place where the offence was committed. It is a popular error to suppose that documents executed on Sunday are invalid. There are several old statutes of the Scotch Parliament unrepealed against work and amusement on Sunday; that of 1693 even enjoins every presbytery to name an informer and prosecutor of offenders for the district. The spirit of the age is probably too much opposed to these Acts to allow of their being enforced. See APPRENTICE, DESUETUDE; see also Scotch law FORBES MACKENZIE ACT.

Lord's Supper is the partaking of bread and wine which our Lord, at the Passover-meal at which he was present with his disciples the night before his crucifixion, appointed them to do in remembrance of himself (Matt. xxvi., Mark xiv., Luke xxii.), and which is observed as a sacrament of the Church under this and other names, *e.g.*, Eucharist (q. v.), Mass (q. v.), &c. Like the Jewish Passover the L. S. was at first associated with a common meal representing the communion of Christians with their Saviour, and their brotherly communion with one another. Both together were called the Supper of the Lord, the Supper of Love (see AGAPÆ). So long as the L. S. proper was connected with the Agape, it was of course observed daily like the latter, and afterwards was held to constitute an essential part of divine service every Sunday. In some churches, however, *e.g.*, the Roman, Alexandrian, and Spanish, a daily observance was kept up as late at least as the 4th c. The Judaizing Christians only observed it once a year, at the feast of the Passover (see EASTER); and others held that it ought only to be taken at stated seasons after due preparation.

The Church from the first attached great and mysterious importance to the bread and wine used in the rite as symbols of the body and blood of Christ. The Fathers in their writings laid great stress on the mysterious connection between the Logos and the elements, corresponding to that between the two natures of Christ, which led them to speak of a real participation of the body and blood of Christ. This idea was sometimes misunderstood, and gave rise to superstitious views, as, *e.g.*, the fear of spilling a drop of the consecrated wine, so that those who wished to partake of the L. S. at home had to content themselves with the bread; which was the first step towards administering the L. S. in one

kind. In the writings of the Fathers, too, there occurs the idea of a Sacrifice. This idea grew with the development of the hierarchy, 'because the ancient world generally could not conceive of divine worship without sacrifice;' and with sacrifice the L. S. presented several points of analogy. There was, first, the prayer, which had always been regarded as spiritual sacrifice (*cf.* 1 Pet. ii. 5); then the gifts of the church members, especially the consecrated bread and wine, came to be regarded as offerings to God, and were indeed called offerings, oblations; and both were compared with the sacrifices and first-fruits of the Old Testament. Further, from the 3d c. to the 8th c. the doctrine of the *Consubstantiation* of Christ's body and blood with the elements was generally held. Even during this period some writers spoke of a real change from the one into the other, but the true doctrine of Transubstantiation (q. v.) was first propounded (830–832) by Paschasius Radbertus, according to whom the elements were no more than a mere veil which deceives the senses. He was opposed by Ratramnus, who distinguished between the sign and the thing represented by it, pointing out the true nature of a *mystery* to be, that through it the mind rises from the visible to the invisible, and supposing indeed a *conversio* of the bread and wine into the body of Christ, but only in an ideal sense. By the middle of the 11th c. Transubstantiation had been so generally adopted as the orthodox doctrine of the Church that Berengarius (q. v.) was condemned by several councils for calling it in question, and in consequence of the controversy raised by him, the phrase 'to partake of the body and blood of Christ' was interpreted in the grossest way. The doctrine was finally made an article of faith by Pope Innocent III. (1215). Along with this doctrine had grown the sacrificial ideas referred to above, which had been fully developed by the scholastic theologians, and had taken shape in the doctrine of the sacrifice of the Mass (q. v.). By the institution of Corpus Christi-day by Pope Urban IV. (1264), this doctrine was expressed in its grossest and most literal form.

The Reformers all made common cause against the doctrines both of Transubstantiation and the Mass, but they differed widely in their opinions as to the real nature of the rite of the L. S. Different interpretations of the words used by Christ at the institution ('This is my body') were advanced by Carlstadt, who held that Christ used the words in pointing to his body; by Zuinglius, who asserted that the rite had been instituted by Christ merely as an act of commemoration, and whose view has since been adopted by the Socinians, Arminians, and Mennonites; by Œcolampadius, whose interpretation differed only grammatically from that of Zuinglius, his opinion being that it is not the expression, but the idea itself which is to be understood figuratively; and by Schwenkfeld, who made the words out to have this meaning, 'My body which is given for you is the very thing I distribute among you, namely bread, a veritable meal, and the efficacious means of preserving eternal life.' Luther was opposed to all these opinions, adhering strictly to the letter of Scripture, from which he deduced the doctrines of Consubstantiation, or the *real presence* of Christ's body and blood in the elements of bread and wine, and of the *ubiquity* of His body. According to Calvin, on the other hand, the *believer* alone who partakes of the elements partakes in a spiritual manner of Christ's body, which is in *heaven*. The Quakers hold that in consequence of their intimate and spiritual union with Christ they may dispense with the participation of His body. See Hagenbach's *Lehrbuch der Dogmengeschichte* (Eng. Trans. 1864), and Gieseler's *Lehrbuch der Kirchengeschichte* (Eng. Trans. 1855).

Lords, House of. See PARLIAMENT.

Lor'elei, or **Lurlei** (Old Sax. *lure*, 'loud,' and *leia*, 'rock'), a steep rock on the right bank of the Rhine, between St. Goar and Oberwesel, 440 feet high, and now pierced by a railway tunnel. It is celebrated for a remarkable echo, and still more for the nix, or water-maiden, who by her magic song lured the unwary fisherman to his destruction in a neighbouring whirlpool. This legend, of disputed antiquity, forms the subject of Heine's exquisite *volkslied*, *Die L.*

Loret'o, less correctly **Loretto**, a city in the province of Ancona, Central Italy, on a hill commanding beautiful views of the sea and the Apennines, 20 miles S.W. of Ancona by rail. It consists of little more than a single long street, full of booths for the sale of rosaries, images, &c., and is greatly infested by beggars. Pop. (1874) 8083. Nearly half a million pilgrims yearly resort hither to visit the sanctuary of Our Lady of L. (*Domus Lauretana*) designed by Bramante, and containing the *Casa Santa* (according to tradition) in which the Holy Family dwelt at Nazareth. In the legend the Santa Casa was rescued from the infidels by angels, who bore it first to the coast of Dalmatia in 1291, and thence to its present site near Recanati, in 1299, where it was deposited on ground belonging to a certain widow Laureta (hence *Loreto*). Externally the Chiesa della Casa Santa has no great architectural beauty. The campanile, designed by Vanvitelli, is a lofty, richly-decorated structure. The chief bell, weighing 11 tons, was presented by Leo X. in 1516. The Casa Santa, a simple brick building, encased in a high marble screen enriched with bas-reliefs by some of the greatest Italian artists, stands in the centre of the church under an octagonal cupola, covered with exquisite frescoes. The church is also decorated with many fine pictures, sculptures, mosaics, bronzes, and silver lamps. Its treasury was formerly one of the richest in the world, but was drawn upon heavily by some of the popes, especially Pius VI., and by the French during the occupation of 1796.

L'O'rient ('the East'), a naval and mercantile port of France, department of Morbihan, at the confluence of the Scorff and Blavet in the Bay of L., 35 miles W.N.W. of Vannes by rail. It is strongly fortified, and the chief buildings are the church of St. Louis, the Lyceum, Observatory (131 feet), Bourse, and School of Artillery, &c. In 1874 there entered the port 92 vessels of 12,214 tons, and cleared 217, of 23,552. The value of imports (naval stores and colonial wares), was £131,121; of exports (corn, wine, brandy, fish, &c.), £25,359. The sardine fishery, ironfounding, shipbuilding, and the making of steam-engines are the chief industries. Pop. (1872) 24,088. L. owes its origin and name to the establishment here of docks and magazines by the French E. India Company in 1666.

Lor'imer (Fr. *lormier*, from Lat. *lorum*, 'a thong'), a name formerly given to the makers of the iron articles used for the trappings of horses. The London guild of Lorimers was incorporated in 1712. In Scotland they were included in the general class of hammermen.

Lo'ris, a genus of Lemurs (q. v.), or lower *Quadrumana* (Monkeys), represented by the *L. gracilis*, or slender L., and other species. The slender L. occurs in the Eastern Archipelago, is active in its movements, and feeds on fruits, birds, eggs, &c. It is about 10 or 12 inches long, the tail is rudimentary, and the muzzle short and pointed. The colour is a greyish brown, tinted with white below, the fur round the eyes is darker. An allied species is the slow-paced L.

Lorraine' (Ger. *Lothringen*), a German duchy which became a French province in 1766, and included the departments Moselle, Meurthe, Meuse, Vosges, and part of Bas Rhin, but of which Germany regained in 1871 the greater part of Moselle and the N.E. part of Meurthe, in all 2406 sq. miles, with 490,459 inhabitants. By the Treaty of Verdun (843) Lothar I. (q. v.) received a narrow territory stretching from the Mediterranean to the N. Sea, called after him Lotharingia. In 855 the Karoling Lothar II., his second son, obtained as his share the lands between the Scheldt, Rhine, Maas, and Saône, the so-called Lotharingian kingdom (Lotharii regnum). After his death it became an object of contention between the French and German Karolings. Otto I. gave it (953) to Bruno (q. v.), archbishop of Köln, who in 959 had to divide it into Lower L. (Lotharingia Mosana or Ripuaria), between the Rhine, Maas, and Scheldt, and Upper L. (L. Mosellana), between the Rhine and Moselle as far as the Maas.—**Lower L.** passed through the hands of several houses. From 1248 its dukes took their title from Brabant (q. v.), and on the death of Duke Philipp in 1430 it fell to Burgundy.—In **Upper L.** the family of Frederick of Bar, the first duke, became extinct in 1046, when its lands were given in fee to Graf Albrecht of Elsass. The last of his family by male succession, Karl II., having died in 1431 as Constable of France, the Emperor Sigismund gave the Duchy to Karl's daughter Isabella and her husband René (Renatus) of Anjou (titular king of Naples, and father of the English queen, Margaret of Anjou), the descendants of whose daughter Jolanthe, married to her cousin Friedrich, Graf of Vaudemont, were the Dukes of L. till 1735. Henri II. seized Metz, Toul, and Verdun in 1552.

and from 1642 all L. was under France till its restoration at the Peace of Ryswick to Leopold Joseph Karl, whose son, Franz Stephen (q. v.), at the Peace of Vienna in 1735, in return for the right of succession to Tuscany, resigned his insecure possession to Stanislas Leszczynski, on whose death (1766) it fell to France, according to the treaty.

Lorraine, Claude. See CLAUDE GELÉE.

Lor'y, the name given to various kinds of *Scansorial* or climbing birds, belonging to the family *Psittacidæ* or parrots, and inhabiting New Guinea, Borneo, and the Moluccas. The wings are of moderate length, and have their second and third quills longest. The tail is rounded, and of moderate size; the bill is smaller than in the parrots and cockatoos. The purple-capped L. (*Lorius domicellus*) has a scarlet plumage, the top of the head being of a rich purple, the breast yellow, and the wings green on their upper parts, mingled with violet on the sides. The average length is 11 inches, the tail being very short. The L. feeds on seeds, &c., and is readily domesticated, although it never learns to speak with the facility of the parrot.

Los Angeles, the chief town in the region known as 'semi-tropical' California, on the Los Angeles River, 30 miles from its mouth, and 350 miles S.S.E. of San Francisco, to which city is being constructed (1877) the S. Pacific Railway. The place where gold was first discovered in 1833, L. was made the capital of California by the Mexican Congress in 1836. It has a Catholic college, two hospitals, three daily, one semi-weekly (Spanish), and five weekly (one German) newspapers. Pop. (1870) 5728.

Lossi'ni (Ger. *Lussin*), an island in the Gulf of Quarnero, an inlet of the Adriatic, belongs to the Austrian Küstenland, is 19 miles by 3, and has a pop. of 10,600. The chief town, L. Piccolo (pop. 5200), with a harbour capable of admitting the largest vessels, carries on a trade in grain, olive oil, fish, wine, &c.

Lost Property. See FINDING, LAW OF.

Lot, a department in the S.W. of France, surrounded by Corrèze, Cantal, Aveyron, Tarn-et-Garonne, and Dordogne. Area, 2012 sq. miles; pop. (1872) 281,404. L. is a calcareous plateau, the E. of which is occupied with offshoots from the mountains of Cantal. The rivers Dordogne and L. cross it from E. to W., forming two main valleys, with numerous branches. It is essentially agricultural. Its fertile soil yields abundance of *vins noirs;* wheat, rye, maize, &c., to the value of 21,000,000 francs yearly, and large quantities of chestnuts, truffles, and mushrooms. Flax, fruits, and tobacco are also cultivated. The silk production is important. The chief town is Cahors.

Lot, a tributary of the Garonne, in S. France, rises in the Cevennes, in the department of Lozère, from which it flows westward with a very winding course, till it falls into the Garonne at Aiguillon, in the department of Lot-et-Garonne. It becomes navigable at Entraignas, and is 272 miles long.

Lot-et-Garonne, a department in the S.W. of France, part of old Guienne, is bounded N. by Dordogne, S. by Gers, W. by Gironde and Landes, E. by Lot and Tarn-et-Garonne. Area, 2067 sq. miles; pop. (1872) 319,289. In great part a cultivated plain, L. is watered by the Garonne, Lot, and Baize. Agriculture is well advanced, and is gradually reclaiming the wastes and marshes. Cereals are raised to the value of 37 million francs; other products are tobacco (3 million francs), hemp of the first quality, good wine, flax, rape, vegetables, and fruits, especially the *pruneaux d'Agen*. There are twenty iron mines, large iron and copper works, and manufactures of cotton, linen, and silk tissues, machinery, paper, tobacco, brandy, glass, &c. L. is traversed by the Canal Latéral à la Garonne, and by the Paris à Agen and Bordeaux à Cette Railways. The chief town is Agen.

Lo'thian, the name of a fertile, well-cultivated district in Scotland, extending along the S. side of the Firth of Forth, and including the counties of Haddington, Edinburgh, and Linlithgow. It was called by the Anglian settlers *Lothene*, and was known to the Gael as *Lethead*. A Latinised form is *Loidis*. The name was afterwards extended to the whole S.E. of Scotland, which formed the 'Earldom of L.' See Skene's *Celtic Scotland*, vol. i. pp. 240–41; also article SCOTLAND.

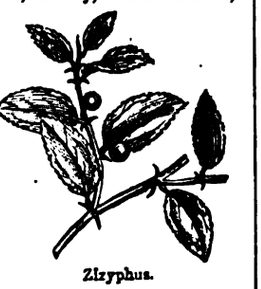
Lo'tions or Wash'es are external fluid applications, consisting of various medicinal substances in solution in water or other menstrua. The pharmacopœial L. are the *Hydrargyri flava*, and *nigra*, or the *yellow* and *black wash* used for venereal sores.

Lotoph'agi (Gr. 'lotus-eaters'), according to the ancients, were a peaceful race inhabiting Cyrenaica, on the northern coast of Africa, and living on the fruit of the Lotus (q. v.), which when strangers had once tasted they forgot all thought of home and friends, as did two of the companions of Ulysses (*Od.* ix.). They form the subject of a poem by Tennyson.

Lott'ery (from Gothic, *hlauts*, 'a lot,' through the Italian *lotteria*), a game of hazard in which small sums are ventured on the chance of obtaining more, and in which the prizes are drawn by lots. Early in the middle ages it was common for Italian merchants to dispose of their goods by lot. The L. is said to have been first used for increasing the revenue by the Genoese, but the custom rapidly spread throughout Europe. The first L. in England was in 1569, and the proceeds were applied to the repair of the harbours and other public works. A state L. was annually licensed by Parliament from 1709 to 1823. The *Loteries Nationales* of France yielded an annual revenue, between 1816 and 1828, of 14,000,000 francs. In 1870 Prussia derived 1,339,500 thalers from its lotteries; Saxony, 800,000 thalers. The home of the L. now, however, is Austria.

Law regarding Lotteries in Great Britain.—Lotteries were rendered illegal by Act of Parliament in 1826. By an Act of William IV. the advertisement in Great Britain of foreign lotteries is prohibited. Law regarding Gaming (q. v.) applies to lotteries.

Lo'tus is a name now restricted to a genus of Leguminosæ, consisting of some fifty species of herbs and under-shrubs, having representatives in the Old and New World, and in the N. and S. hemispheres. A common European species is *L. corniculatus*, or the Birdsfoot Trefoil. If we refer back to the earliest list of plants cultivated in an English garden, namely, that of Gerard, published in 1596, we find therein three plants under the name L.—one of these belongs to the genus above mentioned, another to the modern *Melilotus*, and the third, (*L. arbor*, 'Nettle Tree') is the *Celtis Australis*. This last was the L. of the ancients, as we have the figure evidence of an early manuscript of Dioscorides. The attributes of sweet, pleasant, and wholesome, which, according to Herodotus, Dioscorides, and Theophrastus, were combined in the food whereon the Lotophagi fed, are united in the fruit of the *Celtis*. With the *Celtis* may be joined species of *Zizyphus*, also surmised to have been a Lotophagian delicacy. The fruits of both are at present largely used by the natives of the countries bordering the Mediterranean. *Nitraria tridentata*, a native of the plains of W. and Central Asia, has also been supposed to be the true L. tree of the ancients. Its fruit has a salt flavour. The sacred L. or Pythagorean bean, is different from any of the above, being a water plant with large, fragrant, and beautiful rose-coloured flowers, a native through a wide range in S. and E. Asia and the neighbouring islands. There can be little doubt that it formerly grew also in Egypt, and was held in veneration by the Egyptians as it is by the Hindus. The white and the blue L. of the Nile are species of *Nymphæa*, and will be found referred to under WATER LILY.



Zizyphus.

Lot'ze, Rudolf Hermann, a living German philosopher and physiologist, born 21st May 1817, at Bautzen, studied medicine and metaphysics at Leipsic, where he was appointed extraordinary Professor of Philosophy in 1842. In 1844 he became Professor of Philosophy at Göttingen, where he still remains. Though of the school of Herbart, L. has an independent place, and in the struggle between transcendentalism and materialism he has distinguished himself as a powerful opponent of the latter. His works are *Gedichte* (1840); *Metaphysik* (1841); *Allgemeine Pathologie und Therapie* (1842); *Logik* (1843); *Ueber den Begriff der Schönheit* (1845); *Ueber Bedingungen der Kunstschönheit* (1847); *Allgemeine Physiologie* (1851); *Medicinische Physiologie* (1852); *Mikrokosmus* (1856–64); *Streitschriften* (vol. i. 1857); *Geschichte der Æsthetik in Deutschland* (1868).

Lou'don, John Claudius, a botanist and horticulturist, was born at Cambuslang, Lanarkshire, April 8, 1783. As a landscape gardener he went to London in 1803; he settled on a farm at Tew Park, Oxfordshire, in 1809, where he established a kind of college for instructing young men in the principles of farming. After 1828 his life was chiefly devoted to the publication of works upon agricultural and botanical subjects. The more important of these are *The Encyclopædia of Gardening* (1822); *of Agriculture* (1825); *of Plants* (1829); *of Cottage, Farm, and Villa Architecture* (1832); and *Arboretum et Fruticetum Britannicum* (8 vols. 1838), his last and greatest work. L. was also the editor of *The Gardener's Magazine, The Magazine of Natural History, The Architectural Magazine,* and *The Suburban Gardener.* L. died at Bayswater, December 14, 1843.

Lough'borough, a market town in Leicestershire, England, on a feeder of the Soar, and on a canal between the Soar and Trent, 115 miles W. by N. of London by rail, has a fine old church, dating from the 16th c., several chapels, and a rich educational institution called Burton's School, founded in 1495. L. has manufactures of stockings, cottons, woollens, shoes, and bobbin-net lace. Pop. (1871) 11,456.

Loughrea (Irish Gael. *Loch-riabhach,* 'grey lake'), a market town of Galway, Ireland, on a small lake of the same name, 38 miles N. of Limerick, has two churches, and a Catholic friary and nunnery (the former founded in 1130), and some manufactures of beer, linen, and leather. Pop. (1871) 2669.

Lou'is I. (properly *Hludwig,* surnamed *the Pious*), third son of Karl the Great and Hildegard, was born about 778. In infancy he was made king of Aquitania, and educated under the tutelage of Wilhelm the 'Snub-nosed' at Toulouse. He was made the colleague of Karl in 813. His sympathy with learning was healthy and strong. L. started with the best intentions of having a refined court, and a people every class of which should be elevated higher than he found them. By his wife Hermingard L. had three sons, Hlothar, Pippin, and Hludwig. After her death in 819 he married Judith, who bore him Karl. The greater part of his reign is taken up with the jealousies and quarrels of his children, upon whom he severally had bestowed kingdoms, partition after partition following in rapid succession. In 840 L. died at Engelenheim, after which Karl's empire was split up. L. was 'a clerkly southerner of the gentler type, a pure unselfish devotee, a grave man,' but, says Kitchin, 'his virtues were dangers.' He forgave where a more prudent man would have crushed. See Kitchin's *History of France* (vol. i. 1873). —**L. VI.,** surnamed *Le Gros,* son of Philippe I., was born in 1078. His father, according to the custom of the Capetian Kings (q. v.), made him joint king in 1100, though the royal power was exercised within very narrow limits. To the very gates of Paris the feudal lords exercised sway, and their act of homage on the king's first succession to a fief was about the only mark of obedience offered him. L. at once set himself to restrain the power of the baronage, reduced Bouchard de Montmorenci, defeated the Comte de Ronci, and negotiated Montleheri out of the hands of Guy Troussell. In 1108 King Philippe died, and L., after being crowned at Orleans, renewed his warfare, until in 1111 the serfs lent their assistance against the oppression of the barons. L. fostered a system of justice wherever he appeared, defended the poor, and helped the Church, and gave privileges to the chief cities of the royal domain. In 1119 L. received a severe repulse at Brenneville from the English, being at the time when he fought in behalf of William Clito, grandson of the Conqueror. Five years later, when Henry of England and Henrich of Germany threatened him with war, L. obtained the assistance of his more powerful lords, and though there was no fighting, 'men began to regard him as the central figure of all France.' Still later his rights and powers were felt and recognised from N. to S. A great grief overcame him (1131) by the death, through accident, of his son Philippe, whom he had associated with him on the throne two years previously. Before L.'s death proposals were made to him by Guillaume of Aquitaine to marry his son, Louis *le Jeune,* to his daughter Eleanor, and by this union the formal independence of Aquitaine came to an end. L. died in 1137. He was a man of lovable character, frank, cheerful, and unassuming, whose assiduity and vigour did much towards arousing the sense of national unity realised in later reigns. See Kitchin's *History of France* (vol. i. 1873).—**L. VII.,** son of the preceding, was born in 1119, and crowned as his father's associate in 1131, his education being attended to by the monks of St. Denis, from whom 'he sucked in prejudice and feebleness.' In 1135 he married Eleanor, the daughter of Guillaume of Aquitaine, and was crowned sole king (1137). He quarrelled next year with Innocent II., asserting his right to name the Archbishop of Bourges. The quarrel was only cemented after L. had attached the lands of Theobald of Champagne and burnt the parish church of Vitry, by his promising to the Pope to do penance in a crusade. Much enthusiasm prevailed, and (1147) the French army was prepared. But the crusade was a failure. 'One thing alone came out of it.' The Germans joined in it, and 'the French learnt to look on L. as at least the equal of Konrad the Emperor.' On his return from the East, L. divorced his wife, who, with her dowry of Poitou and Aquitaine, married Henry of Anjou (see Henry II.). After Henry's ascent to the English throne, 'the great controversy between England and France took shape.' By the year 1160 a great part of what is now France acknowledged the supremacy of Henry. In the same year L. married Ala, daughter of Theobald of Blois, by whom (1165) he had a son. L. supported Becket against Henry, and (1172) assisted his sons to revolt. In 1179, when affected with paralysis, he recommended the crowning of his son Philippe at Rheims, and 'of all the hereditary crowns in Europe the French became the most firmly established.' L. died at Paris, September 1180. See Kitchin's *History of France* (vol. i. 1873.)—**L. IX., Saint,** son of Louis VIII., was born at Poissy, 25th April 1215, and succeeded to the throne in 1226. Nearly all the great lords refused to attend his coronation, and, being refused the release of all noble prisoners, they formed a confederation hostile to Blanche, the queen-regent. A war was carried on against her till 1231, when the treaty of St. Aubin du Cormier 'may be said to close the great troubles of the king's minority.' At the same time, by the treaty of Meaux, Raymond VII. ceded to the king all lands and domains on the French side of the Rhone, and made terms which involved the absorption of the south into the kingdom of France. In 1234 L. married Marguerite, a daughter of Raymond Berenger, Comte de Provence, who was only twelve years of age. In the struggle which went on between Gregory IX. and the Emperor Friedrich II., L. remained wisely neutral, and declined to accept the bribe of the imperial crown for his brother Robert of Artois. L. wished his brother Alphonse to become Lord of Poitou and Auvergne (1241), but the barons rebelled, and Henry III. of England assisted them. At Taillebourg the English king and his allies received a severe check, and a second battle, fought at Saintes, broke up the coalition. An attempt of Raymond VII. to reassert the independence of the south, ended (1244) in renewed submission. 'Thus ended the last coalition of the barons against the king.' In the same year, during an illness, L. took the cross, and (1248) set sail for Egypt, landed (June 1249) at the town of Damietta, and for several years distinguished himself in war with the Paynim. Upon his return (1254) he devoted himself to good offices, made peace between rival barons, built hospitals and penitentiaries, founded churches and nunneries, and 'ruled the land as it had never before been ruled, until security brought plenty, the returns of the royal domains doubled, arts flourished, and learning was held in honour.' L. again took the cross (1267) and set out for the East (1270), but died of dysentery upon landing. L. was a man of deep religious convictions, a fearless warrior, a lover of justice, and 'the most loyal man of his age.' See Joinville, *Histoire de Saint Louis;* Guillaume de Nangis, *Gesta S. Ludovici IX.* (best ed.; the *Recueil des Historiens* by Daunon and Naudet, Par. 1840); and Kitchin's *History of France* (vol. i. 1873).—**L. XI.,** son of Charles VII. and Marie of Anjou, was born at Bourges, 3d July 1423. In his seventeenth year he headed the 'Praguerie,' a conspiracy against his father, and was sent to govern Dauphiné. At Dieppe and the Rouergue (1442) he did good service against the English, and at the river Birse he defeated a body of free-lancers (1444). In 1445 he again intrigued against the king, and attempted to revive the Praguerie. At Rheims (1461) he was consecrated to the kingly office. At once L. set the towns against their princes, deprived his father's ministers of their offices, showed the clergy that he meant to curb their power, made a royal progress through his kingdom, and (1463) imposed a series of arbitrary taxes. The 'League of the Public Weal,' consisting of five hundred lords, arose against his 'bad government' in 1464, an indecisive battle was fought at

Montleheri (16th July, 1465) in which the king showed great bravery, and after which he secured Paris. The Peace of Conflans was signed between L. and the nobles (October 5th), and he was 'left sitting desolate in his fair city of Paris.' In the course of two years he successfully broke the treaty, divided the Leaguers, and recovered Normandy. He also convoked the States-General at Tours, April 6, 1468, at which, though it was determined that the king could not dismember the realm, a commission was appointed 'to remedy abuses and to order the course of laws.' Continuing to cultivate the friendship of the nobles, L. (in 1468) reduced Brittany, and in order to make headway against the Duke of Burgundy, he went to negotiate with him at Péronne, placing himself unreservedly in the Duke's power. His trick failed, and he was compelled to sign a peace on the base of the Treaty of Conflans, by which he was degraded before the whole country. The treaty was, however, declared not to be binding upon the king by an Assembly of Notables (1470); war was waged upon the duke, but he, owing to the birth of a dauphin, and having obtained from an Assembly of his States permission to establish a standing army, besides promising his daughter in marriage to the Duc de Guyenne, remained uncrushed, but sued for peace, November 1472. Two years later, Edward IV. of England crossed to assist the Duke of Burgundy, but was bought off, a truce being at the same time renewed with Charles the Bold, who died (1477). L. had now brought down all the ill-affected houses, the estates of Burgundy recognised him as liege lord, Franche-Comté was taken, and Picardy welcomed him. Mary of Burgundy married Maximilian of Austria, and French aggrandisement was checked at the battle of Guinegate (1479). L. suffered defeat, but made peace (1482) with Maximilian at Arras. He died at Plessis-lez-Tours, 31st August 1483. L. is 'the true founder of the French monarchy in its later form, as the government of a nation ruled by absolute power.' He was a subtle, cold-hearted, selfish man, who scrupled at nothing to gain his ends; he was, besides, superstitious, untruthful, and vindictive; mean-looking and physically weak; 'one of the few men destined to do really great things, and yet not himself to be great.' Chastellian calls him 'the universal spider,' from his matchless capacity for intrigue. Commines' *Mémoires*. See Sismondi, *Histoire des Français* (vols. xiii.–xiv.); Michelet, *Histoire de France* (vol. vi.); Kitchin's *History of France* (vols. i. and ii. Lond. 1873–77).—**L. XIII.**, eldest son of Henri IV. and Marie de' Medicis, was born at Fontainebleau, 27th September 1601, married to Anne of Austria (1616), but was kept in strict tutelage until the next year, when he was assisted to freedom by Luynes. In 1620 L. marched against the Huguenots of Normandy, against whom he acted with surprising vigour, and the same year he made peace with his mother at Angers. Another campaign was led by him (1621–23) against the Huguenots of the South, but without much credit. By the year 1624 he had fallen into the hands of Richelieu (q. v.), who governed him and guided the empire thenceforth. L. called an Assembly of Notables to Fontainebleau (1625), where it was determined that the clergy would bear the cost of putting down the Huguenots, whilst the king's revenue was left free for foreign war. A plot in favour of L.'s brother was detected and put down next year, and (1627–28) L. showed a dauntless spirit in the long siege of La Rochelle. He set out for Italy (1629), where he triumphed over the Spanish at Casale, and returning to Languedoc crushed the Calvinist rebels and extinguished their liberties. Next year he sent Richelieu into Italy with an army, giving him the title 'lieutenant-general representing the king's person.' The queen-mother, who held by the Spanish party, was disgusted at the Cardinal's predominance, and (1630) asserted her sway over L., but it lasted for a brief time, Richelieu shortly afterwards being created duke, peer, and governor of Brittany. In 1635 L. established the French Academy and a royal printing-press. Three years before, he declared the Duc de Lorraine a rebel, and Lorraine subject to the French crown. The royal pretensions to 'imperial honour as the successor of Charlemagne' were also pushed forward in these years. Again L. had an opportunity of showing his courage (1636) after the dissipation of the French armies and the threatening of Paris by the Spaniards and Netherlanders. In 1638 he became a father after twenty-four years of married life, and in 1642, though in ill-health, he took the command of an army on the Spanish frontier. L. died May 14, 1643, at St. Germain-en-Laye. He played but a subordinate part in the ruling of home and foreign affairs, but he realised to the end that the policy of Richelieu tended to the greatness of his kingdom. It is his most distinguished merit that in the midst of endless intrigues he remained faithful to his minister. See Richelieu's *Mémoires;* Marius Topin's *Louis XIII. et Richelieu* (Par. 1876); Kitchin's *History of France* (vol. iii. 1877).—**L. XIV.**, eldest son of the preceding, was born 16th September 1638, at St. Germain-en-Laye. He was poorly educated, owing to the troubles of the Fronde, in which he took a share, and in his eighteenth year was governed by Mazarin (q. v.), as his father had been by Richelieu. In 1658 he was deeply in love with Marie Mancini, a niece of Mazarin's, but in the following year he signed the 'Treaty of the Pyrenees,' condemning himself to a marriage of state which exalted high the dignity of the French crown, only to plunge it in the end into the troubles and disasters of the Succession War. He married the Infanta Maria Theresa of Spain in 1660. Next year Mazarin died, having previously instilled into L.'s mind many lessons in autocracy, teaching him to discard first ministers and favourites, and 'to cultivate his strong natural talent for dissimulation.' L. at once showed how he profited by the advice. Statesmen were turned into chief clerks, and the king began to plod through the work of government each day. He threw aside Fouquet and advanced Colbert to the comptroller-generalship of finance. In three years France had peace; and art, commerce, and the French fleet sprung into importance. The taxation was lightened and yet the royal treasury was filled to overflowing. The nobility were taught that the court was the only gate to preferment, and to it they crowded from all parts of the country. 'Nec pluribus impar' was the motto taken by L. when he found himself indeed the sole and central influence in France. In 1665 Philip IV. died, and L., on the pretext that the dowry assigned to his wife had never been paid, and 'transferring customs of feudal lordship to the successor of royalty,' laid claim to Flanders. Two campaigns followed; the first in the Netherlands in 1667, the second in Franche-Comté in 1668. In both districts the French were victorious, but a league, known as the Triple Alliance, between England, Holland, and Sweden, made L. pause. He signed the Peace of Aix-la-Chapelle, 2d May 1668, under which he kept what he had won in the Netherlands, and gave up Franche-Comté. His irritation at Holland induced a renewal of the war in 1672, when 100,000 men, led by Turenne and Condé, marched against 25,000 men headed by William of Orange. L. marched with the French army. Five of the 'Seven Provinces' were overrun or paralysed. The Dutch were in despair, and sought peace. But the French king insisted on the establishment of Catholicism and a French Protectorate. Despair at once gave way to fiery indignation. The Dutch opened the Muyden sluices, and put their country under water. Alarmed by L.'s conditions, a league was made in August 1673 between the Emperor, Kings of Spain and Denmark, the Elector of Saxony, and the Duc de Lorraine. L. abandoned Holland, but reconquered Franche-Comté. Not till August 10, 1678, was the Dutch War brought to a close by the signing of the Peace of Nimwegen, which was dictated by France at the expense of Germany and Spain, Holland having become the accomplice of L., and Charles of England his paid agent. In 1680 the city of Paris voted to L. the title of 'Le Grand,' and preachers, artists, poets, and courtiers vied with each other in heaping up the language of adulation. During these years L. had attached himself to several mistresses, the most prominent of whom were the Duchess de la Valliere and Madame de Montespan. In 1683 he privately married Madame Scarron (better known as Madame de Maintenon), who, though she was never publicly acknowledged as his wife, exercised immense influence over him. 'For two and thirty years,' says Kitchin, 'she was lord of France.' The first fruits of her bigoted Catholicism were seen in the system of religious persecution now inaugurated. The Jesuits gained the ascendancy over the king's mind, the Jansenists were suppressed, and against the Huguenots, though they were quiet and industrious citizens, an ordinance recalling the Edict of Nantes was signed and sealed, 18th October 1685. It has been calculated by Sismondi that owing to the persecution consequent upon the revocation, 300,000 Huguenots left the country, and carried their art and industry elsewhere. But by 1688 William of Orange had become the moving spirit in a fresh coalition—the League of Augsburg, which practically roused Europe against France. Not till 1697,

by the Treaties of Ryswick, were England, Holland, Spain, the Emperor and the empire satisfied that they had curbed in some measure the ambition of L. But the peace France applauded 'as bringing her much needed rest, and as another proof of her monarch's moderation and greatness.' L. was allowed to keep Strassburg, but all that he had annexed beyond Elsass since the Peace of Nimwegen had to be abandoned. Besides, he was compelled to acknowledge the Prince of Orange to be king of England. Before the end of the century the elements of another great war began to reveal themselves. By the death of Charles II. of Spain the vacant throne fell to L.'s grandson, Philippe of Anjou. After protesting, however, to the European Powers that the French and Spanish crowns should never be united, L. drew up a patent securing to the Duc and his sons all their rights to the French throne, and proceeded to treat Spain as if it were a department of his own kingdom. A great alliance of the Powers followed, and in 1701 the War of the Spanish Succession commenced between L., the emperor, the Dutch, and the English. But since 1660 France had been gradually drained of resources till she had reached the point of exhaustion. Half her wealth was said to have perished, and amidst the royal magnificence the people were dying of starvation. Not till 1714 did the War of Succession come to an end, and that after the theatre had shifted from Italy to Belgium, and from Germany to Spain, England being the greatest gainer by the contest. L.'s ambition had conducted his country to a pitch of unexampled misery. 'There was no credit, no revenue, no circulating medium, no freedom of commerce.' Nor did religious persecution cease. It became more terrible by the use of *lettres de cachet*, and its pitiless indiscrimination was shown (1710) by the destruction of Port Royal, which occasionally sheltered the Jansenists. With age L.'s religious fervour increased, and he died at Versailles, 1st September 1715, in ecstasies of pious excitement. Many estimates have been made of his character, which, though it reckoned among its qualities selfishness, ostentation, and deceit, also included firmness of purpose, an unwearied capacity for toil, and a belief in his own destiny, which, viewed in the light of the events of his career, may be said to have amounted to greatness. His intolerance in religion was the result of ignorance: 'he had the faith of a charcoal-burner, so ignorant was he of the veriest rudiments of Christianity.' See Voltaire's *Siècle de L. XIV.*; Kitchin's *History of France* (vol. iii. 1877).—**L. XV.**, third son of Louis, Duke of Burgundy, and Marie Adelaide of Savoy, was born at Versailles, 15th February 1710. On his deathbed L. XIV. instructed the child to remember the obligations he owed to God, to try to keep peace with his neighbours, and to keep down expenditure; and in his fifth year the crown came to him. Whilst the regency was entrusted to Philippe, Duc de Orleans, Cardinal Fleury became the king's tutor, and Villeroy his governor. In 1723 L. was declared to be of age. In 1725 he married Marie Leczinski, daughter of the ex-king of Poland. Through the influence of Fleury, the court for a time was regulated upon principles of economy and simplicity, but in 1743 Fleury died, and L., who declared he would thenceforth have no First Minister, handed over his government 'to a series of boudoir conspiracies and female revolutions worthy of the most degraded of oriental courts.' First of all, L. fell under the spell of the Duchesse de Châteauroux, who stirred up his ambition for arms until he joined his army then operating in Flanders. An illness overtook him at Metz, and as he was supposed to be dying his mistress was banished. He recovered, and was present at the battle of Fontenoy (10th May 1745), where he showed 'plenty of spirit and bravery.' The next favourite of the king was Madame d'Étioles, or, as she was entitled, de Pompadour, under whose influence the royal life was devoted to the chase and the salon. He declined to get through any business. 'No magistrate or burgher could get audience.' Louis XIV. had been hard of access, but his successor was inaccessible. By the year 1764, when Madame de Pompadour died, France had lost many fleets and colonies. To her succeeded Du Barry (q. v.), a woman of low extractions, with the result that a new internal policy was adopted, the Parliament of Paris being broken up, and its members dismissed. L. died May 10, 1774. He was the 'true destroyer' of the absolute monarchy of France. See Kitchin's *History of France* (vol. iii. 1877).—**L. XVI.**, grandson of the preceding, was born at Versailles, August 23, 1754, married in 1770 Marie Antoinette, daughter of Maria Theresa of Austria, and succeeded to the throne May 10, 1774. L. started his career with the best intentions, and looked to his councils Maurepas, who intrusted the finances to Turgot. Just as Turgot was applying extensive plans of reform, L. recalled the Parliament of Paris, which, consisting of nobles, lawyers, and financiers, opposed every great change, and the king had to dismiss his ministers in 1776. Jacques Necker was next appointed 'to stop the mouth of the starved giant Revolution with proper budgets;' but being suspected of leaning towards a constitutional monarchy, he was compelled to resign in 1781. Two years later, at the end of the war of assistance to America, republican ideas had become predominant in the army and among the young nobles. The king drifted away from his good intentions, and, under the queen's influence, the court was given up to frivolity. Calonne, who succeeded Necker, was compelled in 1787 to suggest financial reform; but the king having called an Assembly of Notables, he was treated as a traitor and dismissed, being succeeded by Cardinal Laurence de Brienne. In the same year all the Courts and Parliaments of France called for the States-General, but L. showed no disposition to grant constitutional liberties, and did not convoke a sitting until distress in the country and the absence of funds compelled him, May 5, 1789. There then sat at Versailles 291 nobles, 270 clergy, and 578 of the Third Estate, which latter usurped the chief power in behalf of reform. On the 23d June 1789 L. complained of their conduct, but made a formal declaration of concessions. About the same time the Bastille was destroyed by the Parisian mob, and 'with its fall fell the old *régime* in France.' On the 14th July L. made fresh concessions in the Assembly, and promised to remove his troops from Paris and Versailles, the nobility took fright and fled, the citizens of Paris were driven by want to desperation, and, August 6, 1789, compelled L. to go into imprisonment at the Tuileries. There he remained strictly watched until the 20th of June 1791, when he made an unsuccessful effort to escape. An amnesty was granted by the Assembly to those concerned in the flight, and freedom was restored to the king, the Revolution being declared at an end. The new Assembly, at first inclined to support the amended constitution and the king, became alarmed at the autocratic attitude of the queen; the emigrant nobility and the foreign sovereigns prayed for new decrees, and forced the ministry to resign. The defeat of French troops in the Austrian war made them suspect treason, and new insurrections in Paris were the result. On the 7th November 1792, it was determined to try the king at the bar of the Assembly, and on the 11th and 26th of December he appeared in person to answer the charge of establishing his tyranny by destroying the liberty of the French people. On January 16, 1793, pressed by the Parisian mob, the Assembly, by a vote of 387 against 334, determined that L. should be executed, and on the 21st January the sentence was put in force. L. was a timid, good-natured man, with no will of his own, who always managed to do the wrong thing during an important crisis, but whose natural disposition, had it been guided beneficially from without, instead of being dominated by the will of Marie Antoinette, leant towards gentleness and peace. See the Histories of the French Revolution by Thiers, Michelet, and Louis Blanc; Ernest Semichon's *Les Réformateurs sous Louis XVI.* (Par. 1876); Kitchin's *History of France* (vol. iii. 1877).—**L. XVIII.** (Louis Stanislas Xavier), younger brother of Louis XVI., was born at Versailles, 17th November 1755, married (1771) Marion Josephine Louisa, daughter of Victor Amadeus III. of Sardinia. In 1793 he proclaimed his brother's eldest son King of France, and two years later, upon his death, adopted the title for himself. As an exile his wanderings were many, until he settled down upon a property in Buckinghamshire in 1807. On the 24th of April 1814 L. landed at Calais to assume the crown he had so long claimed, and made a public entry into the capital on May 3d. He pledged himself to constitutional principles, maintaining that representative government should be carried out by a Senate and Chamber of Deputies, that taxes should be voted and imposed by them, that ministers should be responsible and judges irremovable, that liberty of worship and of the press should be guaranteed, and that civil and military employments should be open to all. On the 4th of June, with some slight alterations, the new charter was promulgated, and it remained for three reigns the fundamental code of government in France. After Waterloo the Chamber of Representatives, which was now

'more counter-revolutionary than all Europe, and more royalist than the king,' entertained a design for the annulment of the Constitutional Charter. L. dissolved it in September 1816, and a new election returned a Parliament more moderate and in harmony with popular feeling, but the assassination of the Duc de Berry in 1820 created another reaction in favour of repressive laws and arbitrary prerogative. In 1823 L. sent troops into Spain to assist the restored Bourbon dynasty. He died at Paris, September 16, 1824. L. was a man of some culture, and had learnt by experience to be patient and brave amidst excitement. That he did not give to France the constitutional *régime* which he promised was less his fault than his party's, as he undoubtedly perceived the impossibility of maintaining a rule in the country upon any conditions less binding. See M. Guizot, *Mémoires pour servir à l'Histoire de mon Temps*, and Du Bertrand, *Règne de L. XVIII.*

Louis d'Or, an old French gold coin, first struck in 1640 during the reign of Louis XIII., and superseded in 1795 by the twenty franc piece. Formerly the L. d'O. was current all over the Continent.

Louisia'na, one of the United States of America, is 298 miles long from E. to W., and 280 wide from N. to S., and is bounded N. by Arkansas, S. by the Gulf of Mexico, E. by Mississippi state, from which it is separated partly by the river of that name, partly by the Pearl River, and W. mainly by the Sabine, separating it from Texas. Area, 41,346 sq. miles; pop. (1870) 726,915, of whom 36,4210 were coloured people. The land slopes from hills in the N.W., 240 feet high, towards the Mississippi and the Gulf, and along the lower course of the great river is protected by embankments, which are occasionally broken through by floods, submerging hundreds of thousands of acres. The Mississippi after receiving the Red River from the N.W. flows into the heart of the state, which includes the whole of its delta. Many minor rivers water L., and the coast is honeycombed with salt lakes (largest, Pontchartrain), bayous, and estuaries. The chief formations are alluvial and diluvial, the deposits of the delta being about 60 feet deep, and of marvellous fertility. A Tertiary tract in the N. and N.W. contains lignite, coal, iron, lead, gypsum, and rock salt of the finest quality. The chief products of L. are sugar, cotton, rice, wheat, barley, buckwheat, figs, oranges, Indian corn, sweet potatoes, and tobacco. Like Florida, L. is a land of flowers. About one-fifth of the area is too marshy for cultivation, and much of it is covered with lofty cypress trees, festooned with Spanish moss. Other forest trees are ash, hickory, black walnut, magnolia, oak, chestnut, acacia, sycamore, cedar, maple, cotton-wood, and wild orange. In 1874 the yield of sugar was 102,923 hogsheads, and 90,000 hogsheads of molasses, of cotton, 495,000 bales; of Indian corn, 8,110,000 bushels; of rice, 12,007,380 lbs.; of potatoes, 54,000 bushels; of tobacco, 35,000 lbs. of excellent quality. In 1875 there were 75,000 horses and mules, 87,070 milch cows, 168,650 working oxen and other cattle, 63,100 sheep, and 210,035 hogs. In amount of commerce L. is second only to New York among all the states. In 1874 the value of its domestic products exported was $93,478,513; of its imports, $14,548,056; while the coastwise and foreign commerce was not far below $400,000,000. In 1875 L. was traversed by 641 miles of railway. New Orleans is the capital, and other towns are Baton Rouge, Shreveport, and Monroe. La Salle, descending the Mississippi in 1682, took possession of the country in name of Louis XIV., giving it the name L. It was settled by the French in 1699, relinquished in 1717, became the basis of John Law's gigantic Mississippi bubble, was secretly ceded by France to Spain in 1762, reverted to France by the treaty Ildefonso in 1800, and was finally sold by Napoleon I. to the United States for 60 million francs, and made a state in 1812. L. took an active part in the Civil War, and has since been the scene of much riot and bloodshed, arising from the disfranchisement of many of those who sympathised with the Confederacy, but still more from the election of negroes to the legislature, the strife for power, and the prevalence of bribery.

Louis-Philippe', eldest son of the Duc d'Orleans, was born in the Palais Royal, Paris, 6th October 1773, educated under the Comtesse de Genlis, adopted republican principles at the period of the first Revolution, and took the field at the head of a regiment of dragoons in 1790. On 6th November 1792 he was with Dumouriez at the battle of Jemappes, and in February 1793 at the bombardment of Maestricht, but in April took refuge in the camp of the Imperialists. Upon the death of his father L. joined his sister in Switzerland, travelled (1795) in Germany, Sweden, and Norway, and (1796) crossed to the United States with his two brothers. Four years later he took up his residence at Twickenham, subsequently at Palermo, where he married the Princess Marie Amelie, daughter of Ferdinand IV., the dispossessed king of Naples, and in 1814 returned to France, when he took his seat in the Chamber of Peers. Until 1827 he lived in retirement, though keeping up an intimacy with the Liberal leaders. L. was called to the throne upon the abdication of Charles X., August 9, 1830, accepting the charter under which the sovereignty of the people was acknowledged. Notwithstanding his programme of constitutional government and peace with foreign powers, outbreaks occurred at Paris and Lyons (1831 and 1834), and the Legitimists tried to provoke a war in La Vendée. Secret societies sprang up; and in 1836, by the discharge of an 'infernal machine,' L.'s life was threatened in the streets of Paris. Thereafter the 'laws of September' were passed, and the stability of L.'s position became less assured, owing to the rivalries of those who had elected him. In 1836 his government was involved in difficulties through the failure of an expedition in Algeria, and by the appearance of Louis Napoleon at Strassburg. The announcement of the Quadruple Treaty (1840) roused universal indignation in France, and further diminished L.'s popularity. In the same year Paris was fortified, another attempt made upon the king's life, and the remains of Napoleon I. removed from St. Helena. Misunderstandings between France and England, in connection with the occupation of the Society Islands and the marriage of the Queen of Spain, arose in 1843 and 1846. In 1847 the Socialists were at the height of their propagandist activity, and their demand for reform was refused by L. in his speech from the throne (28th December). On the 22d of February a revolution broke out, and on the 26th, L. with his queen and party arrived at Harfleur *en route* for England. L. passed the remainder of his days at Claremont, where he died, 26th August 1850. See L. Blanc, *Histoire de Dix Ans;* Granier de Cassagnac, *Histoire de la Chute du roi Louis-Philippe* (2 vols. 1857); Guizot's *Mémoires*, and Boudin's *Histoire de Louis-Philippe* (1847). L.'s remains were conveyed from England and interred in the family burial-place at Dreux, June 1876.

Lou'isville, the largest and chief commercial city of Kentucky, U.S., situated at the falls of the Ohio, 90 miles S.W. of Cincinnati. The streets, from 60 to 120 feet wide, are laid out at right angles, and are mostly bordered with trees. The business parts have recently been much improved, and over 1000 new buildings were erected in the year ending June 1875. L. is the centre of five railways, has eleven lines of street railway, ninety-eight churches, of which nineteen are Roman Catholic, including the cathedral, many fine public buildings, three hospitals, various other charities, a public library of 70,000 vols., four theatres and an opera-house, and twenty-six newspapers, five daily (two German). In education ranking next to Boston, it has a University, a Medical College, Kentucky School of Medicine, and eighty-four public and private schools. In 1874 the value of the business was officially returned at $250,000,000. The staples are tobacco (manufactured and in leaf), Kentucky whiskies, provisions, and breadstuffs. L. is the fifth pork-packing city in the United States, and its manufactures are iron wares, oak, sole leather, cement, gas and water pipes, tobacco, malt liquors, woollen goods, bagging, farm implements, &c. Pop. (1871) 100,753, (estimated 1876) 165,984. Settled in 1775, the town was named after Louis XVI.; it lent aid in the War of Independence.

Loule, a town of Portugal, province of Algarve, 10 miles N.W. of Faro, is surrounded by a Moorish wall, has a ruined Moorish castle, and manufactures baskets of aloe thread. Pop. 12,000.

Louse (*Pediculus*), a genus of insects, by many entomologists made the type of a special order—that of the *Anoplura*—characterised by the absence of wings, by the fact that the young undergo no metamorphosis in passing from the egg to the adult state, and by the presence of a suctorial mouth. By other authorities the genus is included in the order *Hemiptera* (q. v.), or that represented by the various kinds of bugs. The body is large, and of oval shape, and consists of nine segments. The

thorax is small, and indistinctly jointed, and the antennæ are filiform, and five-jointed. The eyes are simple and minute. The tarsi are two-jointed, and the terminal joint is hook-like. Schiödte of Scandinavia describes the manner in which the L. sucks blood, and states that this is effected by means of the pumping-action of the sucking stomach. One of these insects placed on this observer's hand was watched in its movements. 'At the top of the head under the transparent skin, between and a little in advance of the eyes, a triangular blood-red point appears, which is in continual movement, expansion and contraction alternating with increased rapidity.' The whole digestive system is next observed to be filled with blood in this manner. The modified *labium*, or lower lip, can be retracted into the upper part of the head. Three varieties of lice infest the skin of man, the *Pediculus capitis*, *P. corporis*, and *P. pubis*. The first deposits its eggs on the stem of the hairs, and is found chiefly on children. Leuwenhoeck estimated that two females, conjointly, might produce eighteen thousand in two months. *P. corporis* chiefly infests adults and elderly persons. It is larger, flatter, and whiter than the *P. capitis*, and its ova are agglomerated and deposited among the body-clothes. The insect causes extreme itchiness of the skin when it comes to feed, and the irritation and scratching give rise to papulæ, which may become pruriginous and pustular. This disease, named *Lousiness* or *Phthiriasis*, has been described by ancient and modern medical authorities.

Louth (Irish Gael. *Lugh Magh*, 'the field of Lugh'), the smallest county of Ireland, in the province of Leinster, is bounded N. by Armagh and Carlingford Lough, S. by Meath and the Boyne, E. by the Irish Sea, and W. by Monaghan and Meath. Area, 201,601 statute acres; pop. (1871) 70,511. It is level and fertile, unless in the peninsula of Carlingford, where continuations of the Mourne Mountains rise to a height of over 1900 feet. L. is watered by the rivers Dee, Clyde, Fane, &c., is (1876) to the extent of 96,980 acres under tillage, 76,037 in pasture, 4335 in plantation, and 24,208 in waste, bog, mountain, &c.; excellent crops are raised of wheat, oats, barley, potatoes, &c. In 1876 L. had 11,202 horses, 39,346 cows, 47,880 sheep, and 15,652 pigs. Dundalk is the capital, and other towns are Drogheda, L., and Ardee. The county, which now returns two members to Parliament, was formed by King John in 1210. It is rich in remains, including sculptured crosses (at Monaster-boyce), round towers, abbeys, &c.

Louth, a town of England, in Lincolnshire, on the Ludd, at the E. foot of the Wolds, 25 miles E.N.E. of Lincoln, and 140 miles N. of London by rail. It has a fine parish church dating from the 14th c., with a spire 300 feet high, a grammar school founded in the reign of Edward VI., a new corn-exchange, a large carpet factory, iron foundries, farm implement works, tanneries, malthouses, bone-mills, lime-kilns, and brick-fields. There are four yearly fairs, and various periodical markets for corn, fat stock, sheep, and general produce. Pop. (1871) 10,500. In the vicinity are remains of L. Abbey, founded in 1139.

Louvain' (Flem. *Leuven*, Ger. *Löwen*, from *loo*, 'a bushy height,' and *veen*, 'a swamp'), a city of Brabant, Belgium, on the Dyle, 15 miles E. by N. of Brussels by rail, which was in the 14th c. the capital of Brabant, with 200,000 inhabitants (15,000 cloth-weavers), but is now a quiet place, with a pop. (1875) of 32,582. It has a very beautiful Gothic town-hall, (1448), and a fine Gothic church (St. Peter's), also of the 15th c. The halls built in 1317 as warehouses for the cloth-weavers' guild were in 1697 given to the University (founded 1426), which had in the 16th c. 6000 students, and was held the first in Europe. It was suppressed during the French Revolution, but re-established in 1817. L. has extensive brewing, founding, and dyeing, and within its district are numerous rice and flour mills, the latter preparing 220,000,000 lbs. annually. A canal passing Mechlin connects it with the Scheldt.

Lou'viers, an old town of France, department of Eure, 15 miles N. of Evreux, is the centre of a cloth-manufacturing district. Other industries are yarn-spinning and the making of machinery, cards, nails, and leather. The first cloth manufactory in France was established here in 1681, and the first cotton factory in 1789. Pop. (1872) 10,189.

Lou'vois, François Michel Le Tellier, Marquis de, minister of Louis XIV., was born at Paris, 18th January 1639. His father was Chancellor, and obtained for him the post of Secretary of State. Louis, pleased with his young minister's efforts in the direction of army reform, gave him full scope for his plans, and the result was a military organisation which triumphantly stood the test of war in 1667 and the following years. It was L. who negotiated the famous capitulation of Strassburg to the French in 1681. Energetic and able, he was yet vain and overbearing, and, though the right-hand man of Louis, was no favourite of the people. Eventually he obtained almost absolute power over state affairs, and only the influence of Madame de Maintenon prevented his making the king his slave. It was L. who instigated Louis to the persecution of the Protestants, and plunged France into useless and prolonged war. Louis, fearing yet obeying him, was at last persuaded to dismiss him; but ere this could be done, the disgraced minister died of apoplexy, 16th July 1691. See Chamlay's *Mémoires pour servir à l'Histoire de F. M. Le Tellier, Marquis de L.*; and Camille Rousset's history of L.'s administration from original documents (4 vols. Par. 1861-63).

Lou'vre. See LANTERN.

Lov'at, Simon Fraser, Twelfth Lord, born at Urray, Ross-shire, in 1667, studied at King's College, Aberdeen, and in 1694 obtained a commission in the Tullibardine regiment. On the death of his cousin, Hugh, Lord L., in 1696, he claimed the headship of the Fraser clan, and, baffled in an attempted elopement with the daughter and heiress of his kinsman, forced a marriage on her mother, the dowager Lady L. Outlawed for this offence, he fled to the exiled court of St. Germains, whence in 1703 he returned to Scotland on a Jacobite mission. Having discharged this, by disclosing to the Duke of Queensberry the details of a real or fictitious plot, he hastened back to Paris, was seized and sent to the Bastille, only obtaining his liberty in 1708 by entering the Jesuit college at St. Omer. Back again in Scotland in 1715, he recovered his forfeited lands and title by an opportune espousal of the Hanoverian cause, to lose them again in the '45, when, sending his eldest son to join the Pretender, and himself remaining inactive, he was, notwithstanding, arrested, tried by his peers, March 7, 1747, and beheaded on Tower Hill, April 9. See Hill Burton's *Lives of Lord L. and Duncan Forbes of Culloden* (Lond. 1847).

Love-Apple. See TOMATO.

Love-Bird, the name given to several species of smaller *Psittacidæ* or parrots, from the affection which they seem to display towards each other. A common species is Swindern's L.-B. (*Psittacula Swinderniana*), which attains a length of 4 or 5 inches. The colour is a light green on the head and body. The neck is encircled by a black ring, a yellow tint appearing below the latter. The tail shows scarlet and black hues. The L.-B. is found in the tropical regions of the world generally. It is readily domesticated, and becomes exceedingly tame.

Lovelace, Richard, a Cavalier poet, son of Sir William L., was born in Kent, 1618, and educated at Charterhouse and Gloucester Hall, Oxford. A zealous Royalist, and a favourite at court, he became a colonel of Charles I., and was imprisoned (1642) for presenting petitions to Parliament in favour of the king's restitution. In 1646 he served in the French army, and was wounded at Dunkirk. News of his death caused Lucy Sacheverell, the Lucasta (*lux casta*, 'chaste light'), who gave her name to his published volume of poems, to marry another; and L., disconsolate and penniless, for his fortune was squandered in the king's service, died miserably in Shoe Lane, London, 1658. One of his songs, written while in prison, contains the famous stanza beginning—

> 'Stone walls do not a prison make,
> Nor iron bars a cage.'

Besides the poems already referred to, published in 1649, L. wrote *The Scholar*, a comedy, and *The Soldier*, a tragedy. See *Poems of L.*, edited by W. C. Hazlitt (Lond. Smith, 1864). For the best selections from the poems of L. and his contemporaries, see Morley's *The King and the Commons* (Bayard series).

Lov'er, Samuel, an Irish novelist and song-writer, was born in Dublin in 1797. He was originally a successful miniature painter, and became Secretary to the Royal Hibernian Society of Arts. The Duke of Wellington and Lord Brougham were

among his sitters. His first literary work of importance was *Legends and Stories of Ireland* (1832, 2d series 1834). In 1837 he removed to London, where he produced his *Irish Sketches* in 2 vols. In 1839 he published *Songs and Ballads*, including *Rory O'More*, *Molly Bawn*, *The Angel's Whisper*, &c., several of which he afterwards expanded into tales and operas. The amusing and vastly popular *Handy Andy* appeared in 1842, and the *Treasure Trove* in 1844, both illustrated by himself. About this time he gave in London a series of performances called 'Irish Evenings,' successfully continued in the provinces and in America, and in 1848 a second entertainment founded on his American experiences. He compiled the *Lyrics of Ireland* in 1858, and published *Metrical Tales and other Poems* in 1859. He died July 6, 1868. L. had genuine lyrical power, and few writers have more happily illustrated the bright and genial side of Irish character. His *Life and Unpublished Works*, by Bayle Bernard, appeared in 1874.

Lo'vicz, a town of Russia, government of Warsaw, on the Bzura, 45 miles W.S.W. of Warsaw by rail. It has six great horse fairs, and was long a residence of the Polish primates. Near it is the fine old castle of Nieborov. Pop. 6136.

Low Archipelago, or **Paumo'tas**, an archipelago of seventy-eight small coral islands in the S. Pacific, the centre of the group being in 19° S. lat., 141° E. long. Their total area is 4125 sq. miles, and the pop. only 8000. The islands were discovered by De Quiros in 1606, and France established a protectorate over them in 1846. An active pearl shell fishery is carried on around them.

Lowe, Sir Hudson, an English lieutenant-general, was born at Galway, Ireland, 28th July 1769, served in the Peninsular War, and in Naples and Sicily, was the first governor of the Ionian Islands, took part in the battle of Bautzen, and carried to London the news of Napoleon's abdication. He was the governor of St. Helena during Napoleon's captivity, and his conduct towards the illustrious exile has been commented on with undue severity by French writers. In 1825 he was made military commander of Ceylon, and in 1830 published a defence (in French) of his conduct at St. Helena. He died in London, 10th July 1844. A *History of the Captivity of Napoleon at St. Helena*, compiled from L.'s journal and letters, appeared in 3 vols. 1853.

Lowe, The Right Hon. Robert, M.P., was born at Bingham (1811), educated at Winchester and University College, Oxford, elected Fellow of Magdalen (1835), called to the bar (1842), and emigrated to Australia, where he took a distinguished position as lawyer and politician. In 1852 he was returned to the English parliament for Kidderminster, became secretary of the Board of Control the same year, Paymaster-General (1855), and Vice-President of the Education Board (1859), when he was elected member for Calne. L. took up strong ground against the Reform Bill of Mr. Disraeli in 1867, and a published volume of his speeches during that and the previous session remains the most caustic and trenchant body of argument urged against the measure. In 1868 L. was returned for the university of London, and became Chancellor of the Exchequer in Mr. Gladstone's government. His budget for 1871, recommending a new scale of succession duties and the imposition of a tax on lucifer matches, was one of the most immediately unpopular in the record of English finance. Both suggestions had to be recalled. In 1873 L. was made Home Secretary, but went into opposition with his party in 1874. L. has received honorary degrees from Oxford and Edinburgh. Since the return to power of the Conservative Government, he has delivered many speeches showing a formidable power of critical acumen, and has contributed articles to the *Fortnightly Review* upon Owen's College and the Gothenburg system. L., though a finished classical scholar, is never weary of decrying the utility of classics; and as a statesman has impaired, if not destroyed, the influence of a shrewd and discerning intellect by a disagreeable brusqueness of demeanour and a total want of tact.

Low'ell, James Russell, an American poet and essayist, born at Cambridge, Massachusetts, February 22, 1819, was educated at Harvard, and commenced the practice of law in Boston, soon, however, renouncing everything in favour of literature. In 1841 he published a volume of poems, entitled *A Year's Life*, in 1844 another collection of *Poems*, in 1845 *Conversations on some of the Old Poets*, in 1848 a third series of *Poems*, *The Vision of Sir Launfal*, *A Fable for Critics*, and the *Biglow Papers*. The latter, written in Yankee dialect, from first page to last sparkling with sarcasm and pungent humour, were attacks upon the upholders of slavery, written in the heat of war. Several years after he attempted a second series of *Biglow Papers*, but confesses that by failure he for the first time understood what inspiration is. In 1855 L. succeeded Longfellow as Professor of Modern Languages in Harvard College. He produced *Fireside Travels* (1864), *Under the Willows* (1868), *The Cathedral* (1869), and two volumes of delightful essays entitled *Among my Books* (1870, second series 1876). He edited the *Atlantic Monthly* (1857-62), and the *North American Review* (1863-72). While in this country he received the degree of D.C.L. from Oxford, and that of LL.D. from Cambridge (1872-74). In 1877 he was appointed United States minister at Madrid. L. writes usually with sustained freedom and vigour; sometimes, however, descending to commonplace, and occasionally to bombast. His poems are stronger, and more dramatic in style than those of Longfellow; but he does not possess the fine sense of beauty of form and the purity of language that characterize his brother-poet. He is a thoughtful, careful prose writer. Probably it would be true to say that he is too much of a critic ever to be a great poet.

Lowell, a city of Massachusetts, U.S., on the Merrimack, near the mouth of the Concord River, 26 miles N.W. of Boston by rail. It is the chief seat of the cotton manufacture in the United States, the converging point of six railways, and had (1876) twelve incorporated manufacturing companies, with a capital of $16,000,000, 80 mills, 678,521 spindles, 15,189 looms, employing 10,000 women and 6000 men, and producing per week 2,660,000 yards of cotton cloth, 60,000 of woollen cloth, 37,000 of carpeting, 2500 shawls, and 16,800 dozens of hosiery. There are also eleven private companies for the manufacture of various textiles, besides extensive iron and engineering works. L. has twenty-six churches, two hospitals, two public libraries, various benevolent institutions, three daily and four weekly newspapers. A system of public waterworks was completed in 1873 at a cost of $1,500,000. Pop. (1870) 40,928.

Low'estoft (Dan. 'the place of the beacon-fire'), the most easterly town of England, on the coast of Suffolk, at the mouth of the Waveney, 24 miles S.E. of Norwich, and 16 S. of Yarmouth by rail. It is a fashionable watering-place, and has an esplanade and a good harbour formed by two piers, 600 and 400 yards respectively, each supporting a lighthouse. There are oil and flour-mills, and shipbuilding yards, but the great industry is the mackerel, sole, and especially the herring fishery. In 1875 there entered the port 751 vessels of 96,214 tons, and cleared 193 of 19,115 tons. Pop. (1871) 15,246. See Nall's *Great Yarmouth and L.* (1866).

Lowth, Robert, D.D., an eminent English Hebraist, born at Buriton, Hants, November 27, 1710, passed from Winchester to New College, Oxford (1730), took his M.A. (1737), and as Professor of Poetry (1741) delivered his *De Sacrâ Poesi Hebræorum Prælectiones* (Oxf. 1753; Eng. trans. 1787; Ger. 1793; French, 1812), of which Moses Mendelssohn published a full analysis in his *Bibliothek der schönen Wissenschaften* (1756). Successively rector of Ovington in Hants, archdeacon of Winchester (1750), and rector of E. Woodhay (1753), L. received a doctor's degree from the university of Oxford (1754), and from Lord Hartington the bishopric of Limerick, which he exchanged for a prebend of Durham and the living of Sedgefield. Made Bishop of St. David's in 1766, he was translated to Oxford in the same year, and to London in 1777, and died at Fulham, November 3, 1787. He was the author of a *Life of William of Wykeham* (1738), *A New Translation of Isaiah* (1778; Ger. trans. 1779-81), &c. See the memoir prefixed to the *Sermons and other Remains of Bishop L.* (Lond. 1834).

Loxodrom'ic Line is a curve which cuts every member of a system of lines of curvature of a given surface at the same angle. A ship sailing towards the same point of the compass describes such a line which cuts all the meridians at the same angle. In *Mercator's Projection* (q. v.) the L. lines are evidently straight.

Loy'alty Islands, a group of five thickly-wooded coral islands in the S. Pacific, to the E. of New Caledonia, lying be-

tween 20°-22° S. lat., and 167°-169° E. long. The largest island, Lifu, measures 37 miles by 15, and the area of the whole group is 1354 sq. miles. The inhabitants are Melanesians, and many of them have been converted to Christianity by the Roman Catholic missionaries, who have long laboured among them. The L. I. belong to France.

Loy'ola, Ignatius, properly **Don Inigo Lopez de Ricalde**, the founder of the Society of Jesus, belonged to the house of L., one of the noblest families of Spain, and was born in 1491. Educated at the court of Ferdinand, Inigo was deeply imbued with the spirit of chivalry and the thirst for renown in the profession of arms. He also displayed from his earliest years great religious fervour, but the circumstance that directed the whole of the intense ardour and overwhelming enthusiasm of his character into a religious channel was his being severely wounded in both legs at the defence of Pampeluna (1521), of which wounds he was never completely cured. Deeply versed in the romances of chivalry from his boyhood, he now in his confinement devoured the lives of the saints and of Christ, and his naturally sensitive feelings being spiritualised by his illness and excited by his reading, he believed himself to be inspired to follow in their footsteps, and to vie with them in their austerity and self-denial. And the more the conviction grew that he could never again shine in military service, the clearer did the idea become, and the stronger the resolve, that he would be a soldier of Jesus Christ, and fight under his banner. As soon as he was able he left his home, and repairing to Montserrat, hung up his arms before an image of the virgin, resolved to achieve renown like that of the saints he admired. Being greatly distressed at this time by a sense of sin, he devoted himself to the severest penances; but besides finding these beyond his strength to endure, he felt that they did not bring him peace, or only for short intervals, so that he concluded he was alternately under the influence of a good and of a bad spirit. One day the conviction came to him like waking from a dream, that the torments he felt for the sins of his past life were assaults of Satan, and he determined to yield to them no more. He was further comforted by other visions he had, namely of Christ, of the Virgin Mary, of the mysteries of the Trinity and of the Creation, of the God and the man in the host, &c. After a visit to Jerusalem, on his return to Spain (1524) he was accused of heresy and attempting to teach others and get them to join him in his spiritual exercises. The consequence was that he was enjoined by the universities of Alcala and Salamanca to study theology for four years before trying to expound points of doctrine, and he proceeded to Paris to acquire that education which, although an interruption to his plans at the time, was doubtless the means of rendering his work and his fame really permanent. At Paris he founded the Order of Jesus (See JESUITS), with which the rest of his life is identified. He died 31st July 1556, and was canonised by Gregory XV. in 1622. See Genelli's *Life of St. Ignatius* (Eng. trans. 1871); Ranke's *Die Röm. Päpste* (Eng. trans. 1847).

Loz'enge, in Heraldry, is a sub-ordinary, being a four-sided diamond-shaped figure less elongated than the Fusil (q. v.). The field is *lozengy* when divided into such figures by crossed diagonal lines.

Lozenges. The following are the L. of the British Pharmacopœia: tannic acid, bismuth, catechu, iron, ipecacuanha, morphia, opium, chlorate of potash, and bicarbonate of soda.

Lozère', a department of France, surrounded by the departments Cantal, Haute Loire, Ardèche, Gard, and Aveyron. Area, 1996 sq. miles; pop. (1872) 135,190 (many Protestants). L. is highly mountainous. In the S.E. are the Cevennes, separated by the Tarn from the Monts de la Lozère (Signal de Finiel, 5582 feet), which gave the department its name, the Monts de la Margeride (highest point, 4569 feet), occupying the N. E., and extending into Haute Loire, the Monts d'Aubrac (Champ de la Roche, 4359 feet) on the N.W. Most of these are volcanic, and rich in iron, lead, silver, copper, and antimony. The N. is drained by the Truyère, and the N.E. by the Allier, which for 18½ miles is the E. boundary. Vines, mulberry, olive, and chestnut trees are cultivated, but the soil in general is unsuited for tillage. Wool and cattle from the hill pastures are the chief articles of trade. The chief town is Mende.

Lubb'ock, Sir John, Bart., M.P., F.R.S., &c., was born in London, April 30, 1834. By profession he is a banker, and has been for several years Hon. Secretary to the London Bankers. In 1865 and 1868 he contested West Kent unsuccessfully in the Liberal interest, but in 1870 was returned for Maidstone. Though he has taken a leading part in certain financial and educational measures, it is chiefly as a man of science that he is generally known. He has been President of the Ethnological and Entomological Societies, of the Anthropological Institute, and of the Royal and Linnæan Societies. As an author, he is widely known through his *Prehistoric Times, as Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages* (3d ed. 1870), *The Origin of Civilisation, and the Primitive Condition of Man* (1870), *The Origin and Metamorphosis of Insects* (1874), and *On British Wild Flowers considered in Relation to Insects* (1874), besides his *Monograph of the Thysanura and Collembola*, and over fifty memoirs in the *Transactions* of the various societies of which he is a member.

Lü'beck (? Slav. 'the place of the linden tree,' or 'of the beloved'), a small free-state in N. Germany, consisting of the city of L., with the surrounding district, and some scattered portions in Holstein and Lauenburg. Area, 109 sq. miles; pop. (1875), 56,912 (chiefly Protestants). By the revised constitution of 1851 L. is governed by a senate of 14 life members and a municipality of 120 chosen for six years. The Budget for 1876 shows a revenue and expenditure equal to £128,838; debt at the beginning of 1876, £1,240,667. L., with Hamburg and Bremen, furnishes two infantry regiments of the Imperial army. It entered the Zollverein May 15th, 1868, and in 1871 the German Empire.—The free-town of **L.** lies on the river Trave, 9 miles from its mouth at Travemünde, and 37 N.E. of Hamburg by rail. It is an old-fashioned town with three suburbs and four gates, yet the streets are wide, especially Königstrasse and Breitestrasse. Prominent buildings are the Gothic Marienkirche (1304), with spires 409 feet high; the Cathedral, founded by Heinrich the Lion in 1173, completed 1334, with towers 394 ft. high; the Jacobikirche (14th c.); Peterskirche (1300); Katherinenkirche, with rich art treasures; and the Rathhaus, with the archives of the Hansa. L. has numerous educational and benevolent institutions, and a public library of 50,000 vols. The industries, chiefly manufactures of sugar, tobacco, leather, beer, and brandy, are comparatively unimportant, but the trade, especially with the Baltic ports, is extensive. In 1876 there entered the ports of L. and Travemunde 2537 vessels, of 436,100 tons; cleared 2520, of 433,900 tons. The chief imports are iron, coal, soda, corn, butter, wood, tar, linseed, hemp, wines and spirits. These amounted in 1875 to £9,721,800, and the exports to £8,015,800. Pop. (1875) 44,799. L., which first appears under the Wendish Prince Gottschalk (1043-66), was removed to its present position in 1143 by Adolf II., Count of Holstein, who gave it up to Heinrich the Lion in 1158. In 1226 it was declared a free-town by Friedrich II., after which it became the head of the Hansa. Its power and wealth decreased greatly from the 16th c., and suffered severely from the Thirty Years' War. Taken and sacked by the French, 6th Nov. 1806, it bore their oppressive rule till 1813, when it was liberated by Bernadotte. See Becker, *Geschichte der Stadt L.* (3 vols. 1783-1805); *Urkundenbuch der Stadt L.* (4 vols. 1854-70).

Lub'lin (Slav. 'the place of the linden tree'), a Russian government in the S.E. of the old province of Poland, between the Bug and Vistula. Area, 6260 sq. miles; pop. (1870) 659,483. It is watered mainly by the Wieperz, a branch of the Vistula, is hilly in the S., and covered in the N. with dense forests. The chief products are hemp and flax, and at Irena are great iron works.—**L.**, the capital, on the Bistriz, in the midst of marshes, 96 miles S.E. of Warsaw. It is the most important town of Poland next to Warsaw, with a cathedral of the 13th c., eleven churches, a priest's college, two hospitals, a fine town-house, a national theatre, woollen and linen factories, and a trade in cloth, grain, and Hungarian wine. There are three yearly fairs, each of which lasts a month. Pop. (1870) 20,784, of whom half are Jews.

Luca'nus. See STAGBEETLE.

Luca'nus, M. Annæus, son of Annæus Mela, a Roman knight, and a brother of the philosopher Seneca, was born at Corduba (Cordova) in Spain, A.D. 39. He was brought, when very young, to Rome, where he received instruction in phi-

sophy and literature. The Emperor Nero raised him to the offices of quæstor and augur; but the increasing poetical reputation of L. excited the jealousy of the tyrant, who forbade the poet to recite his productions in public. L. took part in the conspiracy of Piso against Nero's life, and on its detection stained his name by turning informer, and by denouncing his own mother. Notwithstanding his base betrayal of his accomplices, he was condemned to death, on which he ordered his veins to be opened, and died A.D. 65, repeating his own description of a soldier expiring from his wounds. L. is the most eminent epic poet of the silver age, and next to Virgil in Latin literature. He was the author of numerous works, but his only extant poem is the *Pharsalia*, an epic in ten books, the last of which is imperfect. Its subject is the civil war between Cæsar and Pompey, and it details, in chronological order, the events of that struggle from the passage of the Rubicon to the siege of Alexandria. The *Pharsalia* has been extravagantly lauded, and unduly depreciated. The pedantry, affectation, and turgidity by which it is marred are only too apparent; its learning, vigour, lucidity, and originality, however, prove that with longer life the poet would have done work worthier of his powerful genius. Among modern editions of L. may be mentioned Weber (3 vols. 1821–31), and Weisse (1835). The best English translation is by Rowe.

Lucarne', or **Lucayne'** (Fr. *lucarne*, from Lat. *lucerna*) in architecture, a Dormer (q. v.) or garret window.

Luc'a, a former duchy in N. Italy, exactly corresponding to the modern province of the same name, and lying between Tuscany, Modena, Nassa, and the Gulf of Genoa. Area, 576 sq. miles; pop. (1874) 280,399. The duchy founded by the Lombards became independent in 1055, passed again under a duke (the famous Castruccio Castracani) in 1327, and later (1370) was formed into a republic. With Tuscany it became part of the kingdom of Italy in 1860. The country is singularly fertile, yielding grain, wine, oil, and fruits, and is better cultivated than is usual in Italy. The Lucchesi contribute largely to the itinerant class throughout Europe.

Lucca, the capital of the province of L., N. Italy, in a fine plain on the Serchio, 15 miles N.E. of Pisa by rail. It is girt by well-preserved fortifications, and has a cathedral of S. Martin's, in Romanesque style, built 1060–70, restored and adorned with a rich façade by Guidetto in 1204. Several other buildings (S. Frediano, Palazzo Pubblico, &c.) are important specimens of middle age architecture. Matteo Civitali (1435–1501), one of the most graceful sculptors of the Renaissance, produced many of his finest works here. L. *l'industriosa* is noted for its silk industry, introduced from Sicily in the 14th c. It has also manufactures of woollen goods, oriental fez, linens, cottons, paper, and glass. L. is supplied with water by a splendid aqueduct of 452 arches, 3 miles long, erected 1823–34. About 15 miles N., in a hilly district, are the celebrated mineral baths of L., with springs varying from 86° to 129° F. Pop. (1874) 68,204. The Roman *Luca*, and an important municipium, L. was the scene of a conference between Cæsar, Pompey, and Crassus, B.C. 56.

Luce'na (Basque, *Lucea*, 'the long town'), a town of Spain, province of Cordova, in a romantic hill region, 45 miles S.E. of Cordova. It is famed for its horses and apricots. Here Boabdil, King of Grenada, was captured, 21st April 1483. Pop. 13,100.

Luce'ra, a town of S. Italy, province of Foggia, on a lofty plain, 10 miles N.W. of Foggia. It has a Romanesque cathedral, ruins of a medieval castle, a valuable library, and many rare antiquities. Its trade is in agricultural products. Pop. (1874) 14,014. The ancient *Luceria*, regarded as the key of Apulia, and first heard of during the Samnite wars, was made a Roman colony B.C. 314, and had temples of Apollo, Ceres, Hercules, &c.

Lucerne' (Ger. *Luzern*), a central Swiss canton, bounded N. by Aargon, S. by Unterwalden, W. by Bern, and E. by Schwyz and Tug. Area, 587 sq. miles; pop. (1870) 132,338. It is mainly mountainous, reaching a height of 7040 feet on the S. border, and is watered by the Reuss, Wigger, &c., enclosing the lakes Sempach, Baldegg, and the upper part of L. One-fifth of the surface is covered with forest, and the valleys are very fertile. L. carries on more cattle-rearing than any other Swiss canton, having as many as 2100 cattle for every 21 sq. miles. The inhabitants, though Teutonic, mainly belong to the Roman Catholic church, there being only 3823 Protestants. L. sends seven members to the National Council, and is governed internally by a Great Council of 100 members. See Pfyffer, *Der Canton Luzern* (2 vols. St. Gall, 1857–59).

Lake of L. (Ger. *Vierwaldstätter-See*, 'lake of the four forest cantons'), is bounded by Uri, Unterwalden, Schwyz, and L., is of irregular shape, 25 miles long from L. to Flüelen, and 15 wide from the extremities of the inlets Alpnach and Küssnacht. Other inlets are the bays of L. and Buochs and Lake of Uri; the greatest depth is 510 feet. The Reuss flows through the lake, which receives several smaller rivers. L. lies between the Rigi and Pilatus, and has magnificent scenery.

Lucerne, the capital of the canton of L., beautifully situated on the Reuss, where it leaves the lake with the swiftness of a mountain torrent, 35 miles S.W. of Zürich by rail. It is enclosed by walls and nine watch towers dating from 1385, and the river is spanned by four bridges, adjoining one of which stands the picturesque old Wasserthurm, containing the archives, and (according to tradition) giving name to the town from having been a lighthouse (*lucerna*). L. has a hof-kirche of the 17th c. with a famous organ; the Lion of L., a monument by Thorwaldsen, erected (1821) in memory of 26 officers and 760 soldiers of the Swiss guard who fell in defence of the Tuileries, 10th August 1792; one of the chief Swiss arsenals, a town-hall with fine carved work of date 1605. There is some industry in silks, cottons, gloves, flax, hemp, &c. Pop. (1870) 14,524.

Lucerne, is a well known and important fodder plant, botanically distinguished as *Medicago sativa*, though there is some doubt whether it is more than a form of *M. falcata*, induced by long cultivation. It is common through Europe, has now become naturalised in the United States, and is cultivated in Australia, &c. L. is not only early in its growth, but quick in its vegetation through the whole summer and autumn, and is capable of withstanding unimpaired the autumn frosts, thus affording four good cuttings between May and November. Horses are fond of it, and it suits them either mixed or alone. It requires a deep soil, and if rich and calcareous so much the better. The far penetrating roots render the plant particularly fit for fixing embankments, or hindering the washing away of soil subject to occasional inundations.

Lu'cia, St., one of the British W. India Islands, in the Windward division of the Caribbees, lying between St. Vincent and Martinique. Area, 248 sq. miles; pop. (1871) 31,610, of whom only 837 are whites. It is of volcanic origin, rising to a height of 3000 feet in luxuriantly wooded mountains, and is famed for its rich romantic scenery. The climate is unhealthy, and there are many poisonous insects and serpents. The chief exports are sugar, rum, and molasses. A great increase is perceptible in the agricultural industry. In 1861 the planters numbered 413, and in 1871, as many as 1210. The increase in the class has mainly arisen from field-hands purchasing small parcels of land, and acquiring cattle or wind sugar-mills. A third of the crop for 1870 was raised by these petty proprietors. In 1874 the total exports amounted to £146,858, the imports to £133,006; the tonnage of vessels that entered and cleared was 28,647, exclusive of coasting trade. In the same year the revenue was £21,131, the expenditure £24,268, and the public debt £18,000. Capital, Castries, with 3500 inhabitants.

Lu'cian was born at Samosata, the capital of Commagene in Syria, about 120 A.D. His parents were in poor circumstances. He was apprenticed to an uncle who was a statuary, but, having been severely beaten for breaking a marble tablet, ran away home. He then devoted himself to study, and after wandering for some time in Ionia, practised as an advocate at Antioch. Thereafter he travelled as a professor of rhetoric through Greece, Italy, and Gaul, and returned to his native country when about forty years of age. He seems now to have become engrossed in the production of those numerous witty attacks on the religion and philosophy of his time, to which he owes his fame; but he still indulged his love of travel by visiting Achaia and Ionia, and also Paphlagonia, where he endeavoured to expose the false oracle of the impostor Alexander, who in revenge made, though unsuccessfully, an attack upon his life. In his old age, he was appointed, probably by the Emperor Commodus, procurator of part of Egypt. No reliance can be placed on the statement of Suidas,

that L. was torn to pieces by dogs as a punishment for his impiety; and Gesner's demonstration that he was not the author of *Philopatris* frees him from the charge of apostasy. His unsparing critical spirit, and his relations to the old heathenism and to the Christian faith are well represented in Landor's *Imaginary Conversation between L. and Timotheus*. The writings of L. have been classed under the following seven heads: 1. the Rhetorical; 2. the Critical; 3. the Biographical; 4. Romances; 5. Dialogues; 6. Miscellaneous Pieces; 7. Poems. The most notable of the Romances are *Lucius or the Ass*, and the *True Histories*. The fame of L., however, rests chiefly on his Dialogues, which have been arranged in three classes, those which are directed against the heathen mythology, as *The Dialogues of the Gods;* those which attack the ancient philosophy, as, *The Sale of Lives, The Fisherman, or the Revivified*, and *The Banquet, or the Lapithæ;* and those which simply 'catch the living manners as they rise,'—general satires on the follies and vices of mankind—as *Timon the Misanthrope, The Dialogues of the Dead, The Icaro-Menippus, or Above the Clouds, Charon, the Dream, or the Cock, Twice Accused, Loves*. Among the editions of L. may be mentioned those of Hemsterhuis, finished by Reitz (Amsterdam, 1743); and of Bekker (1853). The best English translation is that of Dr. Franklin, which is incomplete.

Lu'cid In'terval consists not in a mere cessation of the violent symptoms of a disorder, but of an interval in which the mind, having thrown off the disease, has recovered its general habit. The party must be capable of forming a sound judgment of what he is doing, and his state of mind such that any indifferent person would think him able to manage his own affairs. Such is the *legal* definition of L. I. About one-third of maniacal cases are intermittent, and the paroxysms may be marked by very regular intervals of two or three days, a week, a month, or a year, but short intermissions must be distinguished from those longer periods of complete recovery which are designated L. I. See Collinson *On Lunacy*.

Lucife'rians, a sect of early Christians who received their name from Lucifer, Bishop of Cagliari, a contemporary of Athanasius, and a vehement and fanatical upholder of orthodoxy. 'As he believed that the Catholic Church was defiled by the readmission of unworthy ecclesiastics, he became the founder of a separate party, the L., who regarded themselves as constituting the only pure Church.' See Neander's *Kirchengeschichte* (Eng. trans. Bohn, vol. iv. p. 76).

Lucifer Matches. See MATCHES.

Luci'na, a genus of Lamellibranchiate (q. v.) Mollusca, forming the type of the family *Lucinidæ*, in which the shell is orbicular, the hinge teeth number one or two, and the foot is usually long and cylindrical. The mantle is open in front, and respiratory tubes or *siphons* are developed. In addition to L. the family is represented by such genera as *Kellia* and *Diplodonta*.

Luck'enwalde, a town of Prussia, province of Brandenburg, on the Nuthe, 32 miles S.S.W. of Berlin by rail. Besides its cloth manufacture, which is the largest in Prussia, there are wool spinning, dyeing and fulling industries, saw-mills, oil-mills, breweries, distilleries, &c. Pop. (1875) 13,857.

Luck'impore (*Lakhimpúr*, 'the town of the goddess Lakshmi'), the chief town of the district of the same name, in Assam, British India, a few miles N. of the Brahmaputra, 46 miles N.W. of Seebsaugor.—The *district* of L., which extends on both sides of the river, is the extreme N.E. limit of British territory. Area, 3145 sq. miles; pop. (1872) 121,267. In addition, the L. hills, chiefly occupied by the Singpho and Abor tribes, have an area of 8343 sq. miles, but no census has been taken. The tea plant is indigenous here. The Government first established a tea garden in 1834, which was made over to the Assam Company in 1839. But the industry did not flourish until 1852. In 1874 there were 11,680 acres under cultivation in the L. district, yielding 1,812,000 lbs. of tea; there were 84 Europeans and more than 10,000 natives employed, of whom the great majority are imported from Chota Nagpore. The headquarters of the industry are at Debrogurh, the largest town in the district.

Luck'now (*Lachhndo*, 'the hill of Lachhman'), the capital of the province of Oude, British India, situated mostly on the right or W. bank of the river Gumti, 610 miles N.W. of Calcutta; pop. (1869) 284,779, of whom 41 per cent. are Mahomedans. Its history goes back to an early Hindu period, but its greatness only dates from 1775, when the Nawab Vizier, Azaf-ûd-Dowlah, removed his seat of government here from Fyzabad (q. v.). L. is the fourth largest city of India. The imports in 1870 were valued at £747,500, chiefly grain, cotton, salt, sugar, and leather; the manufactures are gold lace-work, brocades, embroidered slippers and caps, and clay models. L. is the terminus of three railway lines, and the river is navigable for large boats. There is not a single building of stone, and many old structures were cleared away after the events of 1857. The finest buildings now standing are the Imambara; the mausoleum of Azaf-ûd-Dowlah, erected at a cost of one million sterling, as a famine relief work, and now used as an arsenal; the Jumma Musjid, which was never finished; the Chattar Manzil Palace, now a club and library; and the public gardens of the Kaiser Bagh. Other spots connected with the story of the Mutiny are the ruins of the Residency, with its memorial cross; the Alum Bagh and the Secunder Bagh. There are now four bridges over the river, here 900 feet wide. The chief thoroughfares are the Outram, Aminabad, and Canning Roads, and the Strand. The cantonments, which lie to the S., cover an area of 12 sq. miles. A magnificent hospital has been recently erected and endowed by the Rajah of Bubiampore, the first of the Oude talookdars. In May 1857 the Sepoys rose in mutiny, with a few exceptions; the Mohammedan population and the large landholders took their part. The foresight of the chief commissioner, Sir Henry Lawrence, prevented a general massacre, but after a disastrous reconnaissance, the Europeans were driven back into the Residency and besieged for three months. At last they were relieved by Havelock and Outram (25th September), only to be again surrounded, until they were delivered by Sir Colin Campbell (17th November). The city was soon evacuated by the British, and not retaken till 19th March 1858.—The *district* of L., which lies on both banks of the Gumti, has an area of 1392 sq. miles; pop. (1869) 970,625. The staple crops are wheat, barley, rice, millets, and pulse.

Lucre'tius, Ti'tus Ca'rus. Our only account of the life of the great philosophical poet of Rome is derived from Saint Jerome's translation of the *Chronicle of Eusebius*. It is therein stated that L. was born B. C. 95, that he was thrown into a state of madness by a love potion, that in lucid intervals he composed several books, which were revised by Cicero, and that he committed suicide, B. C. 51. The late origin and obvious improbability of these statements appear to justify their rejection, and their existence is amply accounted for by the conjecture, that to the opponents of his philosophy, madness and suicide would seem the fitting doom of an atheist. The only work by which L. is known to us was given to the world about B. C. 57. It is entitled *De Rerum Natúra*, and is a didactic poem in six books, composed in heroic hexameters, and addressed to C. Memmius Gemellus. Its practical purpose is to liberate human life from the terrors of superstition by showing 'that there is nothing in the history or actual condition of the world which does not admit of explanation without having recourse to the active interposition of divine beings.' Like his master Epicurus, L. adopts the atomic theory of Leucippus, and, starting from the position that 'nothing is formed out of nothing by divine agency,' he finds in 'atoms' the original substances from which all things are produced, and into which they are resolved, and the first two books of the poem are devoted to the statement and elucidation of the atomic philosophy. The third and fourth books explain the nature of the soul, show that soul and body live and die together, and account for the universal belief in the existence of the departed. The fifth and sixth books seek to explain, apart from the divine agency, the formation of the universe, the origin of life, and the most striking phenomena of nature. On the Romans of his own time the work of L. made little impression, and Virgil alone of his countrymen seems to have felt his power. His high position in ancient literature is now universally acknowledged, and is perhaps given less to the philosophical and moral teacher, than to the intense feeling, and the grandeur, dignity, and freshness of the poet. Among the best modern editions of L. may be mentioned those of Wakefield (4 vols. 1813); Forbiger (1828); Lachmann (1850). That of A. J. H. Munro (Camb. 1866), with notes and an English translation, is one of the noblest works of English scholarship. The *De Rerum Natura* has been translated into English verse by Creech and Good, and into English prose by Watson.

Lucull'us, the surname of a plebeian family of the Licinia gens, of which *L. Licinius*, consul, B.C. 151, was the first to attain distinction. The most illustrious of the family was *L. Licinius*, grandson of the preceding, born about B.C. 109. By distinguished services in the Social War, he attracted the attention of Sulla, whom he accompanied as quæstor on the outbreak of the Mithridatic War, B.C. 88, and whose favour he so completely won by his ability and fidelity, that the great dictator appointed him his literary executor, and the guardian of his son. L. returned to Rome (B.C. 80) to discharge the duties of the ædileship, to which he had been elected in his absence, and became successively prætor (B.C. 77), and consul (B.C. 74). When the contest with Mithridates was renewed, L. obtained the conduct of the war, and in a series of campaigns (B.C. 74–68) frequently attacked, and finally annihilated, the great army of his opponent, destroyed his fleet, drove him back into his own kingdom of Pontus, laid waste the country, reduced the wealthy and important cities of Amisus, Eupatoria, and Sinope, pursued his fugitive foe into the dominions of Tigranes, put to flight, with the loss of only five men, the host of the Armenian king, before Tigranocerta, and renewed this victory on the banks of the Arsanias. The brilliant career of L. was at this stage (B.C. 67) interrupted by the mutiny of his troops, caused by his severe discipline, or by his unsympathetic indifference, and fomented by his enemies at Rome, especially the Equestrian order, whose bitter hostility he had roused by checking their exactions as farmers of the revenue. L. was (B.C. 66) superseded in his command by Pompey, and returned to Rome, where, after three years' opposition he succeeded in obtaining the triumph he had so well earned. He now almost wholly retired from public affairs, and passed the remainder of his life in idleness and luxury. On his gardens, villas, parks, and fish-ponds, he freely lavished the wealth he had amassed as proconsul in Africa and during his campaigns in the East; and the splendour of his feasts is illustrated by the fact that a single supper in the hall of Apollo at Rome was said to cost the sum of 50,000 denarii, or about £1770. He found worthier objects of his munificence in the collection of a splendid library, and in the patronage of men of letters. He died about B.C. 57, and his funeral oration was pronounced by his brother Marcus, through life his affectionate friend, and after the decay of his mental powers, the manager of his affairs.

Lud'low (Old Eng., 'the people's hill'), an old town of England in the county of Salop, on the Terne, 27 miles S.S.E. of Shrewsbury by rail. It has a parish church dating from the reign of Edward III., a free school founded by Edward IV., the ruins of one of the finest and strongest of the Welsh border castles, a museum of local antiquities, a town-hall, market-house, and a new cattle-market (1862), in excavating which was discovered the foundation of a large ecclesiastical building. A statute fair is held in May, and eight others (for cheese, hops, and general produce) during the year. L. has malthouses, paper and flour mills, &c. Races take place in midsummer. Pop. (1871) 6203. L. sends one member to Parliament. The noble castle of L. was long a royal residence, and later of the lord presidents of the marches. Milton's *Comus* was first 'presented' here (1634) before the Earl of Bridgewater, then president of Wales.

Ludlow, Edmund, born at Maiden Bradley in Wiltshire, England, about 1620, studied at Trinity College, Oxford, and entered the Temple, but having joined the lifeguards of the Earl of Essex as a volunteer, fought at Edgehill (1642), and was taken prisoner at Wardour Castle in 1644. Soon exchanged, he was present at the second battle of Newbury, became high sheriff and member for Wiltshire (1645), actively promoted 'Pride's Purge,' was one of the king's judges, and voted for the abolition of the House of Lords. 'Firm as brass or oak timber,' he made himself obnoxious to Cromwell, who sent him to Ireland (1650) as lieutenant-general of the horse. Thence he retired to Essex (1655), and, having refused to take the oaths to Richard Cromwell, he joined the Wallingford House party, and held a brief tenure of supreme power in Ireland, but on the Restoration fled to Vevey in Switzerland, where he died in 1693, his reappearance in London (1689) having been met by a proclamation of arrest. His *Memoirs* (3 vols. Vevey, 1698–99) appear in Guizot's *Collection des Mémoires relatifs à la Révolution d'Angleterre* (Par. 1823).

Ludlow Beds, the highest member of the Upper Silurians, is specially developed near the town of Ludlow (q. v.), where it is distinguishable into three groups—the Lower L. shales, the Aymestry limestone, and the Upper L. sands and shales, capped by red tilestones, which pass into the true Devonian and contain layers full of fish-bones (hence called bone-beds). The fossils are many and characteristic.

Lud'wig I., Karl August, King of Bavaria, eldest son of Maximilian Joseph, was born at Strassburg, 25th August 1786, studied at the University of Landshut (1803), travelled in Italy and Switzerland (1804–5), and married the Princess Theresa of Sachsen-Hildburghausen (1809). L. succeeded Maximilian (12th October 1825), and, after subscribing to the constitution, put in operation several measures of a liberal tendency, abolishing the censorship in the case of non-political journals, suppressing the state lottery, reducing public expense. At the same time he beautified Munich by many noble architectural works, and encouraged art in all its branches. After the revolutionary year of 1830 L. became more reactionary and Conservative in his tastes, but in 1847 the unfortunate influence exercised over him by Lola Montes, whom he created Countess of Lansfeldt, withdrew him from affairs of public moment. His people revolted, and he was compelled to resign in favour of his eldest son Maximilian, 20th March 1848. L. died at Nice, 29th February 1868. He is the author of three volumes of *Gedichte*.—**L. II.**, grandson of the preceding, and son of Maximilian, was born at Nymphenburg, 25th August 1845, succeeded his father in 1864. The man who has probably exercised most influence upon him is Wagner, the composer. He is known to be highly endowed with artistic talent, and is suspected (by the Ultramontanes) of liberal tendencies, but he has so persistently held himself in retirement that it is not easy to ascertain what kind of man he is.

Lud'wigsburg, a town of S. Germany, in Würtemberg, 9 miles S. of Stuttgart by rail, the chief military depot of Würtemberg, has a garrison of 4000 soldiers, an arsenal, a gun-foundry, and a military academy. The great Schloss contains portraits of the kings of Würtemberg. L. was founded in 1706 by Duke Eberhard Ludwig as a rival to Stuttgart. Total pop. (1875) 14,709.

Luff, a nautical term applied to the weather edge of a fore-and-aft sail, or to the roundest part of a ship's bow. To *L.* is to sail nearer the wind.

Luga'no (Ger. *Lauis*), a town of Switzerland, canton of Ticino, on the W. shore of the Lake of L., 38 miles N.N.W. of Milan, is much frequented by tourists on account of its beautiful situation and fine climate. L. has some silk industry, and a great cattle-market in October. Pop. (1870) 6024.

Lake of L. (Ital. 'the lake,' or 'hollow'), on the S. declivity of the Alps, belongs partly (⅛th) to the Swiss canton of Ticino, partly to the Italian province of Como. Length, 14 miles; breadth, 2½ miles; area, 19 sq. miles. Its steep banks are famous for their picturesque beauty.

Luganskij Savod, a town of Russia, government of Jekaterinoslav, on an affluent of the Donetz, 185 miles E. of Jekaterinoslav, has a large library, and has had since 1795 a government cannon foundry. Pop. (1870) 10,049.

Lugg'age. See under CARRIERS—*Carriers, Wharfingers, and Warehousemen, Law Regarding.* Scotch law, see NAUTÆ, CAUPONES, STABULARII.

Lugg'er, a small lightly-rigged vessel with two or three masts, a running bowsprit, and *lug-sails*, which are square, and bent upon yards obliquely slung on the masts.

Lu'go (the *Lucus Augusti* of Ptolemy), the capital of the Spanish province of the same name, on the Miño, 51 miles E.N.E. of Santiago, is well built, with massive walls surmounted by a promenade; has nine churches, and a cathedral of the 12th c. It carries on a trade in cloth, silk, and leather, and in the neighbourhood are celebrated Roman sulphur baths. Pop. 8246.—**L.** (*Lucus Dianæ*) a town of Italy in the province of Ravenna on the Seino, 14 miles W. of Ravenna by rail, lies in a marshy and densely wooded district, but is well built, and has a great fair in August. Pop. 8664.

Lu'gos, a market-town of Hungary, comitat of Krassó, 34 miles E.S.E. of Temesvár, has a gymnasium, a Minorite monas-

tery, and fine barracks, is the seat of a Greek bishop, and carries on a lively trade in wine, silk, and leather. Pop. (1869) 11,654. L. was the last rallying point of the insurgent Hungarian government and army in 1849.

Lug'worm. See LOBWORM.

Lui'ni, or Lovi'ni, Bernardino, a painter of the Milanese school, was born at Luini, on Lake Maggiore, 1470. Some say he studied under Da Vinci; he was at any rate his most distinguished imitator. In aerial effects, the management of shade, and freedom of touch many surpassed L., but none in point of design and colouring. Many of his pictures have passed for Da Vinci's. His son was likewise a painter of note. B. L. died subsequently to 1530. Among his chief works are 'Herodias' at Florence, and 'Christ disputing with the Doctors' and 'Vanity and Modesty,' in the National Gallery, London.

Luise', Auguste Wilhelmine Amalie, Queen of Prussia, daughter of Duke Karl of Mecklenburg-Strelitz and mother of the present German Emperor, was born 10th March 1776 at Hanover, where her father was then governor. On the 24th December 1793 she married the Crown-Prince Friedrich-Wilhelm (afterwards King Friedrich-Wilhelm III.), ascended the throne with him in 1797, and as queen won the highest love and respect of the people through her high-mindedness and patriotism. Sorrow for the humiliation of Prussia helped to shorten her life. She died on a visit to her father at Strelitz, 19th July 1810.

Luke (Gr. *Loukas*, an abbr. of *Loukanos*), the reputed author of the third Gospel and the Acts of the Apostles, seems to have attached himself to the apostle Paul at Troas on his second missionary journey (Acts xvi. 10). He was also with him on his third journey (Acts xx., xxi.); and he accompanied him to Rome (Acts xxviii. 15; Philem. 24; 2 Tim. iv. 11). L. is generally allowed to have been the 'beloved physician' of Col. iv. 14, indication of this being found in the technical language used in L. iv. 38 and Acts xiii. 11. He is also generally supposed to have been a scholar, and was probably a Gentile. At any rate his style is more classical than that of the other evangelists. According to the preface, the writer undertook to compile a gospel which would represent apostolic tradition more fully and accurately than had been done before. The *date* of the composition of the gospel has been variously fixed from about 60 A.D. to the middle or end of the 2d c.; and the *place* variously given as Cæsarea, Alexandria, Rome, Achaia, Macedonia, and Asia Minor.

Lullutpore' (Lalatpur), the chief town of the district of the same name in the N.W. provinces, British India, 93 miles N. from Sangor; pop. (1872) 8976.—The *district* of L., was only formed in 1858, chiefly from forfeitures after the Mutiny; area, 1947 sq. miles; pop. (1872) 212,661. It forms a high plateau, with many hills and jungles. The crops are wheat, barley, millets and pulses.

Lull'y, Raymond, an eccentric theologian and philosopher of the 13th c., was born at Palma, Majorca, 1235. As a youth he led a somewhat loose life in the army, but suddenly taking to science and devotion he graduated at Paris, and proceeded on a mission to Africa, whither he imagined Christ in a vision had commanded him to betake himself. Single-handed he carried on an attack against Mohammedanism, thrice being driven to Europe, and thrice returning, at last falling a martyr to his enthusiasm at Bougiah, Algeria, 30th June 1315. His name in philosophy is principally associated with his Ars Lullia, afterwards designated by disciples, of whom Giordano Bruno was the chief, the Ars Magna. This was a scheme by which all ideas were made capable of formal arrangement, and reasoning could be carried on by a mechanical process. L. became a student of alchemy, and was accused of sorcery. His entire works were published at Mainz in 10 vols. (1721–42). L. was also a poet. His *Obras rimadas* were first published by Rosello at Palma in 1859. See Helfferich, *Raymund L. und die Anfänge der Catalanischen Literatur* (Berl. 1858).

Lumba'go is a rheumatic affection of the muscles in the lumbar region, characterised by the occurrence of sharp pains in the loins on rising from the recumbent position or from sitting. It is distinguished from inflammation of the kidneys by the absence of pain in the groin, and of nausea, and vomiting. L. may be caused by violent straining, by exposure to cold when the body is heated, and is induced by a constitutional tendency. The treatment varies with the intensity of the affection. Diaphoretics, as Dover's powder, in 10 grain doses, and the warm bath at bedtime may remove a slight attack. The best local application for those who suffer habitually from L. is 7 parts of *linimentum belladonnæ* and 1 part *chloroform*, sprinkled thinly on impermeable piline and applied to the painful part. Counter-irritants are often serviceable, and an instrument called the heated hammer is also recommended. The hammer is heated over a spirit lamp to about 200° Fahr. and brought into contact with points of the skin over the painful parts. Electro-galvanic currents generally afford relief, and frequently remove the disease entirely.

Luminos'ity, Animal and Organic. See PHOSPHORESCENCE, ANIMAL.

Lump'sucker (*Cyclopterus lumpus*), the 'cockpaidle' of the Scotch, a peculiar Teleostean fish, belonging to the family *Cyclopoli*, a group allied to the *Gobies* (see GOBY). The body is short and deep. The back is arched, and bears two dorsal fins. The pectoral fins are well developed, but the two ventral fins unite to form a sucker, borne on the lower surface of the body, and by means of which the fish is enabled to adhere firmly to fixed objects. The body is of a steel-blue colour above and on the sides, and of a beautiful rosy pink on the under surface. No scales exist, but rough bony granules are scattered over the skin.

Lu'nacy, Law Regarding. See IDIOTS and LUNATICS, LAW REGARDING.

Lu'nar Caus'tic is the term applied to fused crystals of nitrate of silver, which is applied externally to poisoned wounds, pustules, ulcers, erysipelatous inflammations, polypi, &c. *Mild* caustic points, made by fusing nitrate of potash, in various proportions, with nitrate of silver, are used by oculists and others.

Lu'nar The'ory is the mathematical analysis of the perturbations to which the moon is subject. These perturbations, and the resulting inequalities, are due almost wholly to the varying relation between the mutual attractions of the sun and earth, and of the sun and moon. Here then exists what one might almost call an experimental solution of the famous problem of three bodies. When the moon is in syzygy, *i.e.*, when it is either new or full moon, there is evidently a force due to the sun tending to increase the distance between the earth and moon, since the nearer body is attracted with a greater force than the further off one. When the moon is in quadrature, the sun's attraction resolved along the line connecting the earth and moon acts with the earth's attraction, so that there is a tendency to diminish the moon's distance from the earth. On the whole, however, the sun's attraction tends during one lunation to draw the moon away from the earth, but this action tending to diminish the earth's influence over the moon, and thus lengthen the moon's orbital period, evidently varies with the sun's distance, attaining a maximum in winter when the earth is in perihelion, and a minimum in summer when the earth is in aphelion. Consequently the moon is sometimes in advance of, and sometimes behind her mean position; and the amount by which she is displaced, as far as this cause is concerned, is called the moon's *annual equation*. This inequality was detected by Tycho Brahe, and never exceeds 10′ in amount. Since the orbital velocity of the moon is greater, the smaller her distance from the earth, it follows that there must be retardation in passing from quadrature to syzygy and acceleration in passing from syzygy to quadrature; but this retardation and acceleration are modified by another solar influence, namely, the tangentially resolved portion of the sun's attraction—or rather the difference between this tangential force, and the attraction which the sun exerts upon the earth resolved in the same direction. Its effect is acceleration in passing from quadrature to syzygy, and retardation in passing from syzygy to quadrature. This tangential effect is, therefore, contrary to the radial, but it is the greater of the two, so that the moon's velocity is greatest in syzygy, and least when near quadrature. This inequality, discovered also by Tycho Brahe, is called the moon's *variation*, and attains a maximum value of 32′. The *parallactic inequality*, which never exceeds 2′, arises from the fact that at full moon the ratio of the distances of the sun from the earth and moon respectively is greater the ratio of the distances of the sun from the moon and

earth at new moon, so that the resulting perturbation upon the moon is smaller. Though small it is important as having afforded an indirect method for calculating the sun's distance. Other inequalities, which can merely be mentioned here, arise from changes in the inclination of the orbit, from the revolution of the modes and the position of the perigee, and from variation of the eccentricity both of the moon's orbit and the earth's. (See *Acceleration of the Moon*, under ACCELERATED MOTION.) The oblateness of the earth also produces slight inequalities which are useful as affording a means for measuring this oblateness. Of the planets Venus is the only one which produces a sensible perturbation.

Lu'natic. See INSANITY.

Lun'atic Asy'lums. The earliest retreats for the insane, mentioned in history, were the sacred temples of Egypt, where the highest development of moral treatment was practised for the restoration of reason. In medieval Christian times, conventual establishments were used for similar purposes; and to certain places where miraculous cures of nervous affections were said to have been accomplished, such as Gheel and St. Suaire, lunatics were sent by their friends to be cured of their disorders. In Oriental countries, maniacal lunatics were considered to be possessed of devils, and were treated accordingly; but, in general, the insane, to the present day, have been regarded as under the special protection of God, and treated with kindness. The 'Vagrant Act' (1744) contains the earliest provisions, made in England, for the safe custody of lunatics, but the justices were empowered to *chain* them. In 1763 a committee of the House of Commons investigated the condition of houses in which the insane were kept; and, in consequence of their unfavourable report, the first Act was passed, in 1773, for the regulation of private asylums and 'madhouses.' L. A. situated in London, or within an area of 7 miles, were licensed, and inspected by the College of Physicians, and a medical certificate was required for the admission of patients. Those in the provinces and Wales were licensed by the justices, who also appointed inspectors. In 1828 an Act was passed by which the Secretary of State was empowered to appoint fifteen commissioners annually for the licence and visitation of houses previously licensed by the College of Physicians. All admissions, removals, and deaths were to be reported to the commissioners, and the L. A. were to be visited by a medical man, or to have a resident medical officer. In 1843 power was granted to the commissioners to visit county asylums also, and, in consequence of their unfavourable report, an Act was passed, in 1845, by which eleven commissioners were appointed, five of whom were to be unpaid members, and six (three of them being physicians and two barristers) were to be paid officials. In 1853, another Act was passed making further provision for the care and treatment of lunatics. From the passing of the 'Vagrant Act,' in 1774, various enactments were made regarding proper accommodation for pauper lunatics, and in 1846 it was found to be absolutely necessary to enact stringent regulations for the building of county L. A. By this Act boroughs and counties are compelled to provide, within a certain period, the requisite accommodation for pauper lunatics. According to the Acts the term *asylum* means 'any lunatic asylum erected under the provisions of any Act for the erection or regulation of county or borough L. A.' The laws regarding the admission and detention of the insane are of a very stringent nature, and the supervision of the insane, while confined in L. A., is equally precise. L. A. were formerly little better than prisons, and generally much worse; but within recent years great advances have been made, and, for incurables, they are now comfortable homes, and, for curables, hospitals for skilled and humane treatment. The effect of liberal arrangements, although attended, in the first instance, with increased cost, has been found to be least expensive, as the recoveries are much greater than formerly, and the period of detention shorter. Private L. A. for the middle and higher classes are, in appearance and arrangements, made to resemble as closely as possible private dwellings, and the utmost possible liberty is granted to those mentally afflicted.

Lunawa'ra, the capital of a native state of the same name, in the Rewa Kanta Agency, India, 4 miles E. from the confluence of the Mahi and Panam Rivers, about 350 miles N. of Bombay; pop. (1872) 9662. It is a walled town, founded in 1434, and well situated for defence and for trade. The houses are two or three storeys high, with carved wooden balconies; and the whole is overlooked by the palace. It is inhabited by many artisans and traders.—The state of L., which is irregular in shape, has an area of 388 sq. miles; pop. (1872) 74,813; revenue, £12,800, but one-third of the land is alienated in feudal grants. Tribute is paid both to the Gaekwar and to Scindia, under British guarantee. The ruling family are Rajputs.

Lund (Scand. 'a grove'), an old irregularly-built town of S. Sweden, in the län of Malmöhus, 11½ miles N.E. of Malmö by rail, and 26 miles N.E. of Copenhagen. It is beautifully situated on a wide plain with fine gardens, and fields of tobacco, wood, and madder. L. has a university (founded 1668), with 500–600 students, and a library of 120,000 volumes, a fine cathedral (St. Lawrence), and several charitable institutions. Cloth, tobacco, leather, and sugar are manufactured. Pop. (1876) 10,193. L. (Lat. *Londinum Gothorum*) was an important place from the earliest times. After 1048 it became the see of a bishop, who from 1104 to 1553 was primate of all Scandinavia.

Lun'dy (Scand. 'grove island'), an island in the mouth of the Bristol Channel, 11 miles N.N.W. of Hartland Point, is 2½ miles long by 1 broad. Pop. (1871) 144. Precipitous granite cliffs allow but one landing-place—on the eastern side. L. has a lighthouse near the S. end of the isle, at a height of 567 feet above the sea; and the ruins of the castle of Morisco, a pirate in the reign of Henry III. This castle was held for Charles I. by Lord Say and Sele in the Civil War. See J. R. Chanter's *L. Island: a Monograph* (Lond. 1877).

Lü'neburg, formerly a separate duchy, now forms part of the province of Hannover (q. v).—**L.**, the old capital, on the Ilmenau, 28 miles S.E. of Hamburg by rail, has a fine Fürstenhaus and Rathhaus, and four churches of the 14th and 15th c., and manufactures linens and cottons, tobacco, sugar, and paper. In the neighbourhood are large lime, gypsum, and salt works. From 1267 to 1369 L. was the residence of the dukes of Braunschweig-L., and in 1367 it entered the Hansa. Pop. (1875) 17,532. Near L. the Russians and Prussians defeated the French in 1813.

Lunel, a town of France, department of Hérault, 15 miles E.N.E. of Montpellier by rail; has manufactures of cloth, absinthe, and liqueurs, and a trade in Muscatel wine, grain, raisins, &c. In the neighbourhood are some caves, containing remarkable fossil bones. Pop. (1872) 6973.

Lunette', in Fortification, a detached bastion with two faces and two flanks, chiefly used where the faces can be so placed that the glacis may receive flank defence from the fortress to which the L. belongs.

Lu'néville, a town of France, department of Meurthe, at the confluence of the Meurthe and Vezouse, 200 miles E. of Paris by rail. It is one of the largest cavalry stations in France, the castle of the dukes of Lorraine having been converted into barracks. Its manufactures are thread, calicoes, gloves, wax-candles, ovens, fayence, playing-cards, and conserves. Pop. (1872) 11,929. The Peace of L. fixed the Rhine as the frontier of France, 8th February 1801.

Lungs. See RESPIRATION, ORGANS OF.

Lung'wort, a small genus of Boraginaceæ, some species of which were formerly grown in gardens, partly as ornament, and partly as furnishing a domestic medicine. The popular name, as also the scientific interpretation, *Pulmonaria*, indicate the use to which it was applied. *P. augustifolia* is a native in S. England; but *P. officinalis* is only in Britain a remnant of former cultivation; both are widely distributed through Europe. Bullock's L., is *Verbascum Thapsus*, the name arising from bygone use of the plant in cattle complaints. A fine foliaceous lichen (*Sticta pulmonaria*) having its underside covered with round white or yellow pits, has received the name of Tree L., from being a popular remedy in diseases of the lungs.

Lupercalia, one of the most ancient Roman festivals, celebrated every 15th of February, in honour of Lupercus, the god of fertility. The Luperci (priests of Lupercus) met in the Lupercal, a sacred enclosure on the Palatine, where Romulus and Remus were said to have been nurtured by the she-wolf. Goats and young dogs were sacrificed; and thereafter the

Luperci, covering parts of their body with the skin of the slaughtered goats, and holding in their hands thongs cut from the hides, ran through the crowded parts of the city, striking all whom they encountered, especially women, the blow being believed to possess a purifying and fertilising power. This shepherd-festival was always observed in commemoration of the founders of the city.

Lu'pine (*Lupinus*), is an extensive genus of Leguminosæ dominant in the New World, although fourteen species come from S. Europe. Several of these are a good deal grown on poor sandy ground as a green manure, to plough in, and so improve the soil; their annual duration, quick growth, and abundant herbage rendering them exceptionally useful for this purpose. They also furnish a useful fodder, and their lentil-like seeds, after the bitter principle (*Lupinin*) has been removed through boiling or soaking in salt water, become edible. Different perennial species are sown to bind shifting sand, their roots running to a great depth and ranging over a large area. As garden plants the L. has long held a prominent place, and the botanical exploration of W. America from California to Chili, has led to the introduction of numerous handsome additions—all hardy, elegant, and easily grown.

Lu'pus, or **Wolf**, is the term applied to a disease of the skin, and is suggestive of its destructive nature. L. occurs under three forms :—1. As a superficial affection of the skin, not attended by ulceration, but accompanied by important and destructive changes in its tissue (*lupus non-exedens*). It appears as a red patch on the skin, covered by a fine, branny, epidermic desquamation, having the appearance of a thin cicatrical tissue, and it may involve the greater part or the whole of the face; or it may leave a firm, white, smooth, depressed cicatrix like that of a burn, along the anterior margin of which there is a spreading, elevated ridge composed of soft bluish-white or reddish tubercles. 2. As a slowly ulcerating disease (*lupoid ulcer*), which usually occurs about the face or neck, or the extremities of elderly people. 3. As a disease of rapidly destructive character, eroding superficially, and destroying the tissues deeply (*lupus exedens*), which may begin with or without the existence of a tubercle on the skin. It is most commonly situated on the nose, and the ulcer is at first covered by a thick scab which, when the scab separates, extends and often rapidly destroys one or both alæ, the tip, and the columna of the nose. The ulceration may cease for a time, or it may go on eroding one-half of the face. *Treatment:* In *L. non-exedens*, the avoidance of stimulants of all kinds, the use of a bland diet, the employment of the preparations of arsenic in combination with iodine, and the local application of glycerine with carbolic acid, will be the most likely means of cure. *Lupoid* ulcer is a grave affection, and should be treated with chloride of zinc. The treatment of *L. exedens* must have reference to the constitutional condition, strumous or syphilitic.

Lur'cher, a breed of dogs forming a cross between the greyhound and shepherd's dog. The body is like that of a stout greyhound, the hair short and coarse; and the tail long. The L. is intelligent and faithful. It has, however, been generally employed in the illegal pursuit of game, and is accordingly held in no great favour by sportsmen. It is singularly active, and possesses great powers of endurance, the scent being especially delicate. The colour is usually dark grey.

Lur'gan (Irish Gael. *lurga* or *lurgan*, 'the shin,' applied to any long, low ridge), a town of Ireland, county of Armagh, 20 miles S.W. of Belfast by rail, has large manufactures of linens, muslins, and damasks. There are also breweries and a tobacco manufactory. 'L. twist' is not unknown to fame. Pop. (1871) 7766. There are upwards of thirty places of this name in Ireland.

Lusa'tia (Lat. form of the Ger. *Lausitz*; Fr. *Lusace*), a district of Germany, inhabited partly by Germans, partly by Wends, formerly divided into Ober-Lausitz (now part of Saxony and Prussian Silesia) and Nieder-L. (now S. Brandenburg). L. was inhabited in the earlier Middle Ages by the Slavic *Lusici*, came under Brandenburg in the 13th c., was divided between Bavaria and Bohemia in 1320, and submitted to Matthias Corvinus in 1467. In 1620 the Kurfurst Johann Georg of Saxony seized it in the Emperor's name, and in 1635 received it from him as a Bohemian fief. Prussia obtained all L. in 1815, except a small part, which remained to Saxony, and is now the circle of Bautzen.

Lus'trum (Lat. *luo*, 'I expiate'), the purification of the Roman people in the Campus Martius by one of the censors, on the conclusion of the census, consisted in the sacrifice of a boar, sheep, and bull (*suovetaurilia*). The first L. is said to have been performed by Servius (B.C. 566), the last took place in the reign of Vespasian (A.D. 74). From the census occurring once in five years, the term L. came to be applied to that period of time.

Lute, a musical instrument of the guitar kind, once common in Europe. See GUITAR.

Lu'ther, Martin, son of a miner, was born at Eisleben, in what is now known as Prussian Saxony, 10th November 1483, was trained with much severity at home, and at a school in Mansfeld, from which he was sent to Magdeburg (1497) and Eisenach (1498) to finish his elementary education. In his eighteenth year L. went to the University of Erfurt to qualify as a lawyer, but his tastes led him to the study of philosophy and theology. By accident he came across a complete edition of the Bible, which to his amazement he found included much more than the gospels and epistles used in the lectionaries. A great part of his leisure was employed in mastering the contents of the newly-discovered volume. Having completed his college career, and taken the degree of M.A., L. gave up thoughts of law, and after the depression of a nervous fever had reduced his mind to gloom, he entered the Augustinian monastery at Erfurt (17th July 1505), contrary to his father's wishes. Here he led a life of extreme austerity, praying and fasting sometimes for entire days, but without finding the peace after which his soul panted. Two years later he was consecrated a priest, and with the encouragement of Staupitz, vicar-general of the monastery, continued his study of the Bible and St. Augustine. It ended in his adoption of the belief that forgiveness of sins is obtained through faith in Christ, and not by penance and ceremony, that events happen through the exercise of a predestinating will, and that salvation is, therefore, possible only to those elected to the endowment of faith. In 1508 L. obtained the chair of philosophy at the University of Wittenberg, and in 1509 added to his labours, preaching and biblical exegesis. A visit to Rome (1510) on behalf of the Augustine monastery at Wittenberg, had a great effect upon the subsequent course of his thoughts. His eyes were opened to the corruption of the Church in all its grades, and he went home with his mind fervently turned towards thoughts of reform. His opportunity arrived in 1517. Leo X., being in want of money, sent out indulgences for sale throughout Europe. An agent, Tetzel, arrived with them at Wittenberg, and began to drive a trade in sin-pardoning. L.'s indignation knew no bounds. On the 31st October 1517, the day before the festival of All Saints, he nailed upon the door of the palace church a thesis, containing ninety-five propositions, in which he denied that the pope had the power of forgiving sins. The popular mind was ready to receive the new message of reform, and the writing on the church door immediately passed into universal discussion. Tetzel replied with counter-propositions, and L.'s conventual brothers made an effort to restrain his vehemence. In August 1518 his *Resolutions* were published in justification. At the end of the year he was summoned to Augsburg to meet Cardinal Cajetanus, the papal legate. Being asked to retract his heretical opinions, without even the form of discussion, L. declined. Then a second legate, Miltitz, a German, tried to win him over by flattery but failed. During 1519 Eck, Emser, and Alveld all disputed with him, but the noise of the Reformation only grew louder. Further study had shown L. that the views he had adopted from St. Augustine were one with those of Wiclif and Huss, who had been denounced from Rome as heretics. His quarrel, therefore, gathered more strength, and his invectives against Rome increased in vigour. In August 1520 appeared his pamphlet addressed *To the Christian Nobles of the German Nation*, of which copies were issued both in Latin and German. The arguments were of the most politic sort, urging the superiority of the secular over the spiritual arm, asking why Germany should beggar herself by sending annates to Rome, and advising a larger independence for national churches. The Pope issued a Bull of excommunication against him in September 1520. On the 10th of December L. marched to the margin of the Elbe at the head of the professors and students of the Wittenberg University, and burned the Bull along with the books

of Canon Law. 'His burning the Bull,' says Seebohm, 'against himself was a personal act of defiance. His burning the Canon Law books was a public declaration that the German nations ought not to be subject to the jurisdiction of Rome.' About the same time the Elector of Saxony determined to support L., though having consulted Erasmus, he asked him to cultivate a more gentle spirit. L.'s 'gentle spirit' was manifested in his *Against the Bull of Antichrist.* 'Now,' wrote Erasmus, 'I see no end of it but the turning upside down of the whole world.' On the 18th April 1521, Karl V. held his first Diet at Worms, one of the subjects of discussion appointed being 'the books and descriptions made by Friar Martin against the Court of Rome. The which Friar Martin, of the Elector of Saxony and other princes, is much favoured.' L., provided with a safe-conduct, was summoned to appear in his own defence. He left Wittenberg, April 2d, depositing in the hands of a friend what he called 'a good book for the laity,' a volume of wood-cuts explained by himself, depicting the 'contrast between Christ and the Pope.' All along the road to Worms public excitement ran high. People knew the risk he incurred of being led to the stake like a heretic, as Huss had been, and he knew it himself. But, as he expressed himself afterwards to the Elector of Saxony, 'the devil saw in my heart that, even had I known that there would be as many devils at Worms as tiles upon the house-roofs, still I should joyfully have plunged in among them!' Standing before emperor, electors, archbishops, bishops, and nobility, he acknowledged the authorship of his books, exclaiming at the end of his defence, 'I am bound by the Scriptures which I have quoted; my conscience is submissive to the Word of God; therefore I may not and will not recant, because to act against conscience is unholy and unsafe. So help me God! Amen.' Every effort to get him to submit failed. On the 26th of April he was ordered by the Emperor to leave Worms. 'He left Worms the hero of the German nation. He single-handed had fought the battle of Germany against the Pope. He had hazarded his life for the sake of the Fatherland.' An imperial edict was issued against him, but L. was hidden in the castle of the Wartburg for ten months, where he occupied himself with translating the Bible into German, and where occurred the famous scene in which he assaulted with an ink-bottle what seemed to him an apparition of the devil. During this interval the progress of the revolutionary ideas which L. had done so much to assist did not flag. Frenzied leaders arose from the masses and headed political riots; the peasants, groaning under centuries of tyranny, demanded vengeance against the princes who held them in bondage. Churches were wrecked, and fanatics prophesied strange things. L. left the Wartburg, and declining to sanction a political revolt, mercilessly condemned the revolutionists for fighting against the civil power. His indignation against them burnt with such strength that he went the length of advising a slaughter of the peasantry during these years—advice which forms the least creditable episode of his life. In 1525 L. separated himself still further from the Roman communion by marrying Katharina von Bora, a nun who had thrown aside her vows. During the same year his disgust at the *via media* adopted by Erasmus in the affairs of the Reformation led to a complete breach between them, which was vigorously embodied in the *De Servo Arbitrio.* By 1529 he had also quarrelled with Ulrich Zwingli, on the question as to the true nature of the Lord's Supper, a quarrel which ended in the Reformed Church of Switzerland being established on a basis antagonistic to Lutheranism. In 1530 the Diet of Augsburg assembled, L. remaining in close proximity whilst Melanchthon submitted a statement of the articles of faith afterwards known as the Augsburg Confession. By this event L.'s labours were conducted to a crisis; the chief work of the Reformation had been accomplished. The Elector of Brandenburg, the Elector Palatine, Duke Georg of Saxony, and Duke Ulrich of Würtemberg were all Protestants. L. died at Eisleben, 18th February 1546. He possessed in the highest degree all the qualities essential to the Reformer. He was fearless to the last degree, inflamed with a passionate conviction of the divine truth of his mission, rising to the point of dogmatism in behalf of the objects about which his mind was made up. Through the very exuberance of his strong nature, his language sometimes degenerated into coarseness, but the predominant elements of his disposition were tenderness, sympathy, and humour. In force, fire, grandeur of soul, he is the greatest of the many conspicuous figures of the Protestant Revolution. But L. wrought another great change, besides the religious one, which ought not to be overlooked. His hymns, pamphlets, and translations created a common literary dialect for all Germany. To L. more than to any other is it owing that 'High German' became the standard or classic dialect of the people. Luther's 'Bible' carried into every German home, gradually turned the once powerful 'Low German' speech into a patois. Something was lost in this change, but much was also gained. The German nation, otherwise so much divided, secured through this unity of language a unity of hope and sentiment which enabled it to survive political disintegration, and prepared the way for the triumphs of 1866 and 1870. Of the numerous editions of L.'s works, perhaps the best is that of Walch (Halle, 24 vols., 1740–51; reissued with enlargements, in 67 vols. (Ger.) 1826–57, and 23 vols. (Lat.) 1829–61). See Förstemann's edition of the *Tisch-Reden* ('Table-Talk,' Leips. 1844); De Wette's edition of L.'s letters (Berl. 1825); Michelet's *Mémoire de L.;* Worsley's *Life of M. L.* (1856); Seebohm's *Era of the Protestant Revolution* (1875).

Lu'therans is the historical designation of the followers of Luther, and is still popularly employed to describe those who accept the creed of the great reformer in theology and church government. *Lutheranism* prevails in Germany, and is the state religion in Denmark, Sweden, and Norway, but has received modifications in all of these countries.

Lu'ton, a town of Bedfordshire, England, on the Lea, 35 miles N.N.W. of London by rail. It is the chief seat of the straw hat and bonnet trade in England, and has a handsome corn-exchange (opened 1870), a new strawplait-exchange (cost £6000), large straw hat factories, engineering works, iron-foundries, steam saw and flour mills, &c. Fairs are held in April, October, and September. Pop. (1871) 17,317.

Lütt'ringhausen, a town of Rhenish Prussia, 20 miles S.E. of Düsseldorf, has manufactures of woollens, linens, cottons, cutlery, &c. Pop. (1875) 9493.

Lütz'en, a small town of Prussia, province of Saxony, gives name to two battles fought in the vicinity. The Imperialists, under Wallenstein, were defeated here by Gustavus Adolphus, who fell in the encounter, November 10, 1632. The second battle of L. (May 2, 1813) was the first great conflict between Napoleon and the allied Russian and Prussian forces, and resulted in a victory for the former, by which he regained Saxony and the Elbe.

Lux'embourg, François Henri de Montmorency, Duc de, posthumous son of Comte de Bouteville, was born at Paris, 8th January 1628. Brought up for the army, he accompanied his relative, Prince Conde, as aide-de-camp in Spain and Flanders, and in the French civil wars fought against Mazarin, who took him prisoner at the battle of Rethel. He married the heiress of the Luxembourg house, 1661, taking her name. In the campaign of 1667 he served in Flanders under Turenne as a volunteer, and in the year following was lieutenant-general in Franche-Comté under Condé. In December 1672 he did a rather notable thing, marching over the ice with 8000 men from Utrecht to Wœrden and thence to Swammerdamm, which he burnt. After the death of Turenne he was made a marshal (1675), and in 1676 horribly devastated Breisgau, and compelled the Duke of Würtemberg to evacuate Mömpelgard, which he sacked. In 1677 he beat the Prince of Orange at Mont-Cassel, took St. Omer, and compelled the Prince to raise the siege of Charleroi. After the Peace of Nimwegen, he was imprisoned in the Bastile on a charge of sorcery through the agency of the Minister Louvois, who was jealous of his power. After fourteen months L. was released, and in 1690 again obtained a command in Flanders, defeated the Prince of Waldeck at Fleurus 1st July, the Prince of Orange (now William III. of England) at Steenkerk 4th August 1692, and again at Neerwinden 29th June 1693. He closed the campaign on the 12th of October with the conquest of Charleroi. L. died 5th January 1695. Of a weak frame, L. possessed an active, quick, and piercing genius for war. See Beaurain, *Histoire Militaire du Duc de L.* (Haag. 1756); *Mémoire pour servir à l'Histoire du Maréchal de L., écrite par lui-même* (Haag. 1758); Kitchin's *History of France* (vol. iii. 1877).

Lux'emburg, a grand duchy in the S.E. of Belgium, was a member of the German Confederation from its formation in

1815, since the Treaty of London of 1867 a neutral country, connected with the House of Orange-Nassau, through personal union, but included in the Zollverein (q. v.) of Germany. Area, 1592 sq. miles, pop. (1871) 197,528. The country is in the rugged, woody region of the Ardennes, and is watered by the Moselle (forming the E. border), the Our, the Sure, and its tributaries. The surface is pretty rich in grain and pasture; the chief minerals are coal, iron, copper, lead, marble, and freestone. Other products are wine (Moselle), timber, oak-bark, cork, cheese, paper, flannels, gloves, &c. German is the speech of the people, but French is the language of the upper classes (some 4000) and of the legislature. L., by the constitution of 1868, is governed by a chamber of forty-one deputies, elected by the cantons for six years, and by a stadthalder (Prince Henrik), nominated by the king of the Netherlands. In 1875 the revenue was 6,783,000 francs, the expenditure 6,787,102, and the public debt 12,000,000 francs. The army consists of one battalion of chasseurs (500 men and 13 officers) and a corps of gendarmes.—**L.**, a province in the extreme S.E. of Belgium, is bounded S. by France, N. by Liege, W. by Namur, and E. by the grand duchy of L., and by Rhenish Prussia. Area, 1705 sq. miles; pop. (1873) 206,069. It is the largest, but least populous, province of Belgium, is hilly and woody, has much horse and cattle rearing, and large mineral industries. Arlon is the capital, and the people are mostly Walloons.

History.—The old countship of L., named from the Lutzelburg, was first held by Siegfried from 963. The original family died out with Konrad II. in 1136, and L. passed by female descent to Heinrich I., Duke of Limburg. Heinrich III. became Emperor as Heinrich VII. in 1309, founding the L. imperial line. L. was made a duchy by Karl IV. in 1354, passed to Burgundy in 1443, to Austria in 1477, to Spain in 1555, to Austria again on the Peace of Utrecht, 1713, and to France in 1795. By the Peace of Vienna it was annexed to the Netherlands as a grand duchy, still remaining a state of the German Confederation, the capital being occupied by a Prussian garrison. On the Revolution of 1830, Belgium received the greater part of L., but the Treaty of London (1867) secured a more equal division, the neutrality of the grand duchy, and the withdrawal of the Prussian troops. See König, *Das Luxemburger Land* (Dirkirch 1850).

Lux'emburg (properly *Lützelburg*, 'the little castle'), the picturesque capital of the Grand Duchy of L., on the Alsette, 30 miles N. of Metz by rail. It lies partly on a rocky hill 200 feet high, at the base of the scarped sides of which has risen the Lower Town, with broad streets and modern buildings. The Lower Town is spanned by four great viaducts. The chief building is the cathedral, and the industrial products are wax, leather, spirits, beer, &c. There is a large trade in gold and silver wares, china, vinegar, and hats. L., formerly one of the strongest fortresses in Europe, was, in accordance with the conditions fixed by the London Conference of May 7–11, 1867, evacuated by the Prussian garrison in the same year, and finally dismantled in 1870. Pop. (1875) 15,954.

Lu'zon, the largest of the Philippine Islands (q. v.), and the most northerly of the group, has an area of 51,300 sq. miles, and a pop. of 2,500,000, including the savage inhabitants of the interior. Of volcanic origin, and subject to destructive earthquakes, it is traversed from N. to S. by several ranges of mountains, which attain a height of 7000 feet, and are clad with luxuriant forests of ebony, cedar, iron-wood, cocoa, citron, bread-fruit, tamarind, and other trees, enveloped in a maze of climbing plants and parasites. The products are rice, wheat, maize, sugar, hemp, tobacco (a monopoly yielding $5,000,000 yearly profit), ginger, pepper, vanilla, hemp, mother-of-pearl, amber, coral, tortoise-shell, &c. There is abundance of fish and game, and the island is free from beasts of prey. Tagals and Bisayers of Malayan race are the chief inhabitants. The black people of the interior are believed to be aborigines. Many Chinese have settled here, but comparatively few Spaniards. The chief town is Manila (q. v.).

Lu'zula, a genus of plants closely related to the rushes (*Juncus*), but with more grass-like foliage, which is always more or less beset with long flexuous white hairs. There are about 40 species distributed through the temperate and cold regions of the world. Of these seven are British, and one (*L. campestris*) may be seen in abundance in spring in poor pastures, grass plots, and heathy wastes, its clusters of flowers forming a blackish head, rendering it conspicuous amongst the short herbage. *L. sylvatica*—the wood-rush—is a handsome species, frequent in upland woods.

Lycan'thropy (Gr. *lukos*, 'wolf,' and *anthropos*, 'a man'), wolf-madness, is a form of delusional insanity. Many examples of L. are on record, although it is comparatively an extremely rare disease. Paulus Ægineta says:—'Those labouring under L. go out during the night, imitating wolves in all things, and lingering among sepulchres until morning. You may recognise such persons by these marks; they are pale, their vision feeble, their eyes dry, tongue very dry, and the flow of the saliva stopped; but they are thirsty, and they have incurable ulcerations from frequent falls.' This remarkable disorder was prevalent in Europe in the 14th and 15th centuries. See Calmeil, *De la Folie;* Arnold, *On Insanity*.

Lyca'on, a genus of carnivorous mammals, belonging to the Canidæ or dog family, are represented by the hunting dog (*L. venaticus*) of S. Africa, in which the characteristics of the dog appear to be united with those of the hyena. The L. attains a large size. It commits great havoc amongst sheep and cattle in S. Africa. The colour is a reddish brown, variegated with black and white patches. The ears are large and prominent, and the tail bushy.

Lycao'nia was a bare and dreary district of Asia Minor, extending from the ridges of Mount Taurus on the S. to the Cappadocian Hills on the N. Its inhabitants were characterised by lawless habits, and spoke a rude dialect (Acts xiv. 11). The chief town was Iconium.

Lyce'um (Gr. *Lukeion*), a gymnasium with covered walks in the eastern suburb of Athens, near the river Ilissus, named after the neighbouring temple of Apollo Lyceius. Here Aristotle walked and taught—hence his disciples were called Peripatetics. During the Middle Ages the name was given to the higher schools, in which the Aristotelian philosophy was taught. After the abolition of the scholastic philosophy, it continued to be the official name of Latin or grammar schools, but in Germany, after 1812, it was generally abandoned in favour of 'gymnasium.' In Würtemberg and Baden, however, the name still survives, along with 'gymnasium;' in the former country it denotes a lower; in the latter, a higher grade of classical instruction than is denoted by gymnasium. In France, schools for higher or secondary instruction are still called *Lycées*.

Lych-Gate (Old Eng. *lic-gedt*, 'corpse-gate'), a porch at the entrance of a churchyard where a funeral procession halts, while the priest advances from the church. Ancient examples are common in Wales and Cornwall, rare in Scotland and the E. of England.

Lych'nis, a genus of Caryophyllaceæ occurring in the temperate regions of the three northern continents, and consisting of about thirty species. Of the five belonging to the British flora, the red and the white campion and the ragged robin are common plants, while *L. Alpina* is all but confined to the Clova mountains in Scotland, and *L. viscaria* is distinctly local. The corn cockle is by some botanists placed in this genus, by others it is separated as monotypic under the name *Githago* or *Agrostemma*. The derivation of L. is from the Greek for flame-like, and perhaps the applicability is fairly illustrated by the scarlet L. (*L. chalcedonica*), and the rose campion (*L. coronaria*), both garden plants of the past rather than of the present era.



Lychnis Alpina.

Ly'cia, a country on the southern coast of Asia Minor, traversed by spurs of the Taurus range, and watered by the Xanthus (*Elshen*) and Limyrus. Its earliest inhabitants, the Solymi and

Termilæ, were probably of Semitic origin; while the Lycians (*Leka* in Egyptian inscriptions of the 14th c. B.C.), who entered from Crete, belonged to the Zendic subdivision of the Iranian branch of the Indo-European family. The widespread worship of the 'Lycian' Apollo, the myth of Bellerophon (q. v.), and the present remains of the six cities of the Lycian Confederacy—Xanthus, Patara, Pinara, Olympus, Myra, and Tlos—all indicate a high antiquity. In historic times L. became subject to the Persians (546 B.C.), Macedonians (333), and Romans (188), who made it over to the Rhodians. Restored to temporary independence, it was ravaged by Brutus (42 B.C.), and finally annexed by Claudius (41–54 A.D.) to the prefecture of Pamphylia. See the works of Sir Charles Fellows (q. v.), Spratt, and Forbes, *Travels in L.* (Lond. 1847), and Bachofen, *Das Lykische Volk* (Freib. 1862).

Lycopodia'ceæ, a natural order of the plants often called for convenience 'fern-allies,' consists of about 240 species, growing in all countries of the globe, from the Tropics to the Arctic circles. By far the largest portion, namely, those constituting the genera *Lycopodium* and *Selaginella* (numbering conjointly 220 species), have a general close resemblance; but others, as *Isoetes* and *Psilotum*, to the superficial observer bear little or no relationship. The essentials are that the whole have their capsules situated in the axils of the leaves or of the scales of a cone-like structure, thereby differing from ferns on the one hand, and the pillworts on the other. The leaves also, diverse though they are, are always simple and unbranched, and are penetrated by only one fibro-vascular bundle. The shoots and the roots give an example of true dichotomous branching. The details of germination are not at present satisfactorily ascertained. Seven species inhabit Britain, of which the five belonging to *Lycopodium* are to be found on heathy moory ground from low levels to 4000 feet altitude; the single representative of Selaginella grows in boggy soil, and Isoetes is an aquatic.

Lycur'gus, the Spartan legislator, is said by Aristotle to have lived B.C. 884, but is placed by Xenophon more than 200 years earlier. Sparta was in a state of anarchy when King Polydectes, brother of L., died, leaving his queen with child. The unnatural mother proposed to L. to kill the rightful heir, if he would agree to share the throne with her. He expressed assent, but when a boy was born, proclaimed him king and became his guardian. The king died young, and thereafter L. set out on a journey, which is said to have extended through Crete, Asia Minor, Egypt, and even into Libya, Iberia, and India. On his return to Sparta he undertook, at the request of all parties, to reform the constitution of the state. He did so, with the sanction of the oracle at Delphi, and on the condition that no change should be made by his countrymen on the remodelled polity before his return. He then withdrew to pass his days in voluntary exile, and the place and time of his death remain unknown. A temple was erected in his honour at Sparta, and yearly sacrifices were offered to him as to a god. Though we are not warranted in denying to L., as some have done, an historical existence, it cannot be doubted that much of the foregoing narrative is of a legendary character, and that his legislative work at Sparta was the subject of serious, though quite intelligible exaggeration.

Lyd'gate, John, an English poet, was a native of Suffolk, and was born not later than 1370. He studied at Oxford, Paris, and Padua, became a priest of the Benedictine monastery of Bury St. Edmunds in 1397, and established there a school of rhetoric or literature, which acquired a wide renown in his lifetime. He died in the reign of Henry VI. 'L.,' says Morley, 'was well read in ancient lore, mathematician also and astronomer, as well as orator and poet; a bright, pleasant, and earnest man, who wrote clear, fluent verse in any style then reputable, but who was most apt at the telling of such moral stories as his public liked.' His three chief works are *Troy Book*, *The Storie of Thebes*, and *Falls of Princes*. The first is a metrical adaptation from the French, the second a 'Canterbury Tale' in imitation of Chaucer, and the third is founded on Boccaccio's Latin work, *De Casibus Mustrium Virorum*. His *London Lickpenny* is a satire not yet forgotten.

Lyd'ia, a country on the western coast of Asia Minor, which included Ionia (q. v.), was watered by the Hermus, with the Pactolus and other tributaries, and by the Cayster, and was traversed by the Tmolus and Messogis ranges. Its earliest inhabitants, the Pelasgic Mæonians, were gradually conquered by the Lydians, a Semitic race allied to the Carians, who were ruled successively by the Atyadæ, the Heracleidæ (1200–700 B.C.), and the Mermnadæ, Gyges (q. v.) and Crœsus (q. v.) belonging to the last-named dynasty. With Crœsus' defeat in 546 L. passed to Persia, and its cities—Sardis, Magnesia, Thyatira, &c.—dwindled into insignificance. See Dr. C. von Scherzer's *Smyrna* (Vienna, 1873).

Lydian Stone, or **Touchstone**, a hard flinty jasper, velvet-black in colour. It is used for testing the purity of gold and silver by comparing the tracing left on it with that left by a known alloy.

Ly'ell, Sir Charles, Bart., a celebrated English geologist, was born at Kinnordy, Forfarshire, February 14, 1797. He studied at Exeter College, Oxford, where he graduated M.A. in 1821. While at Oxford he attended the lectures of Dr. Buckland upon geology, and erelong he directed his whole energies to the study of this infant science. Visiting the Continent in 1824, he collected geological facts which afterwards proved of great value, and these observations he supplemented on a more extended tour in 1828–30. In 1830 the first volume of the *Principles of Geology* was published, and was followed by the second and third in 1832 and 1833 respectively. In 1831 L. was appointed lecturer on geology in King's College, London, and his lectures at once disclosed the wide philosophical grasp of the principles of the science, and the capacity for sifting the non-essential from the essential, which he possessed in such a marked degree. His *Principles of Geology* ran through numerous editions and underwent continual alterations. In the sixth edition he suppressed those chapters on the more purely technical branch of the science, reproducing them in an amplified form in his *Elements of Geology*, which after several editions was published in a more condensed and complete form as *The Student's Manual of Geology* (1871). The great alterations which the *Principles* underwent are the best evidence of Lyell's complete freedom from bias in favour of any preconceived theory, and of his readiness to accept, after careful consideration of its merits, any new explanation of imperfectly understood phenomena. The tenth edition, which appeared after the publication of Darwin's *Origin of Species*, was wholly recast so as to incorporate the theory of natural selection in his system. The last edition was published in 1872. L. constantly urged upon geologists the vast importance of observation. He himself paid frequent visits to the Continent, and twice made journeys to America, the scientific results of which are embodied in his *Travels in North America*, 1841–2, and *A Second Visit to the United States*, 1845–46. Excepting the *Principles*, the most important of his works is his treatise *On the Geological Evidences of the Antiquity of Man* (1863), in which he first gave his adhesion to the Darwinian hypothesis. L. also wrote numerous memoirs and papers for scientific journals. His scientific honours were numerous and varied. He was twice president of the Geological Society, in 1836 and 1854; and received the Wollaston Medal in 1866. The Royal Society awarded him the gold medal in 1833, and the Copley Medal in 1858. He presided over the British Association at Bath in 1864, and was president of the Geological Section on four separate occasions—in 1838, 1840, 1849, and 1859. In 1848 he was knighted, and was created a baronet in 1864. L. died at London, February 27, 1875, the last and greatest of those veterans of science who by their united labours have made geology what it is.

Lyly, John, an English dramatist, was born in Kent about 1553, and took a degree both at Oxford and at Cambridge. In 1579 he published the once famous *Euphues, or The Anatomy of Wit*. To this work he added next year a second part, *Euphues and his England*. Euphues takes the form of an Italian story, abounds in wit and wisdom, and on account of its peculiar style has given our language the word euphuism, used to denote a pompous and affected phraseology. L. has another claim to remembrance—as an Elizabethan dramatist. He wrote nine plays, chiefly upon classical subjects,—seven in prose, one—*The Woman in the Moon*—in blank verse, and one—*The Maid's Metamorphosis*—in rhyme. A pamphlet written against Martin Marprelate, entitled *Pap with a Hatchet, or A Fig for my Godson, or Crack me this Nut*, is generally ascribed to L. He died in November 1606. An exact reprint of *Euphues* is published by Arber.

Lyme Grass (*Elymus*), a genus of coarse grasses allied to the barley, and met with in different countries of the north temperate zone. The common L. G. (*E. arenarius*) is natural to sandy seashores, where, from its vigorous growth and widely-spreading roots, it is of important service in binding the drift-sand. By the Dutch it is systematically planted for this purpose. On the British coast it is more frequent in the north than in the south. See BUNCH GRASS.



Lyme Grass.

Lyme Regis ('the king's haven'), a seaport and fashionable watering-place of Dorsetshire, England, at the mouth of the small river Lym, 5 miles S. by E. of Ardminster, the nearest railway station. It has a good harbour with two piers, and the main industries are fishing and the making of sailcloth. The cliffs are picturesque, and abound in fossils. In 1875 there entered and cleared the port 270 vessels of 13,904 tons. Pop. (1871) 2333. L. sends one member to Parliament.

Lym'ington, a watering-place in Hampshire, England, on the W. bank of the river L., a little above its entrance into the Solent, and 25 miles S.W. of Southampton by rail. It is a subport to Southampton, and has large salt works (of great antiquity), and shipbuilding yards. Steamers ply hence to Portsmouth, the Isle of Wight, Cowes, &c. Pop. (1871) 5356. L. sends two members to Parliament.

Lymph, the name given to a fluid found in animals, usually contained within certain vessels known as *Lymphatics* (q. v.), and also found within the intercellular spaces of the tissues and organs. L. may be held to represent in greater part the serum or liquid part of the blood, which has exuded through the walls of the blood-vessels, and come in contact with the tissues. It thus performs a *nutritive* function in nourishing the tissues, and furnishing fresh material for the blood. L. itself is a clear fluid, and in its analysis exhibits a close identity with blood.

Lymphat'ics and **Lymphatic Glands**, are vessels and glands concerned in the transmission and elaboration of *Lymph* (q. v.). They are found in all parts of the body, with the exception of the placenta, umbilical cord, nails, hair, and outer skin. They begin their course in the tissues, and probably originate in the interspaces of the membranes. The smaller L., like the smallest capillaries or blood-vessels, have very ill-defined walls, lined by epithelial cells. Larger L. present a close resemblance to *veins* in their structure, having an outer coat of fibro-cellular tissue, and a second coat of the same material provided with a thin layer of muscular fibres. A layer of longitudinal elastic fibres lined by epithelium, forms the inner lining of the vessels; whilst well-developed *valves*, as in veins, are found in the interior. The valves are simple pouch-like dilatations of the inner wall of the vessel, and give the L. a beaded appearance when the vessel is full, by causing constrictions at the points of attachment of the valves. Lymph is propelled towards the *thoracic duct* chiefly by the pressure exercised by muscles on the walls of the L. This compression forces the lymph upwards in the case of the vessels which ascend from the lower parts of the body, since the valves prevent any retrograde movement of the fluid, and permit the fluid to move in one direction only. L. in the course of their distribution pass sooner or later into L. G., in the groin, arm-pit, and like situations. Each gland consists of a network of tissue, supporting a finer (*retiform*) tissue, within the meshes of which *lymph-cells* or *lymph-corpuscles* are found.

Lynch'burg, a city of Virginia, U.S., on the S. bank of the James River and on the Kanawha Canal, 90 miles W. by S. of Richmond by rail. It has forty tobacco factories, several iron-foundries, machine shops, cotton and flour mills, splendid water-power, an hospital, three daily and three tri-weekly newspapers. Pop. (1870) 6825.

Lynch Law, an American name for the trial and punishment of offenders without legal authority; in other words it is mob-law, or the law which irresponsible men 'take into their own hands.' Various explanations of the name are given, the most common tracing it to a farmer known as 'Judge' Lynch, who was long an informal referee in Virginia.

Lynd'hurst, John Singleton Copley, Lord, an English lawyer and statesman, was born at Boston, U.S., 21st May 1772. His father, J. S. Copley (q. v.), an artist, removed to England in 1774. L. was educated at Trinity College, Cambridge, where he became Second Wrangler (1794), and Fellow (1797). Being called to the bar, L. chose the Midland Circuit, but until 1817, when, in company with Wetherell, he defended Watson and Thistlewood against the charge of high treason, he had not acquired much standing. In 1818, however, he was appointed Chief-Justice of the county palatinate of Chester, entered Parliament in the Tory interest for Yarmouth (though he had previously been a Liberal in politics), became Solicitor-General (1819), Attorney-General (1823), Master of the Rolls (1826), Lord Chancellor (1827), and Lord Chief Baron of the Exchequer (1835). In 1841 he accepted the Chancellorship for the third time. During the last ten years of his life he did not speak a great deal, but after his eightieth year he astonished the Upper House by the vigour of his reflections upon the Russian War, university reform, and other subjects. L. died in London, October 12, 1863. L. is recognised as one of the ablest and most clear-headed lawyers of the century. See Campbell's *Lives of the Lord Chancellors of England*.

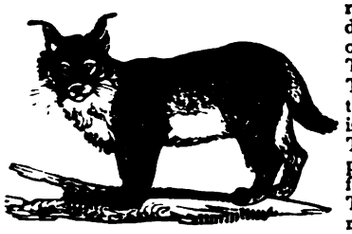
Lyne'doch, Thomas Graham, Lord, the ablest of Wellington's lieutenants, was born at Balgowan, in Perthshire, Scotland, in 1750. He lived quietly as a country gentleman till the age of forty-four, when the death of his wife affected him so deeply that he resolved to travel, in the hope of finding some solace for his grief. After serving as a volunteer under Lord Hood in the S. of France, he returned to Scotland, raised the first battalion of the 90th regiment, of which he was made colonel in 1794. He conducted the blockade of Malta, which the French were forced to surrender in 1801, served under Moore in Spain, and afterwards under Wellington with signal distinction. At Barossa, Vittoria, San Sebastian, and the passage of the Bidassoa, his brilliant and resolute genius proved irresistible. In 1814 L. was appointed commander of the forces in Holland, and raised to the peerage with a pension of £2000 a year. He died 18th December 1843. See Murray Graham's *Memoir of Lord L.* (1868; 2d ed., 1877).

Lynn, a seaport of the United States, in the State of Massachusetts, 10 miles N.E. of Boston by rail, and 1½ miles from the N. shore of Boston Harbour, first settled in 1629, and incorporated as a city in 1850, has twenty-five churches and a fine city hall. The chief industries are the making of ladies' boots and shoes, and of kid and morocco leather, the former involving £200,000 capital, the latter £100,000. L. has three weekly newspapers. The harbour is good for small craft. Pop. (1870) 28,233.

Lynn (Celt. *linn*, 'a deep pool') **Regis**, or **King's Lynn**, a seaport of England, county of Norfolk, on the Ouse estuary, 99 miles N.E. of London by rail. It has four churches, eleven Dissenting chapels, numerous schools and benevolent institutions, three banks, and four newspapers. The town has been much improved in recent years, and since 1850 over 4000 acres of the sands to the N. have been reclaimed from the sea. In 1875 there entered the harbour (which can hold 300 ships) 804 vessels, of 120,448 tons; cleared, 683, of 60,992 tons. The chief exports are wool, corn, and manufactured goods; imports, corn, wine, hemp, coal, timber, linseed, tallow, cork, and tobacco; and industries, iron-founding, shipbuilding, brewing, and the manufacture of tobacco, cork, and rope. L. sends two members to Parliament. Pop. (1871) 17,266.

Lynx (*Lyncus*), a genus of Carnivorous mammalia, distinguished by the presence of tufts of hair on the ears, and by a short and rudimentary tail. The common L. (*L. vulgaris*) in-

habits Europe and N. Asia. It attains a length of 3 or 4 feet; the colour is variable, but is usually a dark grey tinted with red, and variegated with dark spots and patches on the body and limbs. The fur is highly valued. The head is large, and the hair of the cheeks is especially developed. The southern or Leopard L. (*L. pardinus*) is found in S. Europe. The tufted ears are prominent in this L., and the reddish fur is covered with small black spots, the presence of which has given origin to the name *pardinus* or 'leopard-like' L. In N. America, the Canada L. (*L. Canadensis*) represents the genus. Its colour is dark grey variegated with black. The length is 3 feet. It is often known as 'Le Chat'—a name given to it by the French settlers—and as the 'Peeshoo.' The booted L. (*L. caligatus*) is so named from the black colour of its legs. It occurs in Asia and Africa, and is of a yellowish-grey colour.



Lynx.

Ly'on, the second largest city of France, and chief town of the department of the Rhone, situated at the confluence of the Rhone and Saône, 220 miles N.N.W. of Marseille, and 316 S.S.E. of Paris by rail. It extends from the heights of Croix-Rousse S. along the narrow tongue of L., and between the two rivers, with the annexed towns of Vaise on the right bank of the Saône, and Guillotière on the left bank of the Rhone. It is the first manufacturing town of France, the seat of an archbishop, and the headquarters of the seventh military division, and a fortress of the first rank. Eighteen forts defending it have a circuit of 16 miles. The Saône is spanned by fourteen bridges, the Rhone by eight, and the fine quays, 45 kilometres in extent, are ornamented with magnificent trees, and flanked by elegant houses. The Rhone is here navigable for steamers. L. has many fine squares, the most remarkable of which are Bellecour, one of the largest in Europe, and the Place des Terreaux, where the guillotine stood in 1794. Most of the squares are linked together by the splendid Rue de l'Impératrice, opened in 1855. Among the public buildings are the magnificent Hôtel-de-Ville, restored in 1702, the Palais de la Bourse (1860), the Palais de Justice, with a Corinthian portico, the Hôtel Dieu, re-erected on the site of the old hospital, the Hospice de la Charité, the classic Palais des Beaux-Arts, an artillery arsenal, a theatre in the Renaissance style of Louis XV., the theatre de Célestins, &c. The principal churches are the primatial St. Jean, in Roman style, those of Ainay rebuilt in the 10th c. in the Byzantine style, the Gothic St. Nizier and Notre-Dame on the summit of Fourvières, commanding one of the finest views in the world, stretching from the Alps to the Auvergne Mountains. The park of the Fête d'Or, on the left bank of the Rhone, has an area about three times that of the Champ de Mars of Paris, and includes botanical and zoological gardens, a gallery of natural history, an extensive nursery, &c. L. has numerous schools, scientific and literary societies, rich museums and art collections, a town library of 150,000 vols. and 2400 MSS., and a library attached to the Palais de Beaux-Arts of 160,000 vols. The great industry is the silk manufacture, which in and about the city employs some 70,000 looms, and 140,000 hands. The average value of the raw silk imported annually is £16,800,000, and of manufactured silk exported £20,000,000. The making of silk nets, handkerchiefs, and lace employs 800 looms. There are also large iron, copper, and bronze industries, and manufactures of glass, pottery, leather, beer, tobacco, chemicals, liqueurs, jewellery, hats (450,000 yearly), &c. Pop. (1872) 279,785. The ancient *Lugdunum*, on the hill of Fourvières (*Forum vetus*), was founded in 43 B.C. Augustus made it the capital of *Gallia Lugdunensis*, and it early became a great commercial centre, and was the birthplace of Germanicus, Claudius, Marcus Aurelius, Caracalla, and Geta. During the middle ages it belonged to the bishops of L., and was greatly disturbed by feuds between the Comtes de Forez and its ecclesiastical ruler. But in 1307 it was incorporated with France by Philippe le Bel, and its subsequent prosperity attracted from Florence, Lucca, and Genoa, in the 15th c., refugees who brought with them the art of silk-weaving. In revoking the Edict of Nantes, Louis XIV. inflicted a blow on industrial L. from which it did not fairly recover till the Revolution. It rushed eagerly into the Revolution, demolishing its Bastille, the Château de Pierre-Scise, but turned on seeing the excesses of the movement, and for its backsliding the Convention decreed that 'L. n'existerait plus.' Collot d'Herbois, Couthon, and Fouché with an army of 60,000 men, after a siege nearly destroyed the town, ruthlessly massacring the inhabitants. The later events in its history are the riots of 1830 and the inundations of 1840, 1856, and 1875. See *Les Archives de L.*, by M. L. Niepce (Lyon, 1875).

Lyon, properly **Lion, Golfe de**, a bay in the S. of France, which receives the Rhone and Hérault, and the shores of which, in great part lined with lagoons (Fr. *étangs*), resemble those of Holland and some parts in the Adriatic. There is no connection between the name of the Gulf and that of the city. Originally the Gulf was known as the *sinus Gallicus*; about the 14th c. it began to be called *sinus Leonis* ('Gulf of the Lion'), probably from the violence of its storms. See *Les Villes Mortes du Golfe de L.*, by Charles Lenthéric (Paris, 1876).

Lyon Court, the Heralds' College of Scotland, consists of six heralds and six pursuivants, presided over and appointed by the Lyon King-at-Arms (q. v.), whilst among its officials are the Lyon Clerk, or keeper of the record; the Lyon Clerk Depute; the Procurator Fiscal; a herald painter; and a messenger-at-arms, or macer. The functions of the court are regulated by Acts 1592 and 1672 of the Scots Parliament, and are similar to those exercised by its English prototype.

Lyon-King-at-Arms, a legal officer of Scotland, taking his title from the armorial bearing of the Scottish kings, the lion rampant. His jurisdiction empowers him to inspect the arms and ensigns armorial of all the noblemen and gentlemen of the kingdom, to distinguish the arms of the younger branches of families, and to give proper arms to deserving persons, and to *matriculate* these. The Court of Session has power to review the decision of the Lyon Court as to the matriculation of arms; but a reduction is incompetent unless at the instance of one claiming the arms in question.

Lyre, one of the most ancient of stringed instruments. Nearly all the Greek music was written for it. See GREEK MUSIC.

Lyre-Bird, a remarkable bird found in New South Wales, and belonging to the family *Menuridæ*, of the order *Passeres*. The family consists of only one genus (*Menura*), represented by two species. Both in its appearance and in its habit of scraping large holes in the ground, the L.-B. resembles Gallinaceous birds, among which it was at one time classed by some naturalists. It derives its common name from the peculiar shape of the beautiful tail feathers of the male bird, which, when extended, exactly resemble the ancient lyre. It is a fine songster, having a loud and melodious note, and frequently imitates the notes of other birds. *M. superba*, the principal species, is about the size of a pheasant. In the other species, *M. Alberti*, the lyre-shaped feathers are smaller. Both build dome-shaped nests of twigs loosely woven, and are very shy and difficult to approach.

Lyr'ic (Gr. *lyrikos*, from *lyra*, 'a lyre'), the name given by the Greeks to a kind of poetry originally set to the music of the lyre. L. poetry is the expression of the poet's own feelings, and has all the vivid charm of personality. We are invited to share in the love, hate, joy, or grief of a human being like ourselves, and the doors of our heart are insensibly thrown wide. The *song*, either sacred or secular, is the finest form of the L.

Lys or **Lèye**, a river that rises in the department of Pas-de-Calais, flows N.E., forms part of the boundary between Belgium and France, and joins the Scheldt at Ghent, after a course of 100 miles.

Lysan'der, a famous Spartan general, the son of the Heracleid Aristocleitus by a Helot woman, received the command of the Spartan fleet in 407 B.C., and with the help of Cyrus the Younger defeated the Athenians under Antiochus off Notion. In 408, as vice-admiral, he again defeated them at Ægospotami,

and the year following brought the Peloponnesian War to a close by the capture of Athens. In 398 L. secured the succession to Agesilaus (q. v.), but rewarded only with ingratitude, he is said by the later historians to have plotted the substitution of an elective for an hereditary monarchy, an enterprise cut short by his death in the battle of Haliartus (395).

Lythra'ceæ, a natural order of herbs, shrubs, or small trees, numbering about 300 species, widely dispersed, but chiefly tropical. The type genus *Lythrum* has a representative in Britain, namely, *L. Salicaria*, a handsome plant often met with on river and ditch banks, and other watery places. It is interesting from having trimorphic flowers. From India comes the frequent greenhouse plant *Lagerstræmia Indica*, and Brazil produces the equally beautiful shrubby genus *Diplusodon*. Henna (q. v.) also belongs to this order. The genera *Lagerstræmia* and *Physocalymma* yield useful and ornamental timber. The bruised leaves of *Ammannia vesicatoria* are used in India to produce blisters. As a rule, the plants of the order are astringent.

Lytt'elton, George, Lord, son of Sir Thomas L. of Hagley in Worcestershire, was born in 1709, educated at Eton and Christ Church, Oxford, travelled upon the Continent, and was sent to Parliament, where he became a conspicuous opponent of Sir Robert Walpole, on whose fall he was appointed one of the Lords of the Treasury. In 1756, though densely ignorant as to figures, L. was appointed Chancellor of the Exchequer, and promoted to the peerage in 1757. He died 22d August 1773. L.'s contributions to literature were held in high esteem by his contemporaries. The chief are *Observations on the Conversion of St. Paul* (1747), *Dialogues of the Dead* (1760), and *History of Henry II.* (1764).—**Thomas**, second **Lord L.**, born in 1744, died 27th November 1779. He was almost equally noted for his talent and immorality. The Letters and Poems ascribed to him are spurious. — **George William**, fourth **Lord L.**, of Frankley, was born in London, 31st March 1817, educated at Eton, passed to Trinity College, Cambridge, where he was Chancellor's medallist and senior classic in 1838. In 1846 he was Under-Secretary of State for the Colonies, in 1861–63 a member of the Royal Commission appointed to inquire into the management of the Public Schools of England, and was Chairman of the Commission on Endowed Schools, whose reforms were partly arrested by the return of the Tory party to power in 1874. L. committed suicide in a fit of despondency, 19th April 1876. He was an exquisite scholar, a pure philanthropist, a genuine Liberal, and a devoted Churchman. He merits remembrance for his virtues and his accomplishments.

Lytt'on, Edward George Earle Lytton-Bulwer, Lord, son of General Bulwer, was born May 1805, educated at several private schools, and entered Trinity College, Cambridge, graduating B.A. in 1826, and M.A. in 1835. He was M.P. for St. Ives in 1831, for Lincoln from 1832 to 1841, for Herts from 1852 to 1866, serving as Secretary of State for the Colonies in 1858. He was made a baronet in 1838, assumed the name of L. in accordance with his mother's will, and rose to the peerage in 1866. Under the eyes of men greater in intellect than himself, and in the face of a bitter criticism he provoked by his mannerisms and fopperies, L. gained a reputation achieved in any one department by few, and in so many departments by none of his contemporaries. Whether as essayist, actor, statesman, dramatist, scholar, or novelist, his successes were brilliant. He almost succeeded in being a poet too. In Parliament his fame as a speaker rose high, and his speech on Lord Derby's Reform Bill of 1859 is still talked of as a masterpiece. His first drama, *The Duchess of La Vallière*, was indeed a failure; but he never knew when he was beaten. *The Lady of Lyons* (1838) and *Money* (1840) are still among the most popular plays on the stage. His learning in some branches of literature might be termed recondite; and his *Athens, its Rise and Fall* (1836), published almost as a challenge to professed scholars, a work none has convicted of shallowness, gives a picture of Greek life more vivid by far than can be found in any other book of the kind. As a mere boy he wrote a Wertherian romance entitled *Falkland*: but the novel that first brought him fame was *Pelham* (1828). His reputation was sustained by *The Disowned* (1828), *Devereux* (1829), *Paul Clifford* (1830), *Eugene Aram* (1832), and *Godolphin* (1833). With a firmer, bolder hand were written *Rienzi*, ringing with the cry of medieval Rome for freedom, *The Last Days of Pompeii*, a marvellous picture of imperial and pagan Rome (both in 1835), *The Last of the Barons* (1843), and *Harold* (1848). Again his style changed (for the worse) in *Night and Morning* (1841); but when *The Caxtons* appeared in 1849, and *My Novel* in 1853, critics said that his genius had taken a great leap forward. His last novels, *The Parisians* and *Kenelm Chillingly*, were written almost on his deathbed. He died 18th January 1873. Those of his works not already mentioned are *O'Neil*, a tale in verse (1827), *The Siamese Twins* (1831), *Pilgrims of the Rhine, England and the English* (1833), *Leila* and *Calderon* (in one vol., 1835), *Ernest Maltravers* (1837), *Alice* (1838), *Zanoni* (1842), *Eva* (a volume of poems, 1842), *Poems and Ballads of Schiller* (1844), *The New Timon* (1846), *Lucretia* (1847), *King Arthur* (1848), *What will He do with It?* (1858), *A Strange Story* (1862), *Caxtoniana* (1863), *Lost Tales of Miletus* (1866), *Horace's Odes* (translated 1869), *Coming Race* (1871), *Pausanias* (unfinished, 1876), *Richelieu* and *The Sea Captain*, afterwards called *The Rightful Heir* (1839), *Not so Bad as We Seem* (1851), *Walpole* (1869). L.'s workmanship was at all times careful; but rapidity of execution was gained at the loss of deep inspiration. His stories are invariably fascinating, the earliest and latest excelling in brilliant analysis of contemporary manners, those intermediate (his best) powerfully dealing with historical and social questions, but all lacking the impulse of irrepressible passion. Still, when every abatement demanded by the severest criticism has been made, L. must continue to be regarded as one of the most richly gifted and versatile intellects of his age. His writings may cease to be read; that fate has overtaken greater authors than himself, but his name will always be remembered in the annals of English literature.—**Edward Robert Bulwer-L., Lord L.**, son of the preceding, born November 8, 1831, entered Her Majesty's diplomatic service when scarcely eighteen as private secretary to his uncle, Sir Henry Bulwer, ambassador at Washington. After occupying various positions of trust, he was appointed Secretary of Legation at Constantinople in 1863, and both at Madrid and Paris has acted as *chargé d'affaires*. In 1876 he was gazetted Viceroy of India. Under the pseudonym of 'Owen Meredith,' he published in 1855 *Clytemnestra and Other Poems*, in 1859 *The Wanderer*, in 1860 *Lucile*, in 1871 *Serbeke Pesme* (Servian songs), in 1867 *The Poetical Works of Owen Meredith*, in 1869 *Orval, or the Fool of Time*, and in 1874 *Fables in Song*. *Tannhauser* (1861) was written by L. and Julian Fane, of whom he wrote a *Memoir* in 1871. L. also published in 1874 *Speeches of Edward, Lord L., with Prefatory Memoir by his Son.*

M.

M, the thirteenth letter of the alphabet, corresponding to the Greek *Mu*, and the Hebrew *Mem*. It is the labial among the liquids, and very uniform in pronunciation, being most nearly allied to B, with which letter it is occasionally confounded. *Camera* becomes 'chamber;' *mors* = death, has the same root as *ambrosia; hibernus* is the Latin adjective from *hiems* or *hiemps*. This last example shows also the connection of M with P, which may be further illustrated by the fact that modern Greek uses MP to express the sound of B, this latter letter being in that language pronounced as V. M sometimes interchanges with N; English 'him' is German *ihn* in the objective case, and the accusative termination *um* in Latin is always *on* in Greek. In Latin the final M must have had a peculiarly weak sound, for it is sometimes altogether dropped; in metrical scansion it is elided before a following vowel, and in manuscript writing it is frequently omitted and represented by a line over the word. As a numeral M stands for 1000, being said to represent the initial letter of *mille*, or more probably CIↃ. As an abbreviation, M.A. = *Magister Artium;* M.D., Doctor of Medicine, or of Music; MS., manuscript; P.M., *post meridiem*, or after noon.

Maar'mor, or reversely, **Mormaer** (according to Skene) (Gael. *maor*, 'steward,' and *mhor*, 'great'), from the 10th to the 12th c. was the highest title of honour among the Scots, its holders exercising jurisdiction over such extensive districts as Athole, Moray, or Ross, and sometimes waging independent war with the Scottish sovereign, as in the case of Macbeth and Duncan VII. The office was strictly hereditary. With the extension of feudalism the title was gradually superseded by that of Earl (q. v.). The *Maor* was a subordinate authority, holding the same relative position to a M. as a baron to an earl or count. See Skene's *Celtic Scotland*, vol. i.

Maas' (Fr. *Meuse*), a tributary of the Rhine, rises in the Plateau de Langres, in the S. of Haute-Marne, flows in a N. direction through the departments of Vosges, Meuse, and the wild, romantic Ardennes, crosses the Belgian frontier after passing Sedan, and receives at Namur its largest tributary, the Sambre, which nearly doubles its volume. It then changes its course to N.E., passes Liège, where it is augmented by the Ourthe, separates Dutch from Belgian Limburg, passes Maastricht and Roermond, receiving the Roer, traverses Dutch Limburg, and curving westward, forms the N. boundary of N. Brabant, and joins the Waal (q. v.) opposite Gorkum. Its entire length is 580 miles, of which 460 are navigable.

Maas'tricht (Flem. *Maestricht;* 'the pasture on the Maas'), a strongly fortified town of the Netherlands, and capital of Limburg, on the left bank of the Maas, 16 miles N. by E. of Liège, and 20 N.W. of Aachen by rail, and opposite the town of Wijk, with which it communicates by a stone bridge 500 feet long. Its chief buildings are St. Gervais Church, with five towers; a townhouse, containing a public library; the citadel, on the Pietersberg; a synagogue, three hospitals, an athenæum, theatre, music-school, &c. The Pietersberg, a calcareous hill, is honeycombed by a quarry, forming a labyrinth with 20,000 walks. M. has an extensive transit trade, and manufactures of machinery, leather, glass, paper, woollens, pottery, firearms, soap, gin, &c. Pop. (1875) 28,891. M. suffered much in the wars between the United Provinces, Spain, and France. The neighbourhood can be flooded with water.

Mabillon, Jean, a learned French ecclesiastic, was born November 23, 1632, at Saint-Pierremont, entered the Benedictine Abbey of Saint-René (1653), began to edit the works of St. Bernard (1663), the first volume appearing in 1668. In 1681 appeared his *De Re Diplomatica*, which is still regarded as one of the most scholarly contributions to French history. M. travelled through France and Bavaria in 1682, through Italy in 1685, where he made a kind of triumphal progress among scholars. On his return he published the *Museum Italicum*. M. died at Paris, December 27, 1707. He was a man of true piety, and his ideal of historical research was high. His works, both in French and Latin, are extraordinarily voluminous. See Valery's *Correspondance inédite de Mabillon et de Montfaucon*.

Mac, a common prefix in Gaelic surnames, meaning 'son.' Its etymology is still uncertain, but it is synonymous with the Norman *Fitz* (from Lat. *filius*), the Erse *O'*, and the Welsh *Mab*, contracted to *Ap*, and often incorporated, as in Pryce, originally Ap Rhys.

Macad'am, John Loudon, the inventor of 'macadamised' road-making, was born 21st September 1756, in Ayrshire, where he became in middle life a trustee for roads. He published two pamphlets, *A Practical Essay on the Scientific Repair and Preservation of Public Roads* (1819), and *Remarks on the Present State of Road-Making* (1820; 5th ed., with additions and appendix, 1822), recommending, with other improvements, the use in road-making of small pieces of granite, flint, or hard stone, in layers a few inches deep, which would become solidised by traffic. His views attracted the attention of Government, who appointed him surveyor-general of the roads at Bristol, where he first made a practical and successful trial of his system. He was next appointed surveyor of the metropolitan roads, and received a gift of £10,000 from the State. The honour of knighthood, which he declined for himself, was conferred on his son in 1834. He died at Moffat, Dumfriesshire, 26th November 1836. M. published *Observation of the Management of Trusts for the Care of Turnpike Roads* in 1825.

Maca'o, a Portuguese settlement on the S.E. promontory of the Chinese island of Hiang-shan, at the mouth of the Chukiang, 70 miles S. of Canton. Area 28 sq. miles; pop. (1871) 71,739, of whom about 10,000 are Europeans. The town is the seat of a bishop, has a senate-house, twelve churches, and a college, and is defended by six forts, with a garrison (1875) of 54 officers and 972 privates. The commercial importance of M. has been greatly affected by the foundation (1839) of Hong-kong, and by the suppression (1872–73) of the exportation of Coolies (q. v.), and an attempt to revive its prosperity by declaring it a free port (February 28, 1846) has hitherto proved a failure. In 1875–76 the revenues amounted to £77,619; the expenditure to £70,596. The Portuguese founded a factory at M. in 1563, and in 1586 obtained a grant of the peninsula, which till 1844 remained under the jurisdiction of Goa. In a grotto above the town Camoens composed his *Lusiad*.

Macaro'ni (Ital. *maccare*, 'to bruise' or 'crush'), is a preparation from the hard varieties of wheat grown in tropical or warm countries, and which also are the source of the substance known as semolina. For the preparation of M. the wheat is ground to a fine meal, mixed into a stiff paste with water, and squeezed through openings in an enclosed box or piston. The nature of the apertures determines the name of the product, M. being formed as small tubes or rods of the diameter of a goose quill, while that expressed in fine threads through very small apertures is termed *Vermicelli* (q. v.). The same material is

also rolled out to thin flat cakes from which small rings, lozenges, stars, and innumerable other fancy shapes are stamped out, which are called Italian pastes. Of whatever form made, the material is subsequently dried, either by exposure to the sun or by artificial heat; the sun-dried qualities being the best. It is much used for thickening soups, in the preparation of puddings, and in other forms in cookery. The best qualities of M. and pastes are made at Cagliari in Sardinia, where the industry is extensive and important.

Macaron'ic Poetry, a hybrid composition consisting in the admixture of Latin words, forms, and construction with some modern vernacular, was invented by Tifi-degli-Odassi, of Padua, towards the close of the 15th c. Well-known examples are the *Maccaronea* (Tusc. 1521) of Teofilo Folengo, a Benedictine of Mantua; the *Meygra Entrepriza*, &c. (Avignon, 1537), of the Provençal Antoine de la Sable; the German *Floia, Cortum Versicale*, &c. (1593); the *Macaronée* of Molière's *Malade Imaginaire*, and the *Polemo-Middinia*, commonly ascribed to Drummond. See Morgan's *Macaronic Poetry* (New York, 1872).

Macaroon' (Fr. *macaron*, 'a kind of pastry') a small sweet biscuit made in England from the meal of almonds, sugar, white of eggs, and grated lemon peel.

Macart'ney, George, Earl, son of George M. of Auchinleck, Ayrshire, Scotland, was born at Lissanourne, in Ireland, 14th May 1737, and studied at Dublin University. In 1764 he was appointed envoy extraordinary to the Russian court, became secretary to the Viceroy of Ireland on his return, and in 1775 was made Governor of Grenada and Tobago, where he remained till the capture of the islands by the French in 1779, when he was sent to Europe as a prisoner. In 1780 he was made Governor of Madras, and in 1792 was appointed first British ambassador to China. On his return M. was created an earl in the peerage of Great Britain. He died at London, 31st March 1806. His secretary, Staunton, has written a very interesting and instructive account of M.'s embassy. See also Barrow, *Public Life and Writings of the late Earl M.* (2 vols. Lond. 1807).

Macartney Cock, a species of *Phasianidæ* or pheasants, so named from its having been described in the account of Lord Macartney's embassy to China. It belongs to the genus *Gallophasis*, its scientific name being the *G. ignitus*. It has also been named the 'Fireback Pheasant,' and an allied species is Veillot's fireback (*G. Veillotii*). The back is covered with brilliant red feathers. The head is crested, and the general colour is a very deep violet black with a prominent metallic lustre. The central tail feathers are white, and the tail is divided —the feathers of each side being curved. The male is larger than the female, and attains a length of 2 feet. The M. C. inhabits Sumatra and other islands of the E. Archipelago.

Macass'ar, or **Vlaar'dingen,** the capital of the Dutch possessions in Celebes (q. v.), is situated near the extremity of the south-western peninsula, at the mouth of the Goa, and on the Strait of M. Its harbour has good anchorage, is protected by two forts, and was declared a free port, January 1, 1847. M. carries on a lively trade with Java and Singapore in horses, cottons, and cocoa-nuts, and has valuable trepang fisheries. Estimated pop. 21,000.

Macassar Oil. This product, largely used as a drying oil in Britain, is imported from India and other Eastern countries, and is believed to be principally obtained from the seeds of the safflower plant, *Carthamus tinctorius*. When first expressed, M. O. is white and thick like butter, but when refined it becomes liquid and transparent, in which condition it is used for culinary purposes, and for burning in India. It derives its name from the Dutch capital of Celebes, whence it was originally imported.

Macau'lay, Thomas Babington, Lord, a great English historian, son of Zachary M., was born 25th October 1800, at Rothley Temple, Leicestershire. He was educated at a small school in Clapham, and under the private tuition of a clergyman. In his nineteenth year he went to Trinity College, Cambridge, became a great debater at the Union, twice took the Chancellor's Medal for English verse, gained (1821) the Craven Scholarship, graduated B.A. (1822), and was elected Fellow (1824). Before this M. had entered the arena of literature as a contributor to *Knight's Quarterly Magazine*. At the Freemason's Hall, London (1824), he made his *début* as a public speaker upon the question of abolition, began to contribute to the *Edinburgh Review* (August 1825), was called to the bar (1826), appointed to a Commissionership in Bankruptcy (1827), and, through the influence of Lord Lansdowne, was returned for Calne (1830) to the House of Commons. During the next two years his reputation was greatly extended by speeches delivered in the course of the debates upon Reform, which he supported from the Whig point of view. In 1832 M. was returned for Leeds, and spoke against the repeal of the Irish union, in behalf of a bill for removing the civil disabilities of the Jews, and another for depriving the East India Company of their exclusive trade with China. He was at the same time appointed Secretary to the Board of Control, and (in 1834) president of a new law commission for India, and member of the Supreme Council of Calcutta, where he remained till 1838. In 1839 M. was returned to Parliament for Edinburgh, was appointed Secretary of War (1840), re-elected for Edinburgh (1841), became Paymaster-General (1846), with a seat in the Cabinet, during all this period voting with his party and speaking in favour of various liberal measures. At the general election of 1847 M. lost his seat, owing to his advocacy of the Maynooth grant, and though the electors of Edinburgh retrieved their anti-Popish narrowness in 1852 by returning him unsolicited and with his expenses paid, his political career really ended at the former date. In 1849 he became Lord Rector of the University of Glasgow and Fellow of the Royal Society, in 1857 a foreign member of the French Academy, High Steward of Cambridge and Baron of Rothley. Meanwhile his progress in literature had been one of unsurpassed brilliancy. Besides his essays appearing at intervals in the *Edinburgh*, he published his *Lays of Ancient Rome* (1842), which contain vigorous and dashing verses. Two volumes of the *History of England from the Accession of James II.* came out in 1849, and other two in 1855. On both occasions the excitement which followed their publication was unprecedented. Now that the great controversies between Whig and Tory are laid to rest by the universal acceptance of the principles which the former persistently upheld, it becomes possible to do justice to the most brilliant and learned partisan the Whig cause ever possessed. M. had a great historical faculty. He could appreciate characters, motives, movements, and issues. He was filled with a noble enthusiasm for rational liberty and orderly progress, and with an equally noble hatred of despotism and injustice. He recognised that a nation's history is the record of its manifold life, and he poured over his pages the exhaustless wealth of his knowledge, literary, social, religious, and political, till his readers are almost lost in the maze of vivid details. It was impossible that history written with such minuteness could be invariably correct. Errors were discovered and triumphantly exhibited by his political opponents, but when all abatements have been made, his work remains one of the great treasures of English literature, alike for the knowledge it displays, the spirit that animates it, the richness and felicity of its language, and the strength, animation, and brilliant simplicity of its style. During the last six years of his life M. contributed a number of lives to the *Encyclopædia Britannica*. He died at Holly Lodge, Kensington, on the 28th of December 1859. A complete edition of M.'s writings in 8 vols. was published by his sister, Lady Trevelyan, in 1866. See *The Life and Letters of Lord Macaulay*, by his nephew, G. O. Trevelyan, M.P. (2 vols. 2d ed. 1877).

Macaw' (*Macrocerus*), the name applied to various *Scansorial* birds nearly related to the parrots, and included in the latter family (*Psittacidæ*). A special sub-family (*Arainæ*) has been constructed for the reception of the M., the members of this group having bare cheeks and very long tail-feathers. The M. inhabits tropical America. Its plumage is brilliant. The bill is large and powerful, and serves to crack nuts and other fruits upon which it subsists. The M. may be domesticated, but never shows a docility equal to the parrot, while its voice is very harsh. The best-known species are the *M. macao*, the Scarlet M., and the Blue and Yellow M. (*M. Ararauna*). The former inhabits the W. India Islands, and attains a length of 3 feet. The latter, a native of tropical America, is more commonly brought to this country. The green M. (*M. severus*) is found in Guiana and Brazil, and commits great havoc in coffee-plantations.

Macaw Tree is applied to several species of *Acrocomia*, a genus of palms allied to the coco palm, the name being taken from the elegant tufts of leaves at the summit of the stems. One

species, *A. selerocarpa*, is wide-spread in S. America, its trunk rises to 20 or 30 feet in height, and its leaves, which in the young state are eaten as a vegetable, when mature extend to 10 or 15 feet. The 'great' M. T. is *A. lasiospatha*, and *Solanum mammosum* has obtained the name of '*M. bush*.'

Macbeth' or **Macbethad** (Gael. 'son of life'), a Scottish king, whose true history is almost lost in myth. He was husband of Gruach, a grand-daughter of Kenneth IV., and Maarmor of Myrhævi or Moray. At this time Orkney, Sutherland, and Caithness were in the hands of the Norse Earl Thorfinn. The *Orkneyinga Saga* gives a clear picture of the struggle between this Earl and King Duncan. Mr. Skene is of opinion that after Duncan had sustained a crushing defeat, M., instead of hastening to his help, treacherously joined his forces to those of Thorfinn, slew his master—according to the later chronicles—at Bothgowan ('smith's hut'), near Elgin, in 1039, and assuming his sceptre, wielded it with good repute, being the first Scottish ruler who opened communications with Rome, whither he is said to have gone on pilgrimage in 1050, and the first to make grants of lands to the Church. But Malcolm MacDuncan, aided by Siward, the Danish Earl of Northumberland, and by Macduff, Maarmor of Fife, defeated him at Dunsinnane in 1054, and slew him at Lumphanan, in Aberdeenshire, December 5, 1056. Shakespeare borrowed his account of M. from Raphael Holinshed, and he again from Hector Boece. See Hill Burton's *History of Scotland*, vol. i. p. 369, and Skene's *Celtic Scotland*, vol. i. pp. 402–6.

Macc'abees is a name given to a family of Jewish princes, otherwise and properly called the Asmonæan dynasty, the history of which dates from the time of the persecution of the Jews under Antiochus Epiphanes (B.C. 167). When the officers of Antiochus were everywhere setting up heathen altars, at Modin, Mattathias, a priest, slew the first renegade Jew who advanced to take part in the worship, and led a band—including his own five sons, John, Simon, Judas, Eleazar, and Jonathan—who slew the Syrians present, and then retired to the desert, where they were soon surrounded by a small army. They threw down the heathen altars and established the old worship, being generally victorious in their encounters with the Syrians. On the death of Mattathias (B.C. 166) the command of the insurgents was assumed by his third son Judas, from whose cognomen, Makkabi ('hammer'), the whole family derived their name. With vastly inferior numbers he defeated the Syrian armies one after another, and at last recaptured Jerusalem. His first act was to purify the temple, and dedicate it anew to the service of Jehovah (B.C. 163), in commemoration of which act a festival was ever afterwards observed by the Jews. When Judas at last fell in battle (B.C. 160) he was succeeded by his brother Jonathan, who played an important part in the contests for the Syrian throne, and was made high-priest by one of the claimants. Jonathan being put to death (B.C. 143) he was succeeded by his brother Simon as high-priest and prince, under whom the country enjoyed a time of comparative quiet and prosperity in alliance with the Romans. In B.C. 135, however, he was murdered along with two of his sons, by his son-in-law, Ptolemy, and was succeeded by his son, John Hyrcanus I., who died B.C. 106, and was succeeded by his eldest son Aristobulus (B.C. 106–105), who assumed the title of royalty. The other M. were Alexander Jannæus (B.C. 105–78), Alexandra (B.C. 78–69), Aristobulus II. (B.C. 69–46), Hyrcanus II. (B.C. 46–30), Mariamne, the wife of Herod, and her brother Aristobulus, who was made high-priest, but afterwards put to death by Herod. See Ewald's *Geschichte d. Volk. Israel* (Eng. trans. 1869), and Stanley's *Jewish Church* (2d ed. 1877).

Maccabees, Books of, is the title of certain Jewish histories containing chiefly an account of the exploits of the Jews in their war of independence under the Maccabees (q. v.). There were in all four books, and according to some a fifth; of which three are still read in the Eastern Church, and two in the Western, although in the Reformed Churches they are placed among the Apocrypha (q. v.). *The First B. of M.*, which is the second in order of time, contains a history of the war begun by Antiochus Epiphanes against the Jews from B.C. 175 to the death of Simon Maccabee, B.C. 135. The original was probably written in Hebrew, but is now lost. *The Second B. of M.* begins its history a few years earlier than the first, and closes with the victory of Judas Maccabee over Nicanor (B.C. 161). It is an abridgment of an older work by Jason, a Jew of Cyrene, giving the history of the Jews under Seleucus IV., Antiochus Epiphanes and Antiochus Eupator. *The Third B. of M.*, which is still read in the Eastern Church, professes to give an account of the persecution of the Egyptian Jews by Ptolemy Philopater, and of their deliverance by Divine interposition. As it thus contains the history of a time anterior to that of the Maccabees, it seems to have got its name from the resemblance of the actions it records to those in the B. of M. proper. *The Fourth B. of M.*, also called *On the Supreme Sovereignty of Reason*, and which in early times was ascribed to Josephus, contains a fuller history of the martyrdom of Eleazar, of the seven brothers, and of their mother, which forms the subject of 2 Macc. vi. vii. *The Fifth B. of M.*, which is now extant only in the Arabic and Syriac, begins with the attempt on the treasury at Jerusalem by Heliodorus, and ends with the murder by Herod of his wife Mariamne and his two sons.

M'Carthy, Justin, novelist and journalist, was born in Cork, November 22, 1830. He was on the staff of the *Cork Examiner* from 1846 to 1853, when he joined that of the *Northern Times*, Liverpool. In 1860 he became parliamentary reporter for the *Morning Star*, in 1861 foreign editor of the paper, and chief editor, 1864–68. During 1868–71 M. made a complete tour of the United States. For several years past he has been one of the chief political writers in the *Daily News*, a position he still (1877) holds. But though a vigorous and accomplished contributor to political literature, M. has won a wider fame in fiction. His novels are—*Paul Massie* (1866); *The Waterdale Neighbours* (1867); *My Enemy's Daughter* (1869); *Lady Judith* (1871); *A Fair Saxon* (1873); *Linley Rochford* (1874); *Dear Lady Disdain* (1875); and *Miss Misanthrope*, now (1877) appearing in the *Gentleman's Magazine*. These works are skilfully constructed, abound in incident, and are written in exquisitely beautiful English. Everywhere we can notice the play of a keen, incisive, and graceful intellect, of warm, tender sensibilities, and of a singularly pure and healthy spirit. M. has also written essays and papers on many subjects; *Con Amore* (a collection of essays, 1868); *Critical Notice of George Sand* (1870); *Prohibitory Legislation in the United States* (1872); *Modern Leaders* (biographical sketches, New York, 1872), &c. As a lecturer M. has few equals. The easy yet ornate elegance of his unwritten composition exerts a peculiar and unwonted charm.

M'Clell'an, George Brinton, an U.S. general, born at Philadelphia, December 3, 1826, graduated at Pennsylvania University (1842), and at West Point (1846), served with distinction through the Mexican campaign (1846–48), and in 1855 visited the seat of the Crimean War, issuing on his return his *Organisation of European Armies*. In 1857 he quitted the army to assume the vice-presidency of the Illinois Railway, which he exchanged in 1860 for the presidency of the St. Louis Line. On the outbreak of the Civil War M. received the command of the Federal troops in Western Virginia (June 21, 1861), when he defeated the Confederates at Rich Mountain (July 11), and (August 20) of the Army of the Potomac. General-in-chief from November to March 11, 1862, he besieged Yorktown, but was forced by the disastrous 'Peninsular Campaign' to retreat to the James (July 4, 5); and appointed to the command of Washington (September 5), he followed Lee into Maryland, fought the indecisive actions of South Mountain (September 14), and Antietam (September 17), and in the November following was relieved of his command. In September 1864 he failed as Democratic candidate for the presidency, and having resigned his commission (November 4), made a tour in Europe (1865–68). On his return he was engaged in various engineering works, and in 1870 became superintendent of the New York docks, which office he resigned in 1872. M. is the author of numerous military and engineering text-books.

Macc'lesfield, a manufacturing town of Cheshire, England, on the river Bollin, 165 miles N.W. of London by rail. It has seven churches (the finest, St. Michael's, founded in 1278), and an endowed grammar school, founded in 1502, and rebuilt in 1866. M. is the chief centre in England of the silk manufacture. Dyeing and brewing are carried on, also the manufacture of machinery, pottery, and small wares. M. has three banks and two weekly newspapers, and returns two members to Parliament. Pop. (1871) 35,570.

M'Clin'tock, Sir Francis Leopold, an Arctic navigator born at Dundalk in 1819, entered the navy (1831), served in the Franklin Discovery Expeditions of Ross (1848), Austin (1850), and Belcher (1852), and became post-captain (1854). In 1857, as commander of the *Fox*, fitted out by Lady Franklin (q. v.), M. discovered the fate of Sir John and his crews, and on his return to England (1859) he was knighted, presented with the freedom of the city of London, and made LL.D. of Cambridge and Dublin, and D.C.L. of Oxford. In 1871 he became rear-admiral, and in 1872 Superintendent of Portsmouth Dockyard. He is author of *The Voyage of the Fox in the Arctic Seas* (Lond. 1860; 3d ed. 1869).

M'Clure', Sir Robert John le Mesurier, the discoverer of the N.W. Passage, was born at Wexford, Ireland, January 28, 1807. Educated at Eton and Sandhurst, he entered the Navy, served in the Arctic Expedition of 1836, on the Canadian lakes, and on the American and W. Indian coasts till 1846, gradually rose to the rank of first-lieutenant (1838), joined Sir James Ross in the search for Franklin (1848), and on his return was made commander. In 1850 he was nominated to the *Investigator*, and again dispatched in search of Franklin. The expedition, entering Behring Strait, reached 117° 10′ W. long, and 73° 10′ N. lat., 30 miles from Melville Strait (16th September 1851), but was there fixed in the ice. A sledge party sighted the N.W. Passage on the 22d October. After a vain attempt to press forward, the *Investigator* sailed round the S. end of Banks' Land for 30 miles, and was again checked by ice. In an inlet which they called Mercy Bay, the party were imprisoned till April 1854, when they were relieved by Captain Kellett, who conveyed them to England. M. was made post-captain, and received a knighthood, while the officers and crew were rewarded by a grant of £10,000. Subsequently M. served in the E. Indies and China, and died at Portsmouth, October 18, 1873.

M'Crie', Thomas, D.D., a Scottish ecclesiastic and historian, was born at Dunse, November 1772, studied at the University of Edinburgh, was licensed by the presbytery of Kelso, and took charge of an Anti-burgher congregation in 1795. In 1812 he published a *Life of John Knox*, which remains unexcelled as a learned and sympathetic account of the Scotch reformer. *The Life of Andrew Melville* appeared in 1819, and bears the mark of patient scholarship, though, like his other writings, it is deficient in judicial balance when the question of Presbyterianism is concerned. Hallam condemns its 'Presbyterian Hildebrandism.' He died in Edinburgh, 5th August 1835, bearing a personal reputation for sincere piety and noble simplicity of character. See *Life of the Rev. Thomas M'Crie, D.D.*, by his son (Edinb. 1840).

Maccull'och, Horatio, a Scottish landscape painter, was born at Glasgow in 1806. His first important work, 'A View on the Clyde,' appeared in 1829. In 1839 M. was elected an R.S.A., when he removed to Edinburgh, where he died, 24th June 1867. M. had a prolific pencil, and sent from his studio too much work. But his Highland scenes are strikingly vivid and faithful, and will long preserve his name in the northern part of the island. Among his more notable pictures are 'Loch-an-Eilan,' 'View in Cadzow Forest,' 'Misty Corries,' 'Deer Forest, Isle of Skye,' 'Mist Rising off the Mountains,' 'Kilchurn Castle,' 'Bothwell Castle,' and 'Inverlochy Castle.'

Macculloch, John, M.D., a geologist and physician, was born in Guernsey, October 6, 1773. He graduated at Edinburgh, began practice at Blackheath, but in 1811 was employed by the Government to undertake various scientific surveys in Scotland. Latterly he was Professor of Chemistry and Geology in Addiscombe Military School, connected with the East India Company. He died at Penzance, Cornwall, August 21, 1835. M.'s chief works are *A Description of the Western Islands of Scotland, including the Isle of Man* (1819), *A Geological Classification of Rocks* (1821), *The Highlands and Western Isles of Scotland* (1824), *System of Geology and Theory of the Earth* (1831), and *Proofs and Illustrations of the Attributes of God* (1837), besides two medical works on *Malaria* (1827), and on *Remittent and Intermittent Diseases* (2 vols. 1829).

M'Cull'och, John Ramsay, was born at Isle of Whithorn, Wigtonshire, 1st March 1789, and became (1817) a contributor to the *Scotsman*, which he edited for about two years. In 1818 he started a connection with the *Edinburgh Review*, to which he contributed an unbroken series of articles, principally dealing with questions of political economy. In 1828 he was appointed Professor of Political Economy in University College, London, and in 1838 Controller of the Stationery Office. M. was a voluminous writer; but his style was clear and firm; and his thinking remarkable for practical good sense and general liberality. His Dictionaries of Commerce and Geography passed through several editions, and were translated into more than one foreign language. His editions of Smith and Ricardo are of high value, but the most popular of his works is *Principles of Political Economy* (1849). M. died 11th November 1864.

Macdon'ald, Étienne Jacques Joseph Alexandre, a French marshal, of Scotch descent, was born at Sedan, 17th November 1765, entered the army in his nineteenth year, served as sub-lieutenant under Maillebois, and in 1795 had risen to be general of brigade. For nine years he distinguished himself in the field, overcoming the Austrians at Modena (1799), and driving them from Switzerland and the Tyrol (1801), but his friendship for Moreau lost him the Emperor's favour. He lived in retirement for five years, and in 1809 was summoned to a command under Eugène Beauharnais, where he distinguished himself by executing the passage of Isonzo, compelling Laibach to capitulate, and capturing cannons and stores. At Wagram Napoleon was reconciled to him, and conferred upon him the title Duc de Tarente. In Spain, Russia, and Prussia, he led armies with success, and at the Bourbon return to power he took office under the monarchy, being confirmed in his peerage. From 1815 he acted as one of four majors-general of the royal guard near the person of the king. He died 7th September 1840, at Courcelles. See Jomini's *Précis des Opérations Militaires*.

MacDonald, George, novelist and poet, was born in Huntly, Aberdeenshire, in 1825. He was educated at the University of Aberdeen, after which he studied at Highbury College, London, for the Independent ministry. For a short time he was a preacher in that body, but retired from the pulpit to devote himself to literature. He has frequently lectured in different parts of the United Kingdom, on Shakesperian and other subjects, and in 1872–73 made a lecturing tour in America. His works include *Within and Without*, a dramatic poem (1855); *Poems* (1857); *Phantastes* (1858); *David Elginbrod* (1863); *Alec Forbes* (1865); *Annals of a Quiet Neighbourhood* (1866); *Guild Court* (1867); *Robert Falconer* (1868); *Wilfrid Cumbermede* (1871); *Malcolm* (1874); *St. George and St. Michael* (1876); *Thomas Wingfold, Curate* (1876); and the *Marquis of Lossie* (1877). He has written some graceful fairy romances for the young, such as *At the Back of the North Wind* (1870); *The Princess Goblin* (1871); *The Wise Woman* (1876). M. is thoroughly at home in his portrayal of life and manners in the N.-E. of Scotland; infuses a poetry into his treatment of common things, and shows much insight into the development of thought and character. A vein of religious speculation and theological controversy runs more or less through all his novels. His feeling is earnest, his faith is broad and loyal, his creed a tolerant and hopeful Christianity. Among his purely religious writings are *Unspoken Sermons* (1866); *The Miracles of our Lord* (1870); and *Exotics* (translations from German and Italian hymns, 1876).

Macdonald, Sir John Alexander, a Canadian statesman, was born in Sutherlandshire, Scotland, in 1815, educated at the University of Aberdeen, and removed to Kingston, Canada, in 1820. He was called to the bar in 1835, elected to the Canadian Parliament in 1844, and held the posts of Receiver-General, Member of the Executive Council, and Commissioner of Crown Lands (1847–50). Twice Attorney-General for Canada (1854–62, and 1862–64), he was made Minister of Militia in 1865, Minister of Justice in 1868, and Premier in 1869, retaining office till November 5, 1873. The leader of the Conservatives, he was chairman of the commission in London that arranged the terms of confederation, 1866. At present (1877) he is leader of the Opposition in the Dominion House of Representatives.

Mace, in medieval times, was a weapon of offence in the form of a short wooden staff headed with a heavy spiked ball of iron. Now it is a staff of office or authority in Parliament, law courts, universities, and with other high corporate bodies endowed in any way with judicial functions.

Mace consists of the arillode or false aril which surrounds the shell of the *Nutmeg* (q. v.). When fresh it is a brilliant scarlet colour, but on drying it becomes yellow, of which colour, and as thick, flat, somewhat heavy blades it is found in commerce. M. has the odour characteristic of nutmegs, and is used in cookery and medicine in the same manner. A false M. from species of *Myristica*, other than the true nutmeg, and possessed of a strong coarse flavour, is sometimes sent into the market.

Macedo'nia, anciently denoted a region N. of Thessaly, and varying in extent and character. At first it was a purely inland country, nowhere touching on the sea, but its limits were gradually enlarged until, in the reign of Philip, it reached as far N. as Mount Hæmus (the Balkans), and included a seaboard that stretched from the Propontis to the coast of Thessaly. M. is mainly mountainous, but contains three wide alluvial valleys, watered by the Axius, the Erigon, and the Haliacmon. The inhabitants were not originally regarded as true members of the Hellenic family, but at any rate in course of time they became thoroughly Hellenised, and if they did not add much to the common civilisation of Hellas, the conquests of Alexander carried it over half a world, and gave it an influence that is still felt in the East. Even at an early period they were far from barbarous. A Macedonian coin displaying superior art exists, bearing date 500 B.C., and we read of a king Alexander (the 'Philhellene') who was an admirer of the poetry of Pindar. Personal valour, and a frank, military spirit, were the characteristics of the people. The history of M. falls into three periods: (1) From the legendary past, reflected in Herodotus and the older poets, down to the Persian War, B.C. 490. (2) From the Persian War to the death of Alexander, B.C. 323. (3) From the death of Alexander to the Roman Conquest, 168 B.C. Its later history is merged in that of Rome. After the time of Constantine it was overrun by Slavic hordes, who gradually settled in its wasted plains. During the 9th and 11th centuries Asiatic colonists, both Persian and Turkish, were introduced by the Byzantine emperors, and it may now be safely affirmed that the old Macedonian race is practically extinct. See Cousinéry, *Voyage dans la Macedonie* (2 vols. Par. 1831); Leake, *Travels in North Greece* (4 vols. Lond. 1835); Ami Boué, *La Turquie d'Europe* (4 vols. Par. 1840).

Macera'ta, a town of Italy, province of M., finely situated among vineyards and gardens, 23 miles S. of Ancona and 107 N.N.E. of Rome. It has a modern cathedral and six other churches, a fine Palazzo Comunale of the 13th c., and a university founded in 1824. Three miles S. are the ruins of the Roman *Colonia Helvia Ricina*. Pop. (1874) 19,832.

Macfarr'en, George Alexander, a distinguished English composer, was born at London, March 2, 1813. Taught by Charles Lucas (1827), and at the Royal Academy of Music by Cipriani Potter (1829), he became Professor of Harmony and Composition at the R. A. M. in 1834. He succeeded Sir W. S. Bennett as *Principal* of the R. A. M. in March 1875, and in April 1876 was made Professor of Music in the University of Cambridge, and also 'Doctor of Music' (Cantab.). Among the best of his numerous works (of the great merit of which there can be no doubt) are the operas *Don Quixote* (1846), *Charles II.* (1849), and *Robin Hood* (1860); his orchestral symphonies and overtures; the cantatas, *Lenore* (1851), *May-day* (1856), and *Christmas* (1860); and more recently the oratorios *St. John the Baptist*, the *Resurrection*, and *Joseph* (September 1877). M.'s theory of music is contained in his *Rudiments of Harmony* (Lond. 1840), and *Six Lectures on Harmony* (1867).

Macgill'ycuddy Reeks, a group of schist mountains in the S. W. of Ireland, county of Kerry, W. of the Lakes of Killarney, 28 sq. miles in extent. Carran-tual (3404 feet) is the highest summit in Ireland.

M'Gee', Thomas D'Arcy, a Canadian politician, was born at Carlingford, Ireland, 13th April 1825, went to Boston in 1842, where he became editor of the *Pilot*, returned to promote the 'Young Ireland' movement of 1848, escaped to New York, America, where he was editor of the *Nation*, 1848–50, and later of the *American Celt*. Displeased with the 'Know-Nothing' movement (1854–56) he removed to Montreal, Canada, advocated ardent royalism in the *New Era*, entered the Canadian Parliament in 1857, and was made President of the Executive Council in 1864, and Minister of Agriculture in 1867. He denounced the Fenian Society, and was assassinated by one of the body at Ottawa, 7th April 1868. M.'s chief works are *O'Connell and his Friends* (1845); *Irish Writers of the 17th Century* (1846); *Irish Settlers in N. America* (1852); *Canadian Ballads* (1858); *Popular History of Ireland* (2 vols. 1863); and *Speeches* (1865).

Machiavell'i, Nicolo, was born of a noble family at Florence, May 3, 1469. He developed his brilliant talents under the sway of Lorenzo the Magnificent, and after the death of that prince the 'Ten of Liberty and Peace' appointed him Secretary of the Florentine Republic, intrusting him during his term of office with no less than twenty-three embassies to foreign countries. He became the moving spirit of the republic, nerving its incapable chiefs to action, reorganising the whole of the Italian military system, and striving, at length almost single-handed, against the establishment of the Medici family by emperor and pope. But to these the gates of Florence once more opened (1512); the Signory fell, and with it the secretary. Despoiled of rank and office, he was subjected to repeated insult by the new government, and even imprisoned (1513) and tortured on a charge of conspiracy against Cardinal de' Medici, afterwards Leo X. During this period of disgrace were written his most famous works. Leo at length (1519) recalled him, intrusted him with the formation of a new administration and the fortification of the city, sent him on a mission to Carpi in 1521, and finally employed him in the army of the league against Karl V. He died at Florence, 22d June 1527. Pointed to by consent of contemporaries as the profoundest thinker and ablest diplomatist of his time, M. yet enjoys no very enviable reputation among moderns. 'Out of his surname,' says Macaulay (with more epigrammatic point, however, than philological accuracy), 'they coined an epithet for a knave, and out of his Christian name a synonym for the devil.' His views of history were far in advance of the age, as can be seen in the *Discorsi sopra la Prima deca di T. Livio*, his *Vita di Castruccio Castracani* (Prince of Lucca), his *Legasioni* (terse, witty diplomatic dispatches, full of brilliant pictures of contemporary events), and *Delle Historie Fiorentine* (brought down to the death of young Lorenzo de' Medici). His *Dell' Arte della Guerra* shows complete mastery of military systems. He wrote six comedies, one of which, *Mandragola*, Voltaire pronounces better than the best of Goldoni; and his *Belphegor* still holds place as a daintily humorous novel. Even as a poet he obtained some fame with the *Decennali*, *Asino d' Oro*, and *Capitoli*. But his fame or rather his notoriety rests on the treatise on government entitled *Il Principe*. Modern criticism has been unable to find for this work praise or blame strong enough. Chivalry, inhumanity, and utter villany, the noblest generosity, simplicity, and craft, romance and meanness, are alike distinctive of the sentiments expressed in it. But its immorality must be charged to the times. In its own day no cry was raised against it. However despicable and dangerous are some parts of a book he probably wrote for bread, M. preserved all the virtues of a faithful citizen. The best edition of his works is in 10 volumes (Flor. 1818, new issue by P. Fanfani, 1873); a French translation of the entire works by Periès appeared in 12 vols. (Par. 1823–26). See Macaulay's Essay; *Machiavel, Son Génie et ses Erreurs*, by Artaud de Montor (Par. 1833); and more especially Francesco Nitti's *M. nella Vita, e nelle Dottrine* (1876), and Pasquale Villari's *N. M. e i Suoi Tempi*, both based on newly discovered documents (Flor. 1st vol. 1877).

Machines' are combinations of elements, which by their relative and determinate motions are capable of applying energy to the performance of useful work. Until lately, especially in this country, each machine was studied by itself. The mechanism was first described, and the principles of its action then investigated, but little effort was made to attack the subject in a general way, and form a compact science of it. The French went to the other extreme, and regarded M. as merely illustrating particular theorems in theoretical mechanics. Quite recently the general solution of the machine problem has been attempted in two distinct ways by Professor Reuleaux of Berlin, and Professor Fleeming Jenkin of Edinburgh. The former considers M. kinematically, defining a mechanism as a closed kinematic chain, composed of elements which enter in pairs, such as a screw and its nut, a shaft and its bearing, &c. The latter, with the design of following up Rankine's investigations into the *efficiency* of a machine, and of applying graphic methods for its determination, conceives a machine as made up of elements

and joints, which are simply the surfaces of separation between the elements. The elements are the continuous parts of M., and may be solid or fluid. The steam in the cylinder and boiler of a steam-engine is as much an element as the piston-rod which it drives. The energy which drives the machine is developed in one element, or between two elements, and similarly the resistance which is overcome while the machine is doing useful work is exerted by one element, or between two elements. When one element of a machine is fixed, the earth simply becomes a part of that element, and in the analysis of a machine the size and material of an element is of no consequence. What is really essential is the knowledge of the magnitude and direction of the pressure at the various joints. Such is a brief outline of the principles upon which Jenkin bases his dynamic analysis of machinery, for the development of which reference must be made to his paper in the *Transactions of the Royal Society of Edinburgh* (April 1877). The particular forms of M., such as lever, wheel and axle, steam-engine, wedge, &c., are considered under their special headings. The most important works upon the theory of machinery are Willis' *On Mechanism*, Poncelet's *Mécanique Industrielle*, Morin's *Notions Fondamentales de Mécanique*, Moseley's *Mechanics of Engineering and Architecture*, Rankine's *Applied Mechanics*, *Prime Movers*, and *Millwork*, and Reuleaux's *Theoretische Kinematik* (English trans. by Professor Kennedy, Lond. 1876).

Mackay', Charles, LL.D., journalist and poet, was born in Perth in 1812, and educated in London and Belgium. In 1834 he published a volume of *Songs and Poems*. He was engaged on the *Morning Chronicle* from 1835 till 1844, when he became editor of the *Glasgow Argus*, a position he held for three years. M. was one of the original staff of the *Daily News*, to which he contributed in 1846 *Voices from the Crowd*, a series of poems which ran through several editions. For some years he was principal leader writer for the *Illustrated London News*. Among his chief works are *Memoirs of Popular Delusions* (1841); *Voices from the Mountains* (1847); *Town Lyrics* (1848); *Egeria* (1850); *The Lump of Gold* (1855); *A Man's Heart* (1860); *Studies from the Antique, and Sketches from Nature* (1864); *Under the Blue Sky* (1871); and *Lost Beauties of the English Language* (1874). He has compiled several excellent collections of songs and poems. In 1876 he published an interesting autobiography, *Forty Years' Recollection of Life*, &c.

Macken'zie, one of the largest rivers in the world, entirely within the Dominion of Canada, rises in Great Slave Lake, and flows in a direction N.N.W. to the Arctic Ocean. In the open season (June to October) it is navigable to Fort Simpson, where there are rapids, above which it is further navigable to Great Slave Lake. Its three great head-streams are the Peace, Athabasca, and English rivers; its extreme length is 2300 miles. Part of the upper basin is very fertile, and lignite beds occur here and there along the banks. The M. is named after Alexander Mackenzie, who first navigated it in 1789.

Mackenzie, Sir George, nephew of the Earl of Seaforth, was born at Dundee in 1636, and studied at Aberdeen, St. Andrews, and Bourges in France, then 'the Athens of Scottish lawyers.' In 1661 he defended the Marquis of Argyll against high-treason, and in the same year was appointed Justice-depute. In 1669, being then knighted, he was returned to Parliament for Ross-shire, and became king's advocate in 1677. Though he wrote *A Vindication of the Government of Charles II.*, he was not able to wipe out the epithet, 'bluidy Mackenzie,' which he earned by his inexorable attitude towards the Covenanters. M. wrote what Mr. Hill Burton calls 'some unpoetic' poetry, and certain *Essays* (Lond. 1713), of which the very titles convey a premonition of the jejune and didactic, as *Solitude preferred to Public Employment; On Moral Gallantry*, &c., yet his literary power was probably greater than might be inferred from these efforts, if Dryden's phrase, 'that noble wit of Scotland,' be more than idle panegyric. His *Discourse on the Laws and Customs of Scotland in Matters Criminal* appeared in 1678, his *Institutions of the Laws of Scotland* in 1684, and his *Complete Works* (Edinb. 2 vols. fol. 1716). He died in London, 2d May 1691. See *Memoirs of Sir G. M.*

Mackenzie, Henry, novelist and essayist; was born in Edinburgh in 1745. He was educated for the law, and became an attorney in the Scottish Court of Exchequer. He published the *Man of Feeling* (1771); *The Man of the World* (1773); and *Julia de Roubigné* (1777). Of these novels, which are written in the sentimental style of the 18th c., the first is his best. They display keen sensibility, high moral feeling, delicate appreciation of character, and a refined and graceful style. But unfortunately they are no longer read. M. started two periodicals, *The Mirror* (1779) and *The Lounger* (1785), to which he contributed ninety-nine articles, including the touching *Story of La Roche*. He received the comptrollership of taxes for Scotland from Mr. Pitt for literary services to the Tory party. M. died 14th January 1831. His collected works were published in 8 vols. (1808). A French translation by F. Bonnet appeared in Paris (5 vols. 1825). See Sir W. Scott's *Eminent Novelists*.

Mack'erel (*Scomber*) a genus of Teleostean fishes, included in the family *Scomberidæ*, in the members of which spiny rays exist in the first dorsal fin, and in the front of the remaining fins. The body of the common M. (*S. scomber*) is long, and tapers markedly at either extremity. The mouth and upper jaw are prominent. The colour is a bluish-black, marked with a green metallic lustre, the black tint being most prominent in the form of transverse bands above, whilst the under parts are of silvery whiteness. The hinder of the two dorsal fins is split up into a series of small fins extending along the back, and the anal fin is similarly divided. The M. is a migratory fish, and appears in vast shoals during May and June on the English coasts; on the west coast of Scotland it is most plentiful in July and August. It also occurs on the N. American coast, and in the Mediterranean Sea. The M. is captured in long 'drift' nets, which are sunk at night and fished in the morning. When caught by line, any brightly-coloured substance, such as a bit of red flannel, serves as a bait, though the usual bait is a thin strip of the skin of the M. itself. The M. entangles itself in the nets by thrusting its head through the meshes, and is caught by its prominent gill-covers on endeavouring to retract itself. The spawning-season extends over May and June. The flesh is somewhat strong-tasted; the celebrated *sarum* or 'relish' of the Romans being made from the fat of the M. The Horse-M. is described under the head of SCAD (q. v.), and another species is the *S. colias*, or Spanish M.; that found on the N. States' coast being the *S. vernalis*.

Mack'intosh, Sir James, philosopher, politician, and historian, was born at Aldourie, Inverness-shire, Scotland, 24th October 1765. He graduated M.A. at King's College, Aberdeen, in 1784, and M.D. at Edinburgh in 1787. Subsequently medicine was exchanged for law, and after a successful career at the bar, notable for his brilliant conduct of the trial of Peltier, he was sent in 1806 to Bombay as recorder. On his return he became M.P. for Nairn, in the interest of the Whig party, and in 1818 Professor of Law at Haileybury College. He died in London, 30th May 1832. M.'s reputation was once much greater than it is. Macaulay speaks of him with a grave respect, which surprises those who still look into his writings. His eloquence is diffuse rather than brilliant, and neither in his parliamentary speeches nor in his philosophical treatises do we find any trace of a profound or penetrating genius. His chief works are *Vindiciæ Gallicæ*, which first brought him into public notice, and was designed for a reply to Burke's condemnation of the French Revolution; his once famous *Dissertation On the Progress of Ethical Philosophy*, in the *Encyclopædia Britannica*; a *History of England*; and a series of articles in the *Edinburgh Review*. M.'s *Miscellaneous Works* were published in 3 vols. (1846). See *Memoirs of the Life of the Hon. Sir J. M.*, edited by his son (2 vols. Lond. 1835).

Macintyre', Duncan Ban, commonly called by his countrymen *Donacha Ban* ('fair-haired Duncan'), one of the best Gaelic poets of modern times, was born in Glenorchy, Argyleshire, 20th March 1724, became forester first to the Earl of Breadalbane, afterwards to the Duke of Argyll, and entered late in life the city-guard of Edinburgh, where he died, October 1812. His poems were first published at Edinburgh in 1768, under the title *Orain Ghaidhealach, le Donacha Mac-an-t-soir* ('Gaelic Songs, by Duncan Macintyre'). They were reprinted in 1790, and again in 1804. In the opinion of Celtic critics, M. is a master of all kinds of lyric composition, serious and humorous. His diction is pure, and his versification harmonious. A monument has been erected to his memory on a hill near Dalmally, commanding a fine view of Loch Awe.

Macknight', Rev. James, D.D., was born at Irvine, Ayrshire, September 17, 1721, studied at the Universities of Glasgow and Leyden, became parish minister of Maybole (1753), and of Jedburgh (1767), whence he was translated to Edinburgh (1772). In 1756 appeared his *Harmony of the Four Gospels*, of which a translation was made into Hindustani; in 1763 *The Truths of the Gospel History*, and in 1775 *A New Translation of the Apostolical Epistles*, all of which exhibited painstaking scholarship. See *Life of J. M.*, by his son, at the beginning of the *Epistles*.

Maclau'rin, Colin, a celebrated Scotch mathematician, was born at Kilmodan, near Inverary, in February 1698. He was chosen Professor of Mathematics at Marischal College, Aberdeen, when only nineteen years old. In 1722 he travelled abroad as tutor to Lord Polwarth's son, and at this time wrote a treatise on the percussion of bodies, which gained the prize of the Royal Academy of Sciences at Paris. In 1725 he became Professor of Mathematics at Edinburgh. In 1745 he superintended the fortification of Edinburgh against Prince Charles Edward, on whose entrance he was forced to remove to York, where he died, June 14, 1746. M.'s principal works are *Geometria Organica* (1720), which secured him the esteem of Newton, *A Treatise on Fluxions* (1742), and two posthumous works, entitled *A Treatise on Algebra* (1748), and *Exposition of the Philosophical Discoveries of Sir Isaac Newton* (1748). He wrote several memoirs, one of which, on the theory of the tides, shared with Euler's and Bernoulli's the prize offered by the French Academy of Science in 1740.

Macle, a mineral variety of Andalusite, which shows a tessellated or cruciform structure when broken across and polished. It is essentially a silicate of alumina, with a little magnesia and iron oxide. *Macles* is also a technical term in crystallography applied to *twin* or *compound* crystals, which are united according to some definite law.

Macleod', Norman, D.D., after Chalmers the most popular Scottish divine of the 19th c., belonged to a family that has given numerous sons to the service of the Church. He was born June 3, 1812, at Campbelltown, Argyleshire, where his father was minister; was educated at Glasgow and Edinburgh; spent some time in Germany as travelling tutor, and in 1838 became minister of the parish of Loudoun in Ayrshire, whence in 1843 he was translated to Dalkeith. In 1845 he visited Canada on ecclesiastical business, and in 1851 accepted a call to the Barony Church, Glasgow. In 1854 he was appointed one of the Queen's Chaplains for Scotland, and Dean of the Order of the Thistle; in 1860 undertook the editorship of a new monthly magazine, *Good Words*, which under his management became one of the greatest successes in periodical literature; and in 1866, along with the Rev. Dr. Watson of Dundee, was selected by the General Assembly to inspect the Scottish Church Missions in India. His visit to the East in 1867 made an indelible impression on his mind, and gave a tone to all his after thought. In 1869 he was chosen Moderator of the General Assembly of the Church of Scotland. He died 16th June 1872. M. was a large-hearted and warm-hearted man. His sympathies were uncontrollably catholic, and he could not be brought to hate anything or anybody that God had made. Not possessed of a subtle or original mind, his intellectual endowments were nevertheless rich and various, and in the pulpit no Scottish preacher equalled him in easy, unaffected, and impressive eloquence. He approached most nearly to genius through his sense of humour, though both in sermon and story he occasionally showed himself a master of pathos. The Scottish people to a man loved and trusted him, and far beyond the border, in England, America, and India, an affectionate admiration was expressed for one who in the narrow ways of Presbyterianism moved with as free a step as the most liberal of Anglican divines. His piety, though unconventional and unostentatious, was sincere and strong. See *Memoir of Norman Macleod, D.D.*, by his brother the Rev. Donald Macleod (2 vols. 1876).

Maclise', Daniel, R.A., was born at Cork, of Scotch parents, January 25, 1811, became a student at the London Royal Academy in 1828, and carried off all medals he competed for. He was elected in 1835 Associate of the Royal Academy, and in 1841 R.A. In 1866 the presidency of the Academy was offered to M.; but declined. He died 25th April 1870. The 'Play Scene in Hamlet,' 'Shakespeare's Seven Ages,' 'The Marriage of Strongbow and Eva,' 'The Spirit of Chivalry,' 'The Spirit of Justice,' 'The Sleeping Beauty,' 'Scene from Comus,' and 'Caxton showing to Edward IV. his First Proof-sheet' are among his most famous pictures. He succeeded specially in the skilful treatment of a class of subjects he may be said to have originated—combining the historical with the romantic. He executed fine portraits of Lytton, Dickens, Macready, &c. See *Pictures by M.* (11 steel plates), with biographical sketch by Jas. Dafforne (Lond. 1875).

Macmahon, Marie Edme Patrice Maurice, Duc de Magenta, descended from an Irish family which followed the fortunes of the Stuarts to France, was the son of Charles Laure de M., created a peer in 1827. He was born at Sully (Saône-et-Loire), November 28, 1808, entered the military service of France in 1825, was sent to Algeria in 1830, and by 1848 had become General of Brigade. He succeeded Canrobert at the Crimea (1855), and behaved with gallantry in front of the Malakoff. In the Italian war of 1859 his success at Magenta obtained for him the office of Marshal and the rank of Duc. Appointed Governor-General of Algeria (September 1, 1864), he proved himself to be a most incompetent administrator. M. took command of the first army corps, with headquarters at Strassburg, upon the outbreak of the Franco-German war. He was defeated at Wörth and captured at Sedan, and at the conclusion of the war operated against the Commune. On May 24, 1873, he succeeded M. Thiers as President of the Republic, and declared in October of the same year that 'he would not separate himself from the Conservative party which placed him in power.' Next month his tenure of office was extended until 1880. But to the Parliament which elected him by a majority of 68, there succeeded one having a Republican majority of 300. The Conservative pledge of M. could not be maintained. He tried the governments selected from this majority, but (May 16, 1877) in an imperious letter to his Prime Minister he rudely dismissed the Cabinet, called together one composed from the Bonapartist, Orleanist, and Legitimist ranks, and consented to a dissolution of Parliament. At Bourges (July 28th) he proclaimed his intention of keeping on constitutional ground at home, but the reactionary policy of his government, and their ultramontane leanings, filled France with apprehension during the months preceding the election of October 1877. M. is a brave soldier, but conspicuously unfit for political life.

Macmill'an, Daniel and **Alexander**, the founders of a celebrated English bookselling and publishing firm. The former was born in the island of Arran in 1813, served his apprenticeship with Mr. Maxwell Dick of Irvine, Ayrshire, and was engaged successively with Thomas Aitkinson and Co., with Mr. E. Johnson of Cambridge, and for seven years with Messrs. Seeley. Alexander M., born at Irvine in October 1818, was also for several years in the employment of Messrs. Seeley. In September 1843, the two brothers began business in Cambridge; a year after the death of Daniel in 1857, a branch was opened in London; and in 1863 the whole publishing business was transferred to London. In the latter year Alexander M. was appointed publisher to the University of Oxford, and has signalised his office by a series of the most scholarly publications in all departments of learning ever issued from the English press. The services of the firm to the cause of education have been unspeakably great. Not to speak of their admirable text-books in classics and mathematics, they have practically revolutionised the teaching of English in all the great schools of the nation, and placed the study of Chaucer side by side with that of Homer. *Macmillan's Magazine*, started in 1859, is still (1878) a powerful and flourishing periodical. It has been distinguished from the first by its solidity, culture, earnestness, and purity of sentiment.

Macnee', Sir Daniel, a distinguished Scottish portrait painter, was born in Stirlingshire about 1806, studied at the Scottish Academy under Sir W. Allan, settled in Glasgow, and received one of the gold medals at the International Exhibition, Paris, 1855, for his portrait of the Rev. Dr. Wardlaw. A characteristic work is his portrait of Brougham, in the Parliament House, Edinburgh. Among his sitters have been many of the most illustrious Englishmen, as well as Scotchmen, of his day. M. was appointed President of the Royal Scottish Academy in 1876.

Mâ'con (the *Matisco* of Cæsar), chief town of the French department Saône-et-Loire, on the right bank of the Saône, 39

miles N. of Lyon by rail. It has two river harbours, with fine quays, and contains the ruined cathedral of St. Vincent, a prefecture, palace of justice, hôtel-de-ville with a public library of 7000 vols., and some interesting Roman remains. There are manufactures of watches, woollens, velvet, leather, faience, and hardwares, and an important trade in Burgundy Wines (q. v.), grain, and cattle. Pop. (1872) 15,613,

Ma'con, a city of Georgia, U.S., on the Ocmulgee, at the junction of five railways, 80 miles S.E. of Atlanta. It has seven churches, a Baptist college, a Wesleyan Female College, six banks, and four newspapers. Pop. (1870) 10,813.

Macpher'son, James, born in the parish of Ruthven, Badenoch, Inverness-shire, in 1738, was educated at the Universities of Aberdeen and Edinburgh, and returned as a schoolmaster to his native place. In 1758 he published an indifferent poem called the *Highlander*, followed by *Death* and the *Hunter*, both of them equally destitute of enduring poetic merit. In 1759 he became tutor in the family of Graham of Balgowan, and it was during this period that he met Mr. Home and submitted to him some short translations from ancient poems in the Gaelic language. In 1760, at the desire of Home and Blair, he published *Fragments of Ancient Poetry collected in the Highlands of Scotland*, consisting of sixteen pieces, which he held to be episodes of a great work relating to the wars of Fingal. On the strength of this publication he was prevailed upon to undertake a journey of research throughout the Highlands. The result was the appearance in 1762 of *Fingal, an Ancient Epic Poem, in six books, together with several other poems composed by Ossian, the son of Fingal, translated from the Gaelic language by James M.* In 1763 appeared *Temora, an Epic Poem, in eight books.* The literary world was taken by storm, the 'translations' were retranslated into French, German, and Italian, and a great controversy arose as to their genuineness, which continues to be periodically agitated unto this day. (See OSSIAN.) Through the Earl of Bute M. received in 1764 a civil appointment in N. America, and in 1766 he returned to act as a political writer in behalf of Government. His *Introduction to the History of Great Britain and Ireland* appeared in 1771, his *History of Great Britain from the Restoration to the Accession of the House of Hanover* in 1773. He was appointed agent for the Nabob of Arcot (1780), and returned to Parliament for Camelford. M. died at his estate of Belleville, Inverness-shire, 17th February 1796, and was buried at his own cost in Westminster Abbey. See *Dissertations to the Poems of Ossian* (1870), by the Rev. Archibald Clerk.

Macread'y, William Charles, an English tragedian, was born in London, March 3, 1793, and educated at Rugby. In June 1810 he made his *début* at Birmingham as Romeo. He made his first London appearance at Covent Garden, September 16, 1816, as Orestes in the *Distressed Mother*. Among his earliest triumphs were his Rob Roy and Mirandola. In 1822 and 1828 he played in Paris with much success. M. became manager in succession of Covent Garden and Drury Lane, and his rule was characterised by an attempt to elevate the public taste, even at personal loss. He produced the dramas of Bulwer, Talfourd, Knowles, and Browning, and took such parts as Virginius, Caius Gracchus, and Richelieu with great success. He shone in Macbeth and Coriolanus. One of the most thoughtful and scholarly of actors, he became, though in a widely different style, the legitimate successor of Kean. He visited America in 1826, 1843, and 1849. M. retired February 26, 1851, and was entertained at a banquet on March 1, graced by the presence of Dickens, Thackeray, Lytton, and a noble assemblage. He died April 29, 1873. See his *Reminiscences and Diary*, edited by Sir Frederick Pollock (2 vols. 1875).

Macro'bius, Ambro'sius Aure'lius Theodo'sius, a Latin grammarian and antiquarian, flourished at the beginning of the 5th c., in the age of Honorius and Theodosius. He was probably a Greek. His extant works are the *Saturnalia*, in seven books, a series of dialogues in imitation of those of Plato, in which many historical, mythological, and antiquarian questions are discussed, four of the books being devoted to criticisms of Virgil; the *Commentarius in Somnium Scipionis*, embodying many of the views of the new Platonists; and *De Differentiis et Societatibus Graci Latinique Verbi*, which only survives in an abridged form. The best edition of M. is that of Gronovius (1670, reprinted 1736).

Macrothe'rium (Gr. 'large beast'), a fossil genus of Edentate mammalia, the remains of which occur in recent deposits in S. America and in the Miocene formations of France. It is one of the oldest of Edentate fossils, is widely distributed, and appears to have attained a gigantic size. No outer armour or hard parts existed, and the teeth wanted roots and were destitute of enamel.

Mac'tra, a genus of *Lamellibranchiate* (q. v.) mollusca, forming the type of the family *Mactridæ*. The shell is trigonal or three-sided and equivalve; the hinge has two prominent teeth. The mantle is open in front, and the breathing siphons are united and have fringed orifices. The foot is compressed. The genus M. includes several well-known species, both of recent and fossil kind. *M. stultorum* is a familiar living species.

Mac'ulæ is the term applied by Willan and Bateman to diseases of the pigmentary structure of the skin, the seat of the alterations being in the rate mucosum and papillary layer of the derma. The morbid appearances may depend upon original organisation, alteration of function, alteration of nutrition, or chemical coloration. *Treatment*—Iodide of potassium internally and as a local application, and lotions of the bichloride of mercury with or without the hydrochlorate of ammonia.

Madagas'car, a large island in the Indian Ocean, separated from Africa by the Mozambique Channel, which has a minimum width of 270 miles. From Cape Amber, in 11° 27′ S. lat., to Cape St. Mary, in 25° 38′ S. lat., the extreme length of M. is 940 miles. Its greatest breadth is 360 miles, and its area about 225,000 square miles. M. is traversed by chains of lofty and rugged mountains, which for the most part run parallel to the axis of the island, but the coast is usually low, the W. shore being marshy and the E. shore sandy and barren. From the coast on both sides the mountains rise in tiers to the centre of the island, which consists of an elevated plateau called the Imérina. It is bounded on the S.W. by the Ankárat range, the highest mountains in M., which reach a height of 8950 feet. The mountains terminate before reaching the S. end of the island, which consists of a sandy terrace. The central region abounds with craters and other evidences of volcanic action, and vast beds of red clay, resembling those of the Seychelles (q. v.), are found in other parts. The rivers are unimportant, the largest being the Betsiboka, which has a course of 400 miles, and is navigable by boats for 150 miles. Shallow lakes, many of which are salt, skirt the E. and W. shores, and the canalisation of the former was commenced by Radama I. M. possesses abundance of iron, which is found near the surface, as well as copper, lead, and manganese. Its forests yield magnificent timber, and the island is capable of producing rich tropical crops. Of these rice is the staple, but maize, tobacco, and the sugar-cane are also cultivated. The annual value of the export and import trade is now about £500,000, and is steadily increasing. Cattle, hides, beeswax, and gums are the principal exports, and are sent chiefly to Mauritius.

The Malagasy, or inhabitants of M., have been generally believed to belong to at least two distinct races—the Negrito and the Malay. Dr. Mullens, however, is of opinion that they are homogeneous, and that the differences in complexion, &c., are due to residence at a low or high level, the mountain tribes being much fairer than those of the sea-coast. He divides them into three great clans, the Hovas (pronounced Hoovas), Betsimisarakas, and Sakalavas. The first, though at one time despised and oppressed, now rule the whole island. Sir Bartle Frere considered them to bear a striking resemblance to the Japanese, but they are evidently of Malay origin. 'The Malagasy,' says Dr. Mullens, 'are a Malay people, following Malay customs, some of them possessing Malay eyes and hair and features, and all of them speaking a Malay tongue at the present hour.' The island is ruled by a Hova sovereign, residing at Antananarivo (q. v.), in Imérina, and the government is now in some degree constitutional, though the old feudal system is still in force. The population of M., which Ellis estimated at five and a half millions, Grandidier puts down at not more than four millions, and Mullens at only two and a half millions, of whom the Hovas constitute two-thirds.

The fauna of M. includes the curious animals belonging to the family Lemuridæ (q. v.), and the yet more singular Aye-aye (q. v.). Crocodiles infest the rivers and marshes, and serpents of great size are numerous, though few of them are venomous. In the sandy plains at the S. extremity of the island, the French explorer Grandidier discovered abundant remains of a small

species of hippopotamus, an animal which does not now exist in M. He also found bones and egg-shells of three species of the æpyornis, an extinct bird, believed to be allied to the Dinornis (q. v.), and which laid an egg even larger than that of the latter. The flora of M. contains many plants not found elsewhere, such as the peculiar lattice-leaf plant (*Ouvirandra fenestralis*) and the traveller's tree (*Urania speciosa*), which contains a supply of water in the base of its leaf-stalks.

The earliest mention of M. is in the 13th c., in the writings of Marco Polo, and in those of Edrisi, an Arab geographer, quoted by Abulfeda (q. v.). In 1506 it was accidentally discovered by the Portuguese, who in 1508 made an unsuccessful attempt to form a settlement near Cape St. Mary. In 1642 the French Société de l'Orient sent an expedition to the island, and since then the French have been unremitting, though unsuccessful, in their endeavours to gain possession of it. They still hold the island of Ste. Marie on the N.E. coast, and that of Nosibé ('big island') on the N.W. In 1816 the English established relations with the Hova King, Radama I., with a view to the abolition of the slave trade, which took place in 1817. The first missionaries arrived in 1820, being sent by the London Missionary Society, and they met with great success. The enlightened Radama, however, died in 1828, and the throne was usurped by Ranavalo I., one of his inferior wives. Under her the idols were restored, Christianity prohibited, the missionaries expelled from the island, and the native converts subjected to the bitterest persecution, many of them being speared, hurled from a precipice, burned, or boiled alive. This Malagasy Athaliah died in 1861, and her son, Radama II., favoured the Christians, but he was strangled in 1863. His widow, Rasoherina, succeeded him, and under her rule the Christians were not only protected but encouraged, and their numbers greatly increased. She died in 1868, and was succeeded by her sister, Ranavalo II., the present sovereign. At her coronation the Bible played a conspicuous and honoured part, and in September 1869, she issued an order for the destruction of all the idols in the realm, and this was very generally carried out. Since then Christianity and civilisation have made most rapid strides in M., which seems to have a great future before it.

See the Rev. W. Ellis's *Three Visits to Madagascar* (1858), *Madagascar Revisited* (1867), *The Martyr Church of Madagascar* (1868); six articles by E. Blanchard in the *Revue des Deux Mondes* for 1872; *Twelve Months in Madagascar*, by the Rev. Dr. Mullens (1875), and a paper by the same author in the *Journal of the Anthropological Institute of Great Britain*, vol. v. (1876); *Histoire Physique, Naturelle, et Politique de Madagascar*, by M. Alfred Grandidier, in 28 vols., now (1877) in course of publication at Paris.

Mad Apple is a name sometimes applied to the fruits of *Solanum esculentum*, but they are more generally known as aubergines or bringals, and are used as a culinary esculent.

Maddalo'ni, a town in S. Italy, province of Caserta, 26½ miles by rail N.N.E. of Naples, which is partly supplied from its large weekly markets. Pop. (1874) 18,767. 2½ miles N.E. is the great Carolino aqueduct, 30 miles long, which waters the gardens of Caserta.

Madd'en, Sir Frederic, an English scholar of great merit, born in 1801, was Keeper of the Department of Manuscripts in the British Museum from 1837 to 1866, and died 8th March 1873. In the course of a laborious life M. edited numerous historical, genealogical, and literary works, among which may be mentioned *The Household Book of the Princess Mary, Havelok the Dane, William and the Werwolf, Syr Gawayne, Gesta Romanorum, The Wycliffite Version of the Holy Scriptures, Layamon's Brut*, and *Matthew Paris's History of England*. He also wrote numerous archæological articles which have not been collected. All his work is thorough, scholar-like, critical, and fruitful. His edition of Layamon (q. v.) in particular, is one of the most valuable contributions ever made to the elucidation of the language and literature of 'Transition English.'

Madd'er. The M. of commerce is obtained from two only of the numerous species of *Rubia* to which the plants belong. These are *Rubia tinctorum*, cultivated in European countries, and *R. peregrina*, which yields the roots imported from the Levant. To these may be added *Munjeet*, the produce of *Rubia munjista*, cultivated in East India, and which yields the same tinctorial principles as the two species above mentioned. M. roots, when fresh, are from 1 to 2 feet in length, and about ¼ inch in thickness, with a yellow core, but reddish towards the circumference. The roots when collected are washed, and dried by artificial heat; they are freed from their shrivelled skin, and roughly pounded to a powder, in which form they are sent into the market. The cultivation of M. for use in dyeing has been prosecuted from time immemorial in the Levant, whence it spread to Greece, Italy, the S. of France, Alsace, Silesia, and Holland. For upwards of a century Avignon has been a most important centre of the cultivation, yielding in recent years fully one half of the entire quantity consumed. In dyeing and calico-printing M. root is used either simply powdered, or in the form of preparations known as *Garancine* (q. v.), *garanceux, flowers of M., M. extract*, and *alizarine*. The last only of these preparations, alizarine, is a definite chemical compound, the others being extracts containing alizarine and other tinctorial principles in a more or less concentrated form. Alizarine and purpurine are the two chief tinctorial principles present in M., and till the year 1868 they were obtained from that source alone. They are now, however, artificially prepared from anthracine, a product of coal-tar, with such striking success, that M. root has suddenly fallen from a place of the first importance as a dye-stuff to a position of comparative indifference, and the cultivation has decreased with great rapidity. In calico-printing artificial alizarine (which as a commercial article contains a certain proportion of purpurine) is almost exclusively employed; but in Turkey-red dyeing, and in wool dyeing M. and its preparations are still employed. In the processes of Calico-Printing (q. v.), M. was formerly employed only as a 'dye-colour': that is, the cloth was printed with mordants, and afterwards dyed in a beck containing a hot extract of M. root; but artificial alizarine is treated as a pigment colour, and topically fixed by steaming. As a dye-colour, by means of suitable mordants, numerous exceedingly fast and solid shades of colour can be obtained with M., including a range of pinks, scarlets, reds, purples, browns, chocolates, and black. The imports into Great Britain in 1876 were 25,570 cwts. of M., valued at £52,073; 33,824 cwts. of M. root, valued at £45,093; and 15,398 cwts. of garancine, of the value of £142,038.

Madder Lake is a brilliant red pigment, the chief constituent of which is purpurine, obtained by treating M. with a boiling solution of alum, adding a little carbonate of soda, filtering, and collecting and drying the precipitate which results, and which is a compound of alumina and the tinctorial substance.

Madei'ra (Sp. *Madera*), an island belonging to Portugal, in the N. Atlantic Ocean, 280 miles N. of Teneriffe, in the Canaries, 620 S.W. of Lisbon, and 390 W. of the African coast, lat. 32° 36′—32° 53′ N., and long. 16° 40′—17° 20′ W. Area 345 sq. miles; pop. (December 31, 1876) 123,841, including the islet, Santo Porto, with 1760. M. is of volcanic origin, and has a wildly irregular surface, rising in Pico Ruivo to 6050 feet, and sinking in many rich and singularly deep valleys, of which the most notable is the Curral, 2060 feet from brink to bottom. The coast is precipitous, and indented by few harbours, the only port and town being Funchal (q. v.). The climate is remarkably fine, and M. is one of the chief resorts of pulmonary patients; the average temperature in summer is 74°, and in winter 64° F., and earthquakes are of rare occurrence. Among the products are rice, sugar, coffee, bananas, wheat, chestnuts, pineapples, oranges, and M. wine. Since the grape disease (*Phylloxera Vastatrix*) the vine-cultivation, for which M. was long famous, has declined greatly, but is again increasing. In 1876 the value of wine (220,365 gallons) exported was £108,405, of which considerably more than a half went to Great Britain; of sugar, £25,235; of embroidery, £10,135; of onions, £1383; of coal re-exported, £41,565. The total exports amounted to £217,181; and the imports, chiefly coal, cottons, woollens, Indian corn, wheat, and iron wares, to £295,101. There entered the port of Funchal (1876) 606 vessels of 449,496 tons (424 British, of 371,876 tons), and cleared 602 of 448,987 (421 British, of 371,507). In 1876 M. had 22,642 oxen, 17,321 sheep, and 269 horses. The cattle are mostly stall-fed, and fodder is not abundant. The inhabitants are a mixed Portuguese, Arab, and Negro race. M., identified by some with the ancient *Insulæ Purpuræ*, was discovered by the Genoese in the 14th c. A Florentine chart of 1351 calls it the *Isola do Legnami* ('island of

timber'), a name which the Portuguese who found their way hither in 1418 translated into *Madeira* ('timber'). See Schultze, *Die Insel M.* (Stuttg. 1864), and White, *M., its Climate and Scenery*.

Madeira, a navigable river of Brazil, is formed by the confluence of the Beni and Marmora, which rise in Bolivia. It joins the Amazon after a course of 700 miles, some 200 of which are obstructed by cataracts.

Madeira Wines. The qualities and varieties of M. W. are numerous, and differ very widely in commercial value. The kinds chiefly known and appreciated in European markets are Malmsey, Tinto, Sercial, Bual, and Palhetinho, and the highest qualities are produced only on the S. side of the islands. M. W. are naturally rich in alcohol, but those sent to the British market are, like most alcoholic wines, artificially brandied. They are generally fine keeping wines, improving greatly in bouquet by age, and a good Madeira can never be too long kept. Their mellowness and flavour are developed by heat and shaking, on which account the wines are frequently sent on voyages to the East or West Indies, and an East Indian Madeira is regarded as a great luxury.

Madhava Rao, Sir, K.C.S.I., a distinguished native Indian statesman, who was long *dewan* or finance minister of the State of Travancore, which he made the most flourishing perhaps in the peninsula. He left Travancore in 1872, and for some time filled the same office at Indore, but on the deposition of the Guicowar in 1875 he was appointed regent to the young prince, in which capacity he hospitably entertained the Prince of Wales.

Madia, a coarse clammy annual (*M. sativa*), forming a genus of *Compositæ*, and a native of the countries of Chili N. to California, but has been introduced into cultivation in various parts of Europe, &c., for the sake of its seeds, which yield a good oil, and form also a nourishing oil-cake for cattle.

Mad'ison, a city in Indiana, U.S., on the Ohio, 90 miles below Cincinnati, 80 miles S.S.E. of Indianapolis by rail. It has fifteen churches, three banks, three newspapers, and extensive trade in pork and provisions. Tanning and brewing are carried on, also the manufacture of flour and machinery. Pop. (1870) 10,709.—**M.**, the capital of Wisconsin, U.S., situated between two lakes at the junction of five lines of railway, 75 miles W. of Milwaukee. It has a handsome state-house, a university, twelve churches, three banks, two daily and eight weekly newspapers. Agricultural implements, carriages, woollens, and flour are manufactured. Pop. (1870) 9176.

Madison, James, fourth President of the United States, was born at Port Conway in Virginia, March 16th, 1751, and graduated at Princeton in 1771. In 1776 he entered the Virginian Assembly, where he struggled persistently for the removal of Dissenters' disabilities, became a member of the council of state in November 1777, and of Congress in March 1780. During the national convention of 1787, he took a great part in framing the constitution of the United States, and ably advocated its principles in the pages of the *Federalist*. From 1792 he was the avowed leader of the Republican party, in 1798 led the Virginia legislature in its opposition to the 'alien and sedition laws' of the Union, and during Jefferson's (q. v.) term of office held the post of Secretary of State. On the 4th March 1809, M. was made President, and on the 18th June 1812, though personally in favour of conciliation, consented to a declaration of war against England. His active measures led to his re-election in 1813, after which he devoted himself to restoring public tranquillity, and retired from public life March 4, 1817. He died at his estate of Montpelier, June 28, 1836. M. was a prudent statesman, without eloquence or genius; and his moderation and integrity were rewarded by the entire confidence of the country.

Mad'oc, a Welsh prince, the second son of Owen Gwynnedd, who according to Cymric tradition sailed westward with a small fleet in 1170, and after some weeks' voyaging landed on a fertile continent peopled by a race that differed greatly from Europeans. After a long sojourn he returned to Wales, leaving behind 120 of his comrades, and having equipped a second fleet of ten vessels, he set sail once more and was never after heard of. Catlin in his *Letters on the N. American Indians* (1841) regards the Tuscaroras as a mixed race, descended from these old Welshmen and the American aborigines; but Humboldt, though by no means wholly rejecting the tradition, points out that the statement that the bard Meredith celebrated the wanderings of M. fifteen years before Columbus' discovery requires confirmation, the first documentary notice of them occurring in Lloyd's *Historie of Cambria* (1584). M. is the hero of one of Southey's epics.

Madonn'a (Ital. *Mia donna*, 'My Lady') is a name given to the Virgin, generally in art. Some of the early fathers, particularly St. Ambrose, held the Mother of God to possess perfection of corporeal as well as of moral beauty. The representation of the Virgin therefore became the grand aim of Christian art. The first mention of her worship occurs in the writings of St. Epiphanius, who died in 403; and the first mentioned picture of her (declared an authentic likeness) belongs to nearly the same date. Her effigy was stamped on Greek coins about 886 A.D. The M. was first represented alone, her face resembling Christ's, hands crossed on the bosom, and eyes lifted to heaven. Towards the close of the 5th c. she was painted with the infant Jesus, sitting on a throne. Late in art she was again depicted alone. See Mrs. Jameson's *Legends of the M.* (Lond. 1852).

Madoqua (*Neotragus saltiana*), a genus of antelopes occurring in rocky regions in Abyssinia, and noted as being one of the smallest members of its group. It rarely exceeds 14 inches in height and has long legs. It is of a silvery grey colour above, the back being a chestnut-brown, and the under parts pure white. The M. was discovered by Bruce, the Abyssinian traveller.

Madras' Presidency, a province of British India, which occupies the S. portion of the peninsula. On three sides it is bounded by the sea; but it is shut in on the N. by the Bombay Presidency, the dominions of the Nizam of Hyderabad, the Central Provinces, and the Orissa Division of Bengal. Its coherence is interrupted by the Native State of Mysore, which covers much of the hilly interior; and a long narrow strip runs up the E. coast from the mouth of the Godavery to the Chilka Lake, 6° of latitude farther than on the W. Total area 138,318 sq. miles; pop. (1871) 31,597,872, apart from the Native States of Travancore and Cochin. The principal mountains are the E. and W. Ghauts (q. v.), which are joined towards the S. by the Neilgherry range. The rivers are the Godavery, Kistna, Pennar, and Cauvery, which all open E. towards the Bay of Bengal. The interior is mountainous and covered with jungle; on the W. coast only a narrow strip of fertile land intervenes between the Ghauts and the sea, and the rainfall here is excessive. On the E. coasts, there are plains where the rainfall does not exceed 30 inches, the deltas of the rivers are annually turned into sheets of green rice, by natural floods and by irrigation. Of the total area about one-third is cultivated. The staple crops are rice, which is styled a wet crop, and the following dry crops:—*Cholum* (a kind of maize), *cumboo* (a millet), *ragee* and *varagu* for food grains; *gingelly* among oilseeds; and cotton, tobacco, indigo, sugar-cane, chillies, plaintains, and betel leaf. The cocoa-nut and areca-nut palms are especially common on the W. coast, where the hill slopes also yield pepper and cardamoms. Into the mountainous interior European enterprise has introduced coffee, tea, cinchona, and potatoes. There are important government irrigation works at the head of the deltas of all the great rivers, which irrigated in 1875 more than four and a half million acres, paying to government a total land revenue of nearly two millions sterling. In addition there is the Madras Irrigation Company, which has spent a guaranteed capital of more than one and a half million. Many of the canals are also used for navigation. Despite these works and innumerable tanks, the entire region has suffered frightfully from the famine of 1876-77. The most distressed tracts were in the N. and the hilly interior, into which it has been found almost impossible to import adequate supplies of grain. For many months Government supported, directly or indirectly, about 2,000,000 souls, but the mortality from actual starvation, and from diseases engendered by want, has been very high. The Presidency possesses about 1700 miles of seaboard, but not a single really good harbour. In the year 1874-75, the total sea-borne trade amounted to sixteen millions sterling; 34,189 ships entered, with a tonnage of 2,499,000. This, however, includes the coasting trade, which is carried on in native craft averaging under 40 tons burden. The foreign imports proper were valued at £3,812,000, of which cotton twist and cotton piece goods formed more than one half; the foreign exports were valued at £6,794,000, chiefly raw

cotton, coffee, grain, indigo, hides, and oil. The principal ports are Madras, Tuticorin, Mangalore, Calicut, Cochin, and Coconada. The manufactures are now insignificant, though it was the weaving of muslins, prints, &c., which first attracted the British to the Coromandel or E. coast. There are specialities of jewellery and carving at Trichinopoly and Vizagapatam. There is little mineral wealth. Iron was at one time worked by European capital at several places, all now abandoned; and in the district of Salem there are immense beds of magnetic ore. Coal is only known to exist near Ellore, in the extreme N.E. In the Wynaud (q. v.) there is great expectation of valuable gold deposits. The most important industry is the manufacture of salt, conducted by evaporation along the E. coast, which forms a government monopoly. About 200,000 tons are made annually; the duty amounts to almost exactly ½d. per lb. There are altogether about 16,000 miles of roads. In 1875 there were 1075 miles of railway open, belonging to the Madras and S. Indian Companies, on which a total of £12,730,000 had been expended; the net earnings were £228,767. The Madras Railway connects Madras City with Bombay, Bangalore, Ootacamund on the Neilgherries, and Beypore on the E. coast; the S. Indian line goes due S. to Tuticorin.

Of the total pop. 92·3 per cent. are Hindus, mostly of the Sivite sect; 5·9 per cent. are Mohammedans, most numerous on the Malabar coast; and 501,627 souls, or 1·5 per cent., are native Christians, most numerous in Tinnevelly, Madura, and Tanjore. Among the Hindus, the higher castes are very thinly represented, there being only 547,000 Brahmins, and 190,000 Kshatriyas or Rajputs. The average density of the pop. is 226 per sq. mile. The towns with over 50,000 inhabitants are Madras City, Trichinopoly, Tanjore, Madura, Bellary, and Salem.

The administration is vested in a Governor, together with an executive council of three members, of whom one must be the Commander-in-Chief. There is a Legislative Council of eight additional members, of whom three are natives. There are 21 districts, each with a Magistrate-Collector, and a Judge, who are members of the Covenanted Civil Service. In 1874–75 the imperial revenue was £8,823,000, of which £4,637,000 came from land, and £1,331,000 from salt. In addition, about £530,000 was raised locally. The total expenditure was £5,970,000, including £2,804,000 for the military department, and £400,000 for public works. The Madras army, which is under its own Commander-in-Chief, numbered 47,000 men, of whom 34,000 are natives; but the greater part were serving out of the Presidency, in Burmah, the Central Provinces, and even Bengal. The European troops are stationed at Fort St. George, St. Thomas Mount, Bellary, Trichinopoly, and Cannanore. The police numbered 23,451 officers and men, at a cost of £355,700. As regards education, there were altogether 9151 institutions, with 255,737 pupils, at a total cost of £256,800. There were six general and four professional colleges, with a total of 400 students; eleven normal schools, with 1421 pupils; and four special schools, with 849 pupils. In addition, there were six private colleges and five private normal schools. At the university there were 784 matriculations, or threefold the number ten years previously; 183 candidates passed the First Arts Examination; 55 for B.A.; 1 for M.A.; 9 in Law; 2 in Medicine; and 2 in Civil Engineering. The languages spoken almost entirely belong to the Dravidian (q. v.) family of the Turanian branch, by far the most wide-spread being Tamil and Telugu.

This tract of country was in early days occupied by great historical Hindu kingdoms, but the chief rulers, with whom European nations first came into contact, were the Mohammedan Nawab of the Carnatic and the Zamorin on the Malabar coast. The first English commercial settlement was at Masulipatam in 1620, and in 1639 permission was obtained to build Fort St. George, the nucleus of Madras city. For a short period, this Presidency was predominant over all the other English settlements in India; and during the latter half of the 18th c. the continuous wars with the French, and afterwards with Hyder Ali and his son, cause the Carnatic to figure largely in Indian history. But the genius of Clive surpassed that of Dupleix, Bassy, and Lally; Coote was a match for Hyder, and since the capture of Seringapatam, and the death of Tippoo, in 1799, Madras has been a country without a history. The first large acquisition of British territory was the cession of the N. Circars by the Mogul emperor in 1766. The Mahratta Rajah of Tanjore was deposed in 1799; and two years afterwards the Nawab of the Carnatic resigned his territory to the Company. His title became extinct in 1855, but his representative is still called Prince of Arcot, and is the first native nobleman of Madras. During the Sepoy Mutiny of 1857, the whole of this Presidency remained undisturbed. See Annual Blue Books on *The Moral and Material Progress of India* (Lond.); *Annual Administration Report of the M. P.* (Madras); Orme's *Military History of India*.

Madras City, or **Madras-patam** ('the city of the college' or 'school'), is co-extensive with the district of the same name, and is situated on the E. or Coromandel coast of India, 885 miles S.W. of Calcutta, 790 miles S.E. by rail of Bombay, and 513 miles N.E. by rail of Tuticorin in the extreme S. of the peninsula. Area of the municipality 27 sq. miles; number of houses 51,714; pop. (1871) 397,552; average density of pop. 14,724 per sq. mile. Fort St. George, originally founded in 1639, is the most conspicuous building, immediately facing the sea. It contains a large arsenal, as well as accommodation for native and European infantry. The artillery headquarters are at St. Thomas Mount, a suburb to the S. The residence of the Governor, called Government House, is a fine building, surrounded with gardens, separated from the fort on the N. by a narrow river. N. of the fort is the native quarters, known as Black Town, which is densely populated. Most of the Europeans live in detached houses in the environs, but the offices of administration and the business warehouses line the beach. There are churches and chapels of all denominations. The cathedral is called St. George's; the first English church, St. Mary's, was opened in 1680. The chief educational establishments are the Presidency College, the Central Institution of the Free Church of Scotland's Mission, the Doveton Protestant College, the Medical and Civil Engineering Colleges. The university is merely an examining body. A flourishing School of Art was established by Dr. A. Hunter in 1850, and now receives official support; it has passed nearly 5000 students. There is also a Central Museum, annually visited by 120,000 persons. The Government model farm is in the immediate neighbourhood, at Sydapet. There are public statues to Lord Cornwallis, Sir T. Munro, and General Neill. The city is supplied with water from the Red Hill Reservoir, and sanitation is carefully enforced. The municipality have acquired a sewage farm, and the entire drainage system is now (1877) undergoing reconstruction. The city is, probably, not unhealthy, as judged by an Oriental standard, but the returns of vital statistics are not yet trustworthy. The death-rate for 1876 was abnormally swollen by reason of the crowds who flocked in from the famine-stricken tracts. In the year 1874–75, the total municipal income was £50,739, of which £23,000 came from rates on houses, &c.; the expenditure was £55,925, including £14,800 for conservancy, £10,800 for public works, and £5729 as interest on Water Works Loan. Of the total pop., 77·6 per cent. are Hindus, and 12·8 per cent. Mohammedans; the Europeans number 3613 or ·9 per cent., the Eurasians 12,013 or 3·0 per cent., and the native Christians 21,441, or 5·3 per cent. Though situated on an open, surf-beaten coast, with only a wooden pier, M. possesses an important maritime trade, equal to more than one-third of that of the entire Presidency. Ships anchor in the roads, a mile from the shore, in from 7 to 9 fathoms of water, and have always to put to sea in heavy weather. Communication is maintained by masulah boats and catamarans. In 1874–75, the total imports were valued at £3,520,000, chiefly cotton goods, government stores, metals, wearing apparel, and liquor; the exports at £2,441,000, chiefly raw cotton, coffee, indigo, and grain. During the year 889 ships entered, with a tonnage of 527,798 tons. A harbour, the foundation of which was laid by the Prince of Wales (1875), is to be completed in five years at a cost of £565,000. It will consist of two piers of rubble and concrete, each 500 yards long, enclosing a space of 170 acres, with enough water for the largest ships. This will, however, afford no protection in case of cyclones, which are of frequent occurrence. In the storm of May 1872, twenty-nine vessels were wrecked, with a tonnage of 10,800 tons, but only nineteen lives were lost. The municipality is governed by a board of commissioners, of whom one-half are elected by the ratepayers.

The site of Madras was acquired in 1639 from the Hindu Rajah of Chandgherry, by Mr. Francis Day, the Chief of the Company's trading settlement at Armagon. The fort was finished in 1643, and the agency was raised to the rank

of a Presidency in 1653. In 1746 it capitulated to the French under La Bourdonnais and Dupleix, and remained in their possession until the treaty of Aix-la-Chapelle in 1749. They greatly improved the fortifications. In 1758–59 it was again besieged by the French, but successfully defended by Pigot and Lawrence. In 1780 it was threatened by Hyder Ali's cavalry, who burned the villages between St. Thomas Mount and the fort. The only other historical event was the visit of the Prince of Wales in December 1875.

Mad'repore, a general name given to many species of *Sclerodermic* corals. The family *Madreporidæ* belongs to the *Zoantharia sclerodermata*, and has a composite or compound coral, of apparently porous nature. These corals are among the most prominent of the reef-building forms. They are usually hard, coarse, limy, and massive.

Madrid', the capital of Spain and of the province of M., a part of New Castile, lies near the heart of the country, on the left bank of the Manzanares, a small sub-affluent of the Tagus, and on a hilly sandy plateau 2200 feet above the sea, treeless save in the vicinity of the city, and stretching away in the N. to the snow-capped Sierra de Guadarrama. One of the handsomest of European cities, it has a very modern aspect, and is partly surrounded by a brick wall 20 feet high, and pierced by 16 gates, the most notable being the Puerta de Alcalá (1759), a triumphal arch 72 feet high at the foot of the Calle de Alcalá, a magnificent street, that traverses the city from N.E. to S.W. The city is girt with fine promenades and stately suburban villas embowered in beautiful gardens. On the E. side is the famous Prado, the evening resort of the people, with parterres, trees, and marble fountains. Outside the Puerta de Alcalá, in the Plaza de Torres, stood the circus for bull fights erected by Philip V. to accommodate 12,400 persons, which was taken down in 1874, when a new one was begun a little farther N. M. has seventy-two public squares, of which the chief are the Puerta del Sol, the centre of pleasure and business, the Plaza Mayor, 398 by 306 feet, the scene of the *auto-da-fe*, surrounded by colonnades, the Plaza Oriente in front of the royal palace, containing an equestrian statue in bronze of Philip III., and forty-four other statues of kings and queens, and the Plaza de las Cortes, with a fine bronze statue of Cervantes. The great building in M. is the Real Palacio, on the W. side, between the city and the river. It is a square, 470 feet on each side, and 100 feet high, built (1737–50) of granite and white marble, occupying an area of 220,900 sq. feet, enclosing a court 240 feet square, and containing a library of 100,000 vols., an armoury of 2533 specimens, and a numismatic collection of 150,000 pieces. M. has also some sixty churches, several decorated by old masters, forty-four monasteries, used since 1836 for secular purposes, twenty-four nunneries, twenty-four hospitals (one with 1526 beds), fourteen barracks, 100 elementary schools, several colleges or higher schools, a university (since 1836), a medical school, a conservatorium of music, eight theatres, four public libraries (the national with 230,000 vols.), eight museums, a botanical garden, an observatory, an academy modelled on that of Paris (since 1847), &c. The royal museum in the Prado contains a gallery of 1833 pictures, one of the richest collections in the world, with 65 by Velasquez, 58 by Ribera, 46 by Murillo, 10 by Raphael, 62 by Rubens, 43 by Titian, and 22 by Van Dyck. The Escorial (q. v.) is 26 miles N.W. of the city. The industries of M. are slight, the chief manufactures being chocolate, beer, shoes, boots, plated ware, coaches, gloves, and fans. The commerce, however, is important, as M. is the entrepôt for all the interior provinces. Retail business is mainly in the hands of foreigners, mostly French, but most of the wholesale trade is carried on by native houses. The climate is described in a Spanish proverb as 'three months of winter and nine months of hell.' The temperature, which ranges from 18° to 105° F., is subject to frequent and sudden changes. Between the sunny and shady side of a street the difference of temperature is sometimes 20°. The prevailing winds are the parching *Solano* from the S.E., and the icy N. wind from the Guadarrama. Pop. (1870) 332,024. M. or *Majerit* is first mentioned in history in 932, when it was taken by Ramiro II. of Leon. A strong outpost of the Arabs, it was captured by Alfonso VI. of Castile in 1083. Philip II. made it his capital in 1560, when it was still surrounded by extensive forests. From this time it grew rapidly into a fine city, and became the centre of the history of the Spanish people. M. was taken by the French in 1808, and in a rising against Murat some 1500 citizens lost their lives. Recovered by Wellington, 12th August 1812, it subsequently sided with Prim in the revolt which drove Isabella II. from the throne in 1868, and cordially welcomed her son, Alfonso XII., 14th January 1875. See Mesonero Romanos, *El Antiguo M.* (Madr. 1861).

Mad'rigal (Ital. *madrigale*, Sp. *madrugada*, 'dawn;' or Ital. *mandra*, 'a sheepfold'?), a short, pointed poem of Spanish and Italian origin, the subject being usually amatory or pastoral. The importance of the *music* which was set to the M. becoming (about 1500–1620) greater than that of the *words*, the term became musical. In its most advanced form a M. is a composition for (usually) five or six vocal parts, with several voices to a part, and its short and expressive phrases are piled upon one another by all the artifices of imitation and counterpoint. The noble compositions of Edwards, Morley, O. Gibbons, Bennet, Byrd, and many others in this form, mark it as peculiarly English.

Madu'ra (from a Sanskrit word meaning 'honey sweet'), the chief town of the district of the same name, in the Madras Presidency, British India, on the right bank of the Vygah river, and a station on the newly-opened S. Indian Railway, 274 miles S. from Madras by rail; pop. (1871) 51,987. It is a very ancient city, having been the former capital of the Pandian dynasty of Dravidian kings, referred to by Ptolemy. The lofty stone walls are now ruinous. The chief buildings are the great temple of Siva, with its colossal porticoes, and the palace of Tirumalei Nayakkan (1623–59), which now holds all the administrative offices, but is falling into decay. The manufactures are cotton weaving, and a speciality of turbans with a border of gold lace. The *district* of M., which borders on the Palk Straits, has much level plain, and also the mountains of Pulnai, which run up to 8000 feet; area 9502 sq. miles; pop. (1871) 2,266,615. It contains the tract of Dindigul, where the best tobacco in India is grown, to be manufactured into Trichinopoly cigars. The crops are rice and *ragee;* the manufactures are woollen blankets, and salt made by evaporation on the sea coast, on which the annual duty is £60,000. There is some coasting trade. M. was an early scene of the activity of Jesuit missionaries, and there are still many native Christians. A railway to M. from Trinchinopoly was opened in 1875.

Mad'vig, Johan Nikolai, a Danish philologist and politician, born August 7, 1804, at Svaneke in Bornholm, entered the University of Copenhagen (1820), where he took his doctor's degree (1826), and was appointed Professor of the Latin Language and Literature (1829). His earliest works, *Emendationes in Ciceronis Libros de Legibus et Academica* (1826), and *De Asconii Pediano* (1826), attracted much attention, and from this time M. produced a series of critical works which have had the greatest influence on scholarship, particularly in the direction of textual criticism. Of these the chief are *Ciceronis Orationes Sclectæ Duodecim* (4th ed. 1858); *Ciceronis Cato Major et Lælius; Ciceronis de Finibus Bonorum et Malorum libri* v. (2d ed. 1869, with a rich critical and exegetical commentary; *Opuscula Academica* (1st vol. 1834; 2d 1842); *Latinsk Sproglære til Skolebrug* (1841, 5th ed. 1870; Eng. trans. by Woods, Oxford, 1851); *Græsk Ordföiningslære* (2d ed. 1857; Eng. trans. by T. K. Arnold). From 1848 to 1851 M. was Minister of Religion and Education. He entered the 'Landsthing' in 1853, and in 1855 the 'Rigsraad,' of which he was president till 1863. Of his political writings, *Curieafstemning* (1853) and *Den Nationale Politik og det danske Monarchi* (1864) had a marked effect on public opinion. Throughout this period M. still continued his philological lectures and study, the fruits of which are *Emendationes Livianæ* (1860); *Livius* (4 vols. 1861–66), in which he was assisted by Ussing; and *Adversaria Critica ad Scriptores Græcos et Latinos* (2 vols. 1871–73).

Mæan'der (mod. *Bozuk, i.e.*, 'great,' *Meinder*), a river in Asia Minor, 200 miles long, which flows W.S.W. from Mount Aulocrene, in Phrygia, to the Ægean Sea near Miletus. The proverbial windings of the M. made its name a synonym for a tortuous course.

Mæce'nas, Caius Cilnius, a Roman statesman, born on the 13th April, 73–63 B.C., of an equestrian family, descended from the royal *Lucumones* of Etruria. He is first mentioned in 40, when he helped to bring about a marriage between Octa-

vianus and Scribonia, and took part in the negotiations with Antonius that led to the peace of Brundisium. During the war with Antonius he remained at Rome, entrusted with the care of civil affairs, and effectually crushed the plot formed by the younger Lepidus. After the battle of Actium (31 B.C.) M. for many years enjoyed the highest confidence of his master, and he is said to have been his chief adviser in establishing the empire. But between 21 and 16, from some unknown cause, an estrangement took place, and Tacitus says that from this time till his death (B.C. 8), M. had only the appearance of the emperor's friendship. With most of the poets and learned men of the time he lived on the most intimate terms, and towards Virgil (q. v.), Horace (q. v.), and others he was so bountiful, that the name of M. as a literary patron has become proverbial. He was a wise and faithful minister, and, if over-addicted to ease and luxury, found in his enjoyment of these a security that Augustus, equally with Julius Cæsar, would have denied to a man of higher ambition and a more 'lean and hungry look.'

Mælar, Lake (anc. *Lögrin*), a beautiful lake in the S.E. of Sweden, surrounded by the provinces of Upland, Vestmanland, and Södermanland. Greatest length from E. to W. 79 miles; area, 761 sq. miles (of which 478 are water, the rest made up by 1260 islands of various sizes); greatest depth, 170 feet (mean depth, 85). M. receives a large number of small streams, which, with the Strömsholm and Hjelmare canals, afford communication with the interior of the country. Its level is 2 feet above the Baltic, with which, besides its natural outlets Norrström and Söderström, it is connected by the Södertelge Canal. On the shores and islands of M. are 9 towns, 200 castles, and a very large number of villas.

Maestricht Beds form a local deposit at Maastricht in Holland, which occupies a position intermediate to the highest English Chalk formations and the lowest Tertiary. They consist of a yellowish limestone, and abound in corals, bryozoa, foraminifera, echinoderms, and lamellibranchs, and the remains of the *Mosasaurus*, a large reptile.

Maffei, Francesco Scipione, Marchese, an Italian dramatist, born at Verona 1st June 1675, studied at the Jesuit college of Parma, and served through the War of the Spanish Succession. Devoting himself to letters, he founded the *Giornale de' Letterati d'Italia* (1710), and by his tragedy *Merope* (1713), and comedy *La Ceremonia* (1730), as well as by sundry works upon the dramatic art, won a high reputation, and exercised a healthful influence on the Italian stage. He visited France (1732), England (1736), Holland, and Germany, and died at his native place 11th February 1755. The complete edition of his works (18 vols. Ven. 1790) includes treatises on theology, archæology, and literary subjects generally.

Maf'ra, a town of Portugal, in Estremadura, 18 miles N.W. of Lisbon, and celebrated for the immense, finely decorated building which João V. erected here in 1717–31, and which comprises a royal palace, with 866 rooms; a cathedral, 186 by 135 feet, surmounted by a splendid dome; and a monastery, with 300 vaulted cells. The whole is of white Carrara marble, and stands in the midst of beautiful gardens.

Magadox'a, or **Makadish'u**, a town on the E. Coast of Africa, belongs to the Imaum of Muscat, and has some trade in slaves, ivory, gum, spices, &c. Founded by the Arabs in 924, it was formerly a great trading place. Pop. 5000.

Mag'azine (Arab. *makhsan*, 'storehouse') is a name especially given to a storing-place for gunpowder. The military M. is bomb-proof, and is usually covered with earth, having the entrance protected by heavy traverses. On shipboard the M. is so placed in the hold that it may be instantly flooded in case of fire. The name is also applied to a literary periodical on account of its 'stores' of varied knowledge.

Magdala, a town of Abyssinia, on a branch of the Blue Nile, in a mountain region, 9000 feet above the sea, and 120 miles S.E. of Gondar. It was taken and destroyed by the English 13th April 1868. (See ABYSSINIA.) General Napier, commander-in-chief of the English expedition, was created Baron of Magdala.

Magdalen College (pron. *Maudlin*), Oxford, was founded in 1458 by William of Waynflete, Bishop of Winchester, and Lord High Chancellor of England, for a president, forty fellows, thirty scholars (called *demies*), a schoolmaster, usher, four chaplains, a steward, organist, eight clerks, and sixteen choristers. By 17 and 18 Vict. c. 81, ten fellowships were suppressed, the remainder thrown open; the demyships were increased to forty, each of an annual value of £95; and twenty exhibitions and four Waynflete professorships were established. With its noble tower, exquisite chapel, cloisters, and hall, M. C., standing on the banks of the Cherwell, and surrounded by the Magdalen water-meadows, is the most beautiful of all the Oxford colleges. It presents to 41 livings, and in 1876 had 199 members of Convocation, 101 undergraduates, and 389 members on the books.

Magdalen Hall, now **Hertford College**, Oxford. In 1282 Elias de Hertford founded Hertford, Hert, or Hart Hall, which, raised to a college in 1740 by Dr. Richard Newton, the then principal, was dissolved in 1803, owing to want of funds, but in 1816 was incorporated with M. H. The latter, founded by Bishop Waynflete as an appendage to Magdalen College, and an independent hall since 1602, was itself dissolved in 1874, and its principal and scholars, with certain fellows, incorporated as Hertford College, which consists of a principal, 15 fellows, and 28 scholars, presents to 10 livings, and in 1876 had 193 members of Convocation, 69 undergraduates, and 312 members on the books.

Mag'dalen Islands, a group of eleven islets in the Gulf of St. Lawrence, 55 miles N.W. of Cape Breton Island, and 85 S.W. of Newfoundland. Area, 125 sq. miles; pop. (1871) 3172. Grindstone, Allright, and Amherst are the largest. Fish, oil, and gypsum are exported.

Magdale'na, a river of S. America, rises in the Cordilleras of Ecuador, flows N. through Colombia, and enters the Caribbean Sea, after a course of 900 miles. It is full of cataracts as far as Honda, 540 miles from the mouth, where it becomes navigable. It is the chief means of communication with Bogota (q. v.).

Magdalene', Mary, is so called from Magdala, the city she belonged to, and to distinguish her from the other Maries mentioned in the Gospels. She is first mentioned as being in attendance on Christ, along with certain other women, after she had had seven devils cast out of her (Luke viii. 2), then as standing with other women near the cross at the crucifixion (John xix. 25), and lastly as the first to whom Christ appeared after his resurrection (Mark xvi. 9; Luke xxiv. 10; John xx. 1, 14; but *cf.* Matt. xxviii. 9). From the gratuitous assumption that M. M. was the same as the Mary mentioned in Luke vii. 36–50, there has been a prevalent notion that previously to her association with Christ she was an unchaste woman, and this is the character in which she has always been represented in art. The same assumption appears in the phrase, a 'M. asylum.'

Magdalene College, Cambridge, founded (1519) by Edward Stafford, Duke of Buckingham, and completed, after his attainder, by Thomas Audley of Walden (1542), has eight open fellowships; three open scholarships of £60, three of £40, and six of £20; and eight exhibitions. This college possesses the MS. diary of Samuel Pepys (q. v.), and his valuable collection of books, known as the Pepysian Library. It presents to six livings, and in 1877 had 126 members of the Senate, 52 undergraduates, and 216 members on the board.

Mag'deburg, the capital of the province of Saxony, Prussia, 76 miles W.S.W. of Berlin, at the junction of four main railway lines, and on the left bank of the Elbe, which is here divided into three arms. A fortress of the first rank (since 1866), it is also one of the most important commercial towns in N. Germany. It consists of the town proper, and of four suburbs, one of which, Friedrichstadt, lies on the right bank of the Alte Elbe. The river here encircles an island, which is occupied by the citadel, and connected with both banks by bridges. M. has a massive Gothic cathedral (1208–1363, restored 1825–35), with a tower 337 feet high, and containing the tombs of Otho I. (died 973), and his wife, the English Editha; a church of Our Lady, in Romanesque style of the 12th c.; a lofty monument of Otho I., erected by the municipality soon after his death, and restored in 1858; many benevolent institutions, and several military, medical, and industrial schools, &c. Fine promenades are the Fürstenwall, on the Elbe, and the Friedrich-Wilhelm's Garten, adjoining the glacis in the S.W. Two miles below M., on the

river, are Herrekrug, and Vogelsang, both favourite resorts, with beautiful gardens. The manufactures are cottons, woollens, beet-sugar, tobacco, chocolate, machinery, leather, gloves, and spirits, and there is a large transit trade. Pop. (1875) 122,789. M. was founded at the beginning of the 9th c., and chiefly owed its early prosperity to Otho I., who established a Benedictine monastery here in 937. In 967 the town was raised to the rank of an archiepiscopal see, to which was annexed the primacy of Germany. After much contention, it threw off the archiepiscopal yoke, and towards the end of the 15th c. compelled the prelates to reside elsewhere. The Reformation was espoused as early as 1524. During the Thirty Years' War, M. resisted the attacks of Wallenstein for seven months (1629), but in 1631 was stormed by Tilly, who slew some 30,000 inhabitants, and left only the cathedral and 140 houses standing. The see, which was presided over after the Reformation by three Protestant archbishops, was incorporated with the Mark of Brandenburg in 1680. M., with a garrison of 23,800 men, surrendered ignominiously to the French under Ney, November 8, 1806. It was restored to Prussia in 1814. See Wolter, *Geschichte der Stadt M.* (1845); Hoffmann, *Chronik der Stadt M.* (1843–50).

Magdeburg Centuries was a Church history published at Basel (1559–74), and so called because it was divided into centuries, and was begun at Magdeburg, by M. Flacius (1552), who was assisted by J. Wigand, M. Judex, B. Faber, A. Corvinus, T. Holthuters, and others. The writers, who got the name of M. Centuriators, were Protestants, whose object was to demonstrate that early Church history, when cleared of the obscurity and fables with which it had been overlaid by Romish writers, was opposed to the doctrines and pretensions of Popery. The history was only brought down to the 13th c., and as a volume was devoted to each century, the work just extended to 13 vols. folio. It was in reply to the M. C. that Baronius wrote his *Annales Ecclesiastici* (12 vols. fol. Rome, 1588–1607). See Dowling's *Introduction to the Critical Study of Ecclesiastical History* (Lond. 1838).

Magdeburg Hemispheres are two hollow hemispheres which fit accurately together so as to form an air-tight sphere. They were invented by Otto von Guericke, of Magdeburg, to practically demonstrate the enormous pressure exerted by the air, an experiment which he accomplished by exhausting the sphere of its contained air, and then trying to pull the hemispheres asunder.

Magee', William, D.D., born in county Fermanagh, Ireland, March 18, 1766, graduated at Dublin University (1785), was elected fellow (1788), ordained (1790), and after serving for some years as assistant professor of Oriental languages, was raised to the chair of mathematics (1806). In 1811 he published his *Discourses on the Atonement* (7th ed. 1841), and the year after accepting the livings of Kappagh and Killyleagh, became Dean of Cork (1814), Bishop of Raphoe (1819), and Archbishop of Dublin (1822), where he died, August 18, 1831. A complete edition of his works appeared in 1842.—**William Connor M., D.D.**, born at Cork in 1821, entered Trinity College, Dublin (1834), became incumbent of the Octagon Chapel, Bath (1850), and of Quebec Chapel, London (1860), Rector of Enniskillen (1861), Dean of Cork (1864), and shortly afterwards of the Chapel Royal, Dublin, Donellan Lecturer (1865–66), and Bishop of Peterborough (1868). He has published numerous sermons, but is best known by his speech against the disestablishment of the Irish Church (June 14, 1869).

Magell'an, properly **Magalhaens, Fernando de**, a famous navigator, was born at Oporto about 1470, served in the E. Indies under Albuquerque, experienced niggardly treatment at the hands of Dom Manuel, entered the service of Karl V. in 1517, and undertook to find a western route to the Moluccas. With a fleet of five vessels and 234 men, he sailed from Seville, August 10, 1519. He reached the mouth of the La Plata, January 12, 1520, and entered (October 21) the strait which now bears his name, but which he called the 'Strait of the Eleven Thousand Virgins.' Clearing the strait, he discovered the great southern ocean, which he named the Pacific, on account of the tranquillity of the weather. After many hardships, the fleet, reduced to three vessels, reached the Ladrones, March 6, 1521, and Tamar, the first discovered of the Philippines, on the 18th of the same month. M. was killed on the island of Matan in an encounter with natives, April 27, 1521. Only one ship and fifteen men returned to Europe, thus completing (September 6, 1522), for the first time a voyage round the world. See Amoretti's *Narrative* (Milan, 1811), and *The First Voyage Round the World*, from the accounts of Pigafetta and other contemporary writers, by Lord Stanley of Alderley (Lond., printed for the Hakluyt Society, 1874).

Magellan, Strait of, divides Patagonia from Tierra del Fuego. It is about 300 miles long, and is now regularly navigated by steamers. At the W. entrance there is a Chilian colony, which had a pop. of 1140 in 1874. The Strait was discovered by Magalhaens in 1520. At a place called Vaqueria, Captain Corey discovered three large beds of coal of an average thickness of 24 feet (April 1875). See J. G. Kohl's very interesting *Geschichte der Entdeckungsreisen sur M.'s Strasse* (Berl. 1877).

Magen'die, François, a French physiologist, was born at Bordeaux, October 15, 1783. In 1821 he began the publication of a medical journal, and the same year was elected a member of the Academy of Sciences. In 1831 he became Professor of Medicine in the Collége de France. He died at Paris, October 7, 1855. By experimenting on living animals he made many important physiological discoveries, and is specially known for his investigations into the action of poisons and the physiology of the nervous system. Of his numerous writings, the more important are *Précis Élémentaire de Physiologie* (2 vols. 1816); *Leçons sur les Phénomènes Physiques de la Vie* (4 vols. 1836–38); *Leçons sur les Fonctions et les Maladies du Système Nerveux* (2 vols. 1839); and *Recherches Philosophiques et Cliniques sur le Liquide Céphalorachidien ou Cérébro-spinal* (1842).

Magen'ta, a town of N. Italy, province of Milan, 20 miles E. of Milan city by rail. It lies in a wine-growing district traversed by the Naviglio Grande, and gives name to one of the new coal-tar colours. From its central position it has been the theatre of many battles, of which the last and greatest was that in which the Italians and French defeated the Austrians, 4th June 1859, forcing them to evacuate Lombardy. Marshal Macmahon bears the title of Duc de M. A monument was erected here to Napoleon III. in 1862. Pop. (1874) 6135.

Ma'gerö. See NORDCAP.

Maggio're, Lago di (Lat. *Lacus Verbanus*), the second largest and most beautiful of the Italian lakes, lies between the Swiss canton of Ticino on the N., Lombardy on the E., and Piedmont on the W. It is 678 feet above the sea-level, 37 miles long by 2–8 broad, and 2800 feet deep, and is fed by the Tosa, Tresa, and Ticino. The northern shore is fringed by lofty granite mountains, which, along the eastern side, slope gradually down to the level of the plains of Lombardy, and in the middle of the lake are the four Borromean Islands.

Magg'ot, a name given to the grubs or larvæ of flies or *Dipterous* insects, but applied also to the larvæ of other groups of insects, *e.g.*, the beetles. They appear in putrefying or decomposing substances, and their appearance was held to be a proof of *spontaneous generation*, till Redi of Florence, in the middle of the 17th c., showed that they proceeded in reality from the eggs of the flesh-flies.

Ma'gi (Gr. *magoi*, 'wise men;' Pehlvi, *mag*, 'priest') were originally the priestly caste of the fire-worshipping tribes of Western Asia, according to Herodotus one of the six tribes of the Medes, a position apparently analogous to that of the Levites among the Jews. Under the Medo-Persian empire, after a struggle with the Persian dualism (see PARSEES), the Median nature worship maintained its footing, and the M. also remained the priestly and learned caste, with unbounded influence in religious, social, and national affairs, insomuch that it was considered a necessary part of a princely education to be instructed in their peculiar learning. From the nature of their religion their science included astrology, many forms of divination, interpretation of dreams, and other natural phenomena. According to Strabo they practised three forms of divination:—(1) By raising the dead (see NECROMANCY), (2) by cups, and (3) by water. Their religion was reformed by Zoroaster (q. v.), and the order divided into three classes:—(1) Herbeds ('learners'), (2) Mobeds ('masters'), (3) Dester Mobeds ('perfect scholars').

In later times the civilised world was overrun with *magians* or *magicians* who could predict the future by the language of the stars, interpret dreams, cure by charms otherwise incurable diseases, &c. But the fall of the Eastern monarchies in connection with which the M. had been maintained had deprived them of their authoritative position, and the progress of knowledge and the spread of Christianity gradually deprived them of their influence. All the arts of divination, &c., gradually fell into disrepute, and *magic* became a comprehensive name for jugglery and tricks of legerdemain.

Magic (through the Gr. *magos* from the Pehlvi *mogh*, 'a priest,' akin to Sansk. *mahat*, 'great') may be termed the science of superstition—a philosophy of the Unknown older than Von Hartmann's. It comprehends all forms of Witchcraft (q. v.); the degraded Fetichism (q. v.) of Africa, Shamanism (q. v.) of Tartary, and Taouism of China; and the abstruser Alchemy (q. v.), Astrology (q. v.), and Divination (q. v.), with its modern developments Clairvoyance (q. v.) and Spiritualism (q. v.). Its origin is traceable to man's love of referring all effects to some cause known or unknown. Phenomena which we now-a-days explain, or think to explain, by attributing them to 'odic' or 'psychic force,' an older generation would have ascribed to occult powers—in a word, to M. For what is M. to one is science or imposture to another. Hence jugglers, ventriloquists, and charlatans figure side by side with sages and self-duped fanatics; and the Marabouts (q. v.) of Algeria, the medicine men of the Red Indians, and the Dr. Slades of civilised England, are as truly magicians in the eyes of their believers as were ever the Magi (q. v.) of Persia, the adepts of the Cabala (q. v.), or the Rosicrucians (q. v.) of the 18th c. Nay, Solomon and Alexander, Aristotle and Virgil, Robert Grosseteste and St. Thomas Aquinas, Roger Bacon and Faust, all these have been at one time or another regarded by the vulgar as professors of M.; and placed in the midst of savages, Tyndall or Carpenter might win, like Houdin, a reputation equal to that of Albertus Magnus, Michael Scott, Cornelius Agrippa, Paracelsus, Van Helmont, Dee, Lilly, Cagliostro, and other masters of 'grammarye.' The Alexandrian philosophers distinguished between the *goëteia* of demons and the *theurgia* of good genii, and Cornelius Agrippa divided M. into three kinds:—*Natural*, producing marvellous effects by the application of natural agents to passive subjects; *celestial*, nearly identical with judicial astrology; and *superstitious M.*, more powerful than either of the preceding, baneful in its workings, and depending on the co-operation of evil spirits. The popular medieval fancy, again, classed all M. under the two heads of *Black* and *White*. The latter of these was not only held to be lawful, countenanced as it was by many of the highest ecclesiastics and princes of the times, and hallowed by countless religious rites and formularies; but, as the foster-mother of chemistry, astronomy, medicine, and a host of the arts and sciences, did undoubtedly work on the whole for the good of the human race. But if the White were beneficial, the Black Art was no less deadly in its results. Believing in their own pretensions to supernatural powers, its practisers scrupled at no villany in the prosecution of still greater results, and the nameless abominations of Giles de Retz and his compeers account for, if they do not justify, the horrible persecutions of wizards and sorceresses that were acted throughout the 16th and 17th centuries. See Symphorien Champier, *Dialogus in Magica Arte* (Lyon, 1506); Montfaucon Villars, *Le Comte de Gabalis* (Par. 1670); Defoe, *System of Magic;* Tiedemann, *De Artium Magicarum Origine* (Marb. 1787); Horst, *Zauberbibliothek* (6 vols. Mainz, 1820–26), and *Von der alten und neuen Magie Ursprung, Idee, Umfang, und Geschichte* (Mainz, 1820); Scott, *Letters on Demonology and Witchcraft* (1830); Godwin, *Lives of the Necromancers* (1830); Ennemoser, *Geschichte der Magie* (Leips. 1844; Eng. trans. by W. Howitt, 1854); Eliphas Levi, *Dogme et Rituel de la Haute Magie* (2 vols. Par. 1856), the work of a firm believer in the reality of M.; Comte de Resie, *Histoire des Sciences Occultes* (Par. 1857); L. F. Maury, *La Magie* (Par. 1860); and Michelet, *La Sorcière* (1862).

Magic Lantern is an optical instrument for throwing a magnified image of a picture upon a screen. It consists of a lantern with a horizontal tube inserted in the one side at the height of the lamp flame, whose rays are directed through the tube by a reflector placed behind. Before entering the tube the rays are concentrated by means of a plano-convex lens. They then pass through the picture, which is painted in transparent colours upon glass, and are received by a double convex lens set in the further extremity of the tube. The image of the picture is then brought to a focus, and thrown upon a screen which is placed at a certain distance. The glass slide must be inserted upside down, since the image is inverted when projected upon the screen.

Magic Square is an arithmetical curiosity on which the oldest writing in existence is a MS. of the 16th c. (now in the Paris *Bibliothèque Nationale*), and which has since engaged the attention of many eminent mathematicians. It consists of a series of numbers belonging to an arithmetical progression, so arranged in the equal subdivisions of a square that the sum of any column or row, horizontal, vertical, or diagonal, is the same. The following are the two simplest, formed of the natural numbers from 1 to 9, and from 1 to 16 inclusive respectively:—

2	7	6
9	5	1
4	3	8

1	15	14	4
12	6	7	9
8	10	11	5
13	3	2	16

The latter has the further property that if quartered, the numbers in each quarter, when added together, give the same sum 34. See Hutton's *Recreations in Mathematical Science* (1814).

Ma'gilus, a singular genus of *Gasteropodous* Mollusca, represented by the *M. antiquus*, which bores into masses of coral. It inhabits the Red Sea and Mauritius. In the young state the shell is of ordinary form, and of thin and delicate structure. It encloses itself amongst the growing coral, and elongates its shell to keep pace with the growth of the latter. An 'operculum' closes the mouth of the tube. M. may attain a length of 2 or 3 feet.

Maginn', William, LL.D., son of a classical teacher, was born at Cork, Ireland, 11th November 1794, entered Trinity College, Dublin, at the early age of ten, and took the degree of LL.D. in 1816. During 1818–20 he was a frequent contributor to *Blackwood*, settled in London in 1823, and rapidly came to the front as a brilliant and versatile penman. In 1828 he joined the staff of the *Standard*, and was editor of *Fraser's Magazine*, when its pages were constantly irradiated with the flashes of youthful genius. He died at Walton-on-Thames, 21st August 1842. His *Homeric Ballads*, *Shakspeare Papers*, and critical essays have been edited by Dr. R. S. Mackenzie (5 vols. New York, 1855–57). M. was one of the gayest, brightest, and wittiest of those reckless litterateurs who half a century ago worshipped with equal devotion at the shrines of Apollo and Bacchus.

Magliabec'hi, Antonio, was born at Florence in 1633. Bred a mechanic, he gained fame as a scholar, became librarian to Cosmo III., and lived the life of an eccentric bookworm in the strictest seclusion till his death at Florence, 12th July 1714. He made little use of his learning, except in publishing a catalogue of Oriental MSS. in the Laurentian Library, and editing the *Hodæporicon* of Ambrosio the Camaldulensian and the *De Præstantia Virorum sui Ævi* of Benedetto Accolti. His letters were published (5 vols. 1745), at Florence, where his library (30,000 vols.) still remains entire.

Mag'na Char'ta, properly **Magna Carta**, was a 'treaty of peace' between King John and the English people, so called on account of its importance, to distinguish it from the *Carta de Foresta*. It was submitted to and signed by the king, July 15, 1215, on the banks of the Thames between Staines and Windsor. 'Although it is not the foundation of English liberty, it is the first, the clearest, the most united, and historically the most important of all the great enunciations of it; and it was a revelation of the possibility of freedom to the medieval world.' There is still a copy of it in the British Museum. The central clause of the charter was that which enunciated the principle that 'no freeman shall be taken or imprisoned, or be divested of his freehold or liberties, or free customs, or be outlawed, or exiled, or any otherwise destroyed; nor will we pass upon him, nor send upon him, but by lawful judgment of his peers, or by the law of the land. We will sell to no man, we will not deny or delay to any man justice or right.' It was also provided that royal exactions should be repressed, inasmuch as 'no scutage or aid shall be imposed on our realm save by the common council of the realm,' whilst guardians

were restrained from wasting the lands of their wards; heirs were to be married without disparagement, and widows protected against the compulsory marriages to which they had been subjected to the profit of the crown. Nor were the benefits of M. C. confined to the rich. What was granted to the tenants-in-chief in the way of immunity from the exactions of the crown, was granted to the under-tenants in their relation to superiors. And the towns were confirmed in their privileges of regulating trade, dispensing justice, and of deliberating upon their own affairs. So often did monarchs try to evade these conditions that there are on record thirty-eight ratifications of the M. C. See Thompson's *Essay on M. C.*, and Professor Stubbs' *Selected Charters* (1874).

Mag'na Græ'cia, the Roman translation of the name (*Hē Megalē Hellas*) given by the Greeks to their group of colonies in Southern Italy. The term does not seem to have been used with much strictness of application. Sometimes it denotes only the cities on the Tarentine Gulf, at other times it excludes those N. of the Bruttian Peninsula; but it is more generally extended to all the Hellenic settlements on the Italian mainland from Cumæ southwards. Whether the Hellenic cities of Sicily were ever included under the appellation is more than doubtful. The name had no territorial meaning, though it is certain that in some instances the colonists acquired not only rule over the native Italian tribes, but also the possession of land. It was employed rather in an *ethnical* than a *geographical* sense. Wherever the Hellenes went they carried Hellas with them, and in Italy their cities were so numerous and became so rich and powerful that the name M. G. was hardly hyperbolical. The earliest settlement is believed to have been Cumæ (q. v.), but the exact date is not known. Omitting the Sicilian cities, the next in order were the Achæan settlements of Sybaris (q. v.) and Croton (q. v.), followed by the Spartan settlement of Tarentum (q. v.), and the Locrian settlement of Locri Epizephyrii, all within the last twenty years of the 8th c. B.C. Most of the cities, however, on the Tyrrhene and Ionian Seas were not colonies direct from Hellas, but from the first Hellenic settlements in Southern Italy. Such were Posidonia, Laüs, Scidrus founded by Sybaris; Terina, and Caulonia, by Croton; Hipponium and Medma by Locri, &c. The golden time of the cities of M. G. was from about 710 to 510 B.C., though Tarentum flourished down to its capture by the Romans in 209 B.C., and the important cities of Thurii and Heraclea were not founded till 443 and 432 B.C. respectively. The causes of their decline were mutual jealousies with their accompaniments of bloody strife, the rise of the Syracusan power in the South, and of the Samnite power in the North. Rome deliberately allowed them to perish from political motives, Rhegium, Posidonia (Pæstum), and Brundusium alone maintaining their prosperity. In the days of Cicero, M. G. was 'wiped out' (*deleta*).

Magne'sium (symbol Mg; atomic weight 12), is usually grouped with the metals of the alkaline earths—barium, strontium, and calcium, but many of its properties resemble more nearly those of zinc. It occurs in nature as a constituent of various minerals, which have as a rule a peculiar soapy feel. The metal, which is best obtained by fusing chloride of M. with sodium, is brilliant white in colour, resembling silver. It is more ductile and malleable than zinc, fuses below a red heat, and may be distilled. Unlike the other metals of the alkaline earths it is practically unacted upon by cold water, and only slowly oxidised by boiling water. In the presence of acids, however, oxidation takes place rapidly. A M. wire when heated in a flame takes fire and burns with an intense white light, which has been used for photographic purposes at night. It forms only one oxide (Mg O), corresponding in composition to the other alkaline earths, and generally known by the name of *calcined magnesia* from its formation by calcination of the carbonate. It is much feebler as a base than baryta, strontia, or lime, combining with water without evolution of heat. Its hydrate is very slightly alkaline, and is easily decomposed by heat. Calcined magnesia when mixed with water forms in time a hard compact mass like plaster of Paris, and may be used for similar purposes. The *carbonate* occurs in the mineral kingdom as *Magnesite*, and as a constituent of *magnesian limestone* or Dolomite. It is the latter mineral that forms the chief source of our magnesian compounds. By calcining Dolomite to remove the carbonic acid, and then washing to remove part of the lime, a residue of lime and magnesia is left, which by treatment with sulphuric acid is converted into a mixture of the sulphates. From this the *sulphate* of magnesia may be readily dissolved and reprecipitated by evaporation as prismatic crystals having the composition $MgOSO_3.7H_2O$. The chief source of the sulphate, or *Epsom salt* as it is commonly termed, from its former occurrence in certain springs near Epsom in Surrey, is however the *mother liquor* left after evaporating sea water during the manufacture of common salt. (See EPSOM SALTS.) *Chloride of M.* ($MgCl_4$) is important as the source of the metal. It is obtained by evaporating a solution of hydrochloric acid neutralised by magnesia or the carbonate. To prevent the chloride being decomposed by water at the close of the process, hydrochlorate of ammonia is added, and the double chloride of M. and ammonium formed. From this the latter may be driven off by fusing. M. is one of the few metals which unite directly with nitrogen at a high temperature to form a *nitride*. The nitride of M. (N_2Mg_3) gives rise to magnesia and ammonia when treated with water. Compounds of M. are met with in many minerals. Periclase and brucite contain the oxide; guanite and struvite the phosphate (which also enters into the composition of bones); boracite the borate; serpentine and olivine the silicate; and pearl spar the carbonate, forming a crystallised compound with the carbonate of lime.

Medicinal Properties and Preparations of M. The compounds of magnesium, employed in medicine, are magnesia and its carbonates, its sulphate and citrate. Magnesia is employed as an antacid, laxative, and antilithic; and is prescribed in cases of dyspepsia, acidity, gout, and various complaints attended with acidity and constipation. It is an excellent and mild purgative for children. *Carbonate of magnesia* is prepared under two forms—the heavy and the light. *Heavy* carbonate of magnesia acts in the same manner as magnesia, and from it *liquor magnesiæ carbonatis*, or fluid magnesia is prepared. *Citrate of magnesia*, the French *limonade purgatif*, is prepared from the *carbonate of magnesia, citric acid, syrup of lemons, bicarbonate of potash*, and *water*. The *sulphate* of magnesia is the same as *Epsom Salts* (q. v.).

Mag'netism. If a bar of soft iron be held in a certain definite direction with reference to the earth, and be hammered, twisted, or filed, it will be found upon trial to have acquired the property of attracting and lifting small fragments of iron or steel. The bar has become a *magnet;* and the influence which imparts this property to iron is called M. There are other and better methods of making magnets than that indicated above. These will be described later. Before discussing the fundamental experiments upon which the theory of M. is based, however, it is advisable to notice as a preliminary that the same attractive power is possessed by a native ore of iron, called magnetin, magnetic iron ore, or loadstone. It is said to have been found in great abundance near Magnesia in Lydia, from which the name (Gr. *magnes*) was probably derived. The attractive force exerted by a long thin magnetised bar is greatest at the extremities of the bar, and vanishes towards the middle. This is readily shown by simply plunging a bar magnet into a heap of iron-filings, which on the withdrawing of the magnet will fix themselves in clusters only at or near the extremities. If suspended so as to permit of free motion in a horizontal plane, the magnet will always tend to set itself in a definite azimuth, and if disturbed from this azimuth will oscillate about it. For ordinary latitudes the general direction of position taken up is north and south, so that the one extremity, called the *north pole*, points north, and the other, called the *south pole*, points south. Every magnet has this directive property. If a second magnet be brought near the suspended one, the latter is drawn out of its original position of equilibrium and takes up a new position relatively to the other magnet. By experiment it is found that if the north pole of the second magnet be brought near the north pole of the suspended magnet, the latter is repelled and the south pole attracted. This is precisely the same law which holds in statical electricity—*like repels like, and like attracts unlike*. It warrants us also in treating of M. mathematically, to speak of the one pole as *positive* and the other as *negative*. If two freely and horizontally suspended magnets be placed near one another in the same plane, they will tend to set themselves so that the nearer ends are opposite poles—as also the further ends. We have seen that a single magnet, uninfluenced by other magnets, tends to set itself in a north and south direction;

and this would indicate that the earth itself is a great magnet, whose poles are situated near the geographical poles of the earth. Strictly speaking, then, what is commonly called the north pole of a magnet should be called the south, since it is attracted by the north magnetic pole of the earth; and such was the nomenclature originally suggested by Gilbert (q. v.) in 1600, who was the first to discuss scientifically the fundamental phenomena of the polarity of magnets. From these experiments we conclude that every magnet (including the earth) has two dissimilar poles, and that like poles repel each other, and unlike poles attract. Further, the poles of a magnet are equal in intensity of magnetisation—*i.e.*, the one will attract a third pole with the same force that the other repels it. Hence, mathematically, we may express the strength of the one pole by $+ m$, and of the other by $- m$. It is impossible to isolate one magnetic pole from the other; if a magnet be cut in two, the halves present the same polarity that the whole did originally. Into however many fragments a magnet may be broken, indeed, each little piece is in itself a perfect magnet. The force with which two poles attract or repel each other was found by Coulomb by means of the Torsion Balance to be proportional directly to the product of the intensities, and inversely to the square of the distance separating them. Hence, defining a unit magnetic pole as a pole which exerts unit force at unit distance on another equal pole, and representing the intensities of the two poles by m and m', and their distance from one another by r, the force between them is $F = \frac{mm'}{r^2}$. When m and m' are of different signs, the force is attractive, and tends to diminish the distance between the poles; when m and m' are of the same sign, the force is repulsive, and tends to increase this distance. The above formula is identical with the one which holds for gravitation; and consequently all the theorems proved by Newton for the law of the inverse square hold in the theory of M. Further, the following propositions regarding the *potential* may be assumed. The potential at a point distant r from a magnetic pole of intensity m is $\frac{m}{r}$, and represents the work done on or by a unit pole carried from this point to an infinite distance. Taking the unit pole as positive, the work will be done *on* the unit pole when $\frac{m}{r}$ is negative, since there is resistance to be overcome, and *by* the unit pole when $\frac{m}{r}$ is positive. The force at the point in any given direction is equal to the rate of change of potential in that direction. The idea of potential implies (see ELECTRICITY) action through a medium. Of the true nature of the action we have no clear conception; but its effect is to modify the region immediately surrounding a magnet, inducing in it a state of strain, and constituting what is termed a *magnetic field*. The existence of a magnetic field is not necessarily dependent upon the presence of a magnet—the same state of things may be produced, as will be shown later, by electric currents. Consequently it is more proper to regard the magnetic field and not the magnet as the direct cause of the various magnetic phenomena. This was the great step taken by Faraday in his investigations. He conceived *lines of force* to emanate in all directions from the poles of a magnet; and the direction of the line of force at a given point is the direction of greatest rate of change of potential. Hence the equipotential surfaces are everywhere perpendicular to the lines of force. The equipotential surfaces due to a single magnetic pole are therefore spheres, since the lines of force are straight lines diverging in all directions from the pole. Practically, however, such an arrangement cannot be realised, on account of the impossibility of isolating a single pole. The lines of force due to a single bar magnet are curved, and run from pole to pole—in other words from the place of highest potential to the place of lowest. According to convention, the N. pole of a magnet is regarded as the positive pole, so that the direction of a line of force at any point is the direction in which a positive unit pole would be urged by the magnetic forces. In a *uniform* magnetic field the lines of force and therefore the equipotential surfaces are parallel. Such a state of things can only be produced by particular combinations of magnets, but it may be assumed to exist in small portions of space at a great distance from the pole producing the state. Thus the magnetic field due to the earth's M. at any place in ordinary latitudes may be taken as uniform. The direction of the lines of force is shown by what is called the *Dipping Needle* (q. v.). All magnets tend to set themselves in a particular vertical plane, which intersects the earth's surface in what is called the *magnetic meridian*—this property is shown by the ordinary compass needle. If a magnetised needle be suspended from its centre of gravity, however, it tends also to set itself at a certain inclination from the horizontal, called the *dip*. This dip gives the true direction in which the lines of force due to the earth's M. act. It varies in value from 0° near the equator to 90° at the magnetic poles. (See TERRESTRIAL M.) The direction of dip is the direction in which the bar of soft iron must be held so as to be magnetised in the manner indicated in the opening sentence of the present article; and the discussion of this point introduces the vast subject of *magnetic induction*.

If a piece of soft iron, not originally magnetised, is brought near a magnetic pole, it immediately acquires the polarity peculiar to a magnet. This is the primary phenomenon of induction. An ordinary iron nail, attached by its one extremity to the N. pole of a magnet, has its other extremity at once magnetised so as to act also as a N. pole. A second nail may then be attached to the free end of the first, and so on, until a chain of nails set end to end is obtained hanging from the pole of the magnet. The chain may be formed into an arc, by simply bringing the last member, whose free extremity is of course a N. pole, into contact with the S. pole of the magnet, to which it will at once adhere strongly. This phenomenon of magnetic induction is at first sight closely analogous to electric induction, and originally it was explained upon the same hypothesis of two fluids which attracted each other, while each repelled itself. Upon this hypothesis unmagnetised matter was neutral, because of the complete intermingling of the two fluids, whereas in a magnet the fluids had been separated, the one kind collecting at the one extremity, the other kind at the other. On the approach of the one end of a magnet to a piece of soft iron the fluids in the latter were separated, the kind different from that in the contiguous pole being attracted, the same kind being repelled. This hypothesis, however, is untenable in the light of the well-known and already-mentioned phenomenon that the fragments of a broken magnet are in themselves perfect magnets. Poisson, it is true, obviated this difficulty by supposing the separation of fluids to take place not in the general mass of the magnet, but in the individual particles which make up the magnet. His theory, however, leads to the result, which can hardly be physically true, that the space occupied by the molecules bears to the whole volume of the magnet the ratio 134:135. Weber's theory differs from Poisson's in assuming that the molecules of iron are permanently magnetised, that in non-magnetised iron these molecules are set indifferently in all directions, but when placed in a magnetic field they turn or tend to turn in one direction, so that the whole magnet acquires polarity. This theory implies a maximum intensity of magnetisation, which is reached when all the particles are set parallel to each other. Experiments by Joule, Müller, and more especially by Beetz, furnish complete evidence as to the existence of this limit. The last-named physicist, by electrolytic deposition of iron in a strong magnetic field, obtained a filament of iron whose *magnetic moment* (the product of the length into the strength of the positive pole) was hardly increased by the action of a powerful magnetic force acting in the same direction. A magnetising force in the reverse direction reduced the filament to the condition of ordinarily magnetised iron. Weber's hypothesis is thus in perfect accordance with experiment. The angle through which the molecules are turned, and therefore the resulting magnetisation of the bar, depend upon the strength of the magnetic field, and if the magnetising force exceeds a certain limit, experiment shows that after removal of the force a certain residual magnetisation remains, and the soft iron bar is permanently magnetised. The molecules have acquired a permanent *set*, and have not returned to their original relative positions. If, instead of a soft iron bar, a steel bar be used, the inductive effect is very much smaller, but the residual magnetisation is greater in proportion to the magnetisation produced when the magnetising force is present. It would appear, then, that the molecules of steel are more difficult to rearrange; but, once moved, they have a much feebler tendency to return to their original positions.

Under ELECTRICITY, Œrsted's discovery of the effect of a current upon a magnet in its vicinity—the fundamental fact of

electro-magnetism—is discussed. The properties of *solenoids* or helices of conducting wire are shown to be precisely analogous to the properties of bar magnets. Every electric current, indeed, forms in the region around it lines of magnetic force. Wherever a current is, there is a magnetic field. Conceive an indefinitely long vertical straight wire carrying an electric current, and suppose a person so to set himself in the position of the wire that the current flows from his head to his feet; then a freely suspended magnet would under the action of the current turn so that the N. pole would point to his right hand. The lines of magnetic force are concentric circles, which have their common centre coincident with the wire, and which lie in planes perpendicular to the wire; the equipotential surfaces are therefore planes containing the straight wire. Ampère and Weber have shown that the magnetic action of a small plane circuit at distances great compared to the dimensions of the circuit is the same as that of a magnet whose axis is perpendicular to the plane of the circuit, and whose magnetic moment is equal to the strength of the current multiplied by the area of the circuit. If the circuit be the boundary of a surface, and if for this surface a magnetic shell of the same intensity as the current be substituted, the magnetic action of the shell upon distant points is the same as the action of the current. A person standing on the *positive* side of this shell, that which corresponds to the N. pole of a magnet, would have the current in front of him flowing from right to left. The action of a current of intensity i of any form and size, at an external point (P) may be studied by taking the circuit as the boundary of a surface (S), and breaking up this surface into a number of elementary quadrangular elements, small compared to the radius of curvature of the surface and to their distance from P, by two series of lines crossing each other. Round each element let a current of intensity i flow. Then at any common line of separation there will be equal currents flowing in opposite directions, whose magnetic effect is *nil*; and therefore the total effect of the elementary circuits is equivalent to that of the original circuit. Substitute for each small circuit-compassed area, a magnetic shell of intensity i; and the result will be a whole magnetic shell of intensity i coinciding with the surface S having the same magnetic action at P as the original circuit. The form of the surface S being quite arbitrary, the above shows that the action of a magnetic shell at an external point depends only on its magnetic intensity and the form of its edge, being quite independent of the form of the shell itself. The action of an electric circuit upon a magnetic system in its neighbourhood may therefore be deduced from the action of a magnetic shell, having the circuit for its boundary, on the same—provided that the magnetic shell passes through no part of the magnetic system. And hence, the action of the system upon the circuit may be deduced from its action upon the shell. Consequently, the mutual action of two circuits may be deduced from the mutual action of two shells which have these circuits as their boundaries, and which have their magnetic intensities equal to the respective current intensities. Lenz's Law of the induction of electric currents (see ELECTRICITY) holds then for more purely magnetic phenomena. In other words, the motion of a magnet in the vicinity of a closed circuit should induce in it a current, whose mechanical action upon the magnet tends to stop its motion. This was experimentally discovered by Faraday, and has since been proved by both Thomson and Helmholtz to be a necessary deduction from Œrsted's discovery taken in connection with the principle of the conservation of energy. It is the fundamental experiment, upon which magneto-electricity is based, and upon which the construction of magneto-electric machines depend.

The magnetic action of electric currents is taken advantage of in the manufacture of magnets. If a steel or hard iron bar be made the core of a coil or helix of wire through which a powerful current is passed, the bar is permanently magnetised. A soft iron core is magnetised only temporarily, and loses its power as soon as the current stops. This property which soft iron possesses of readily acquiring and losing its magnetism on make and break of the current is widely taken advantage of in the construction of electric bells, induction coils, and other electro-magnetic machines. The magnetic action of electric currents further suggested to Ampère his theory of magnetism. He conceived a bar-magnet to owe its magnetism to electric currents revolving round it. This conception may be advantageously applied to Weber's theory of magnetism, and the permanent magnetisation of the molecules may be looked upon as in reality due to electric currents flowing round each. Upon this theory, then, the true seat of magnetic action is in the region surrounding the magnet and not in the magnet itself. The same is indicated by Faraday's wonderful researches in the magnetism of bodies—researches which extended to other bodies than iron with similar magnetic properties. The metal nickel had long been known to behave like iron, and the repulsion of bismuth and antimony by a magnetic pole had also for some time afforded grounds for speculation as to the true nature of M.; but it remained for Faraday to show that all bodies, solid, liquid, or gaseous, are either *paramagnetic* like iron and nickel, or *diamagnetic* like bismuth and antimony. See DIAMAGNETIC.

If the conductor moving relatively to a magnet be a closed circuit, a current of considerable intensity may be induced in it, the direction of which depends upon the direction of motion of the nearest pole relatively to the circuit. Machines constructed with a view to the generation of currents by this means are called *magneto-electric* machines. The first machine of this kind was constructed in 1833 by a Frenchman, Pixii. He made a U-shaped magnet rotate round a vertical and longitudinal axis beneath two fixed coils, in which the currents were induced and utilised. Saxton and Clarke improved upon this arrangement by making the coils rotate instead of the heavier magnet. In Clark's machine the U-shaped magnet is inverted and set vertically, and near its lower extremity the two coils, with soft iron cores, are made to rotate rapidly round a horizontal axis, which passes between the permanent poles. The two iron cores are joined by iron at the back—*i.e.*, at the ends furthest from the horse-shoe magnet. The wires forming the coils are united so as to make one single wire, whose free extremities are attached to a commutator, by means of which the current may be allowed to pass or be broken at will. Each coil passes once in front of each pole during each revolution. The magnetisation of each core is therefore constantly varying in intensity, and suffering constant reversion, so that two equal and opposite currents are induced in each coil at each revolution. At any instant the current in the one coil is right-handed, while that in the other is left-handed; but the coils are so joined that the currents are added to one another, and by an arrangement of contact pieces on the axis the direction of the ultimate current in the external circuit is kept constant. The currents produced by Clarke's machine are of sufficient intensity to decompose water, fuse a thin wire, or magnetise an electro-magnet; but for greater effects the machine would require to be made of inconvenient dimensions. By using a number of coils, and a corresponding series of magnets, a more powerful arrangement may be obtained. Such, for instance, is the machine constructed by Nollet of Bruxelles, which has been successfully used in the lighting of lighthouses. Far more powerful in their effects, however, are the inventions of Siemens, Wheatstone, Wilde, and Ladd. The current induced by the permanent magnet is used in exciting an electro-magnet which is then employed in inducing a second current, which is as much stronger than the original current as the electro-magnet is stronger than the permanent magnet. Siemens and Wheatstone converted the permanent magnet itself into the electro-magnet by sending the induced current round it. These machines can produce currents capable of fusing an iron rod an inch in diameter and a foot long. Great improvements have recently been effected by Gramme; and a Gramme machine, worked by a gas-engine, is now recognised as the most economical means for producing an electric light. Graham Bell's *telephone* must also be regarded as a magneto-electric machine. It consists essentially of a permanent magnet, a closed coil and circuit, and a vibrating iron disk. This disk being in a magnetic field is of course magnetised, and any motion of the disk must induce in the coil a current which flows through the whole circuit. The vibratory motion produced in the disk by articulation of sounds results in the generation of rapidly alternating currents in the circuit; and these currents carried round the coil of a second similar instrument produce variations in the magnetic field there which set its disk into vibrations, similar in every respect to the vibrations of the first disk. These vibrations are then transmitted to the air as sounds, which are an exact reproduction of the original sounds. By this means words have been transmitted through considerable lengths of wire. For standard works see article ELECTRICITY.

Magnif'icat is the name given to the song of the Virgin Mary recorded Luke i. 46–55, which in the Vulgate begins *M. anima mea Dominum*, and which is sung at evening service in the Roman Catholic, Lutheran, and Anglican Churches. The first mention of it, according to Bingham (*Eccl. Ants.*), is about 506, when it was ordered to be sung in the French churches at morning service.

Magno'lia is named by Linnæus after Dr. Pierre Magnol. The natural order *Magnoliaceæ*, having M. for its representative genus, consists of some seventy species of splendid trees or shrubs. The genus *M.* is found abundantly in the S. United States, and is also met with in various parts of Asia. *M. grandiflora*, a native of Carolina, forms a most conspicuous object in the landscape, attaining sometimes a height of 30 feet, and bearing a profusion of flagrant flowers of a milky-white colour 6 to 8 inches in diameter, in contrast to evergreen shining elliptical leaves that measure 9 inches long. Its noble appearance has led to its introduction into British gardens, where, however, it is usually trained against a wall. *M. conspicua*, from China, has also been introduced into cultivation since 1789; its large lily-like flowers, which expand in spring before the leaves are developed, and are produced in large quantity, render the tree at a distance one compact sheet of white. *M. purpurea*, a Japanese species, has fragrant flowers, the outer portions of which are purple and the inner white. It too stands open-air cultivation in S. England. Another handsome species is *M. Campbellii*, a native of Sikkim, and *M. macrophylla*, belonging to the United States, is described as attaining a height of 40 feet, with leaves more than 3 feet long, whilst its flowers attain a diameter of 12 inches. Most of the species possess aromatic tonic properties sufficient to lead to their employment in fevers and rheumatism. *M. glauer* is known in America as 'Swamp Sassafras,' from its ordinary place of growth, and the similarity of its properties to real sassafras. For other notable plants belonging to *Magnoliaceæ* see STAR ANISE, TULIP-TREE, and WINTER'S BARK.

Mag'nus or **Mag'ni, Johannes**, a Swedish historian, born at Linköping, 19th March 1488, studied at Louvain and Köln, and in 1523 was appointed Archbishop of Upsala, with the consent of Gustaf Vasa. His opposition to the Reformation led to his imprisonment for a short time in 1526, after which he visited Prussia, Poland, Germany, and afterwards Italy, where he died at Rome, 22d March 1544. During his exile he wrote a *Historia metropolitanæ Ecclesiæ Upsalensis* (Rome, 1557–60) and *Historia de omnibus Gothorum Sueonumque Regibus* (1554).—**Olaus M.**, brother of the above, born 1490, after holding various posts in the Swedish diplomatic service, accompanied his brother into exile as his secretary, and was after his death appointed titular Archbishop of Upsala, yet remained at Rome, where he died in 1558. He edited his brother's works, and himself wrote a comprehensive *Historia de Gentibus septentrionalibus earumque diversis Statibus* (Rome, 1555; Eng. trans. Lond. 1658), which was long the main source of knowledge of Sweden and the Swedes available to other nations.

Mag'nusen, Finn, the name by which is best known Finnur Magnusson, who was born 27th August 1781, at Skalholt, in Iceland, and in 1815 was appointed professor at Copenhagen, where from 1819 he lectured on old Scandinavian literature and mythology. In 1829 he was made 'Geheimearchivar,' which he continued to be till his death, 24th December 1847. M. was a laborious investigator and profound scholar in Northern mythology, chronology, and palæography. The following are his chief works,—*Udsigt over den kaukasiske Menneskestammes ældste Hjemsted og Udvandringer* (1818), *Bidrag til Nordisk Archæologie* (ib. 1820), *Dansk Oversættelse af Sæmunds Edda I.–V.* (1821–23), *Eddalæren og dens oprindelse* (1824–26), *Priscæ veterum borealium Mythologiæ Lexicon* (1829), *Grönlands historiske Mindesmærker* (1838–42), which last, as well as the posthumous *Antiquités russes* (1860–62), were prepared in conjunction with Rafn.

Mag'pie (*Pica caudata*), a species of insessorial birds, allied to the Crows (q. v.), and included in the Conirostral section of the order. The average length is 18 inches, and the beak, wings, and tail are black, glossed with a beautiful metallic lustre, the breast, abdomen, and flanks, and certain portions of the wings being white. The tail is long and spreading. The food consists of insects and fruit, but the M. is also known to seize the eggs and young of other birds by way of food, and to attack mice, reptiles, &c. The nest is of dome-like shape, and is generally found at the summit of a tall tree. The M. is well known as a tame bird. It learns to talk with great ease and vivacity, and is a most inveterate thief. The M. is common on the Continent, and occurs in N. Asia and in N. America, and is represented by allied species in Eastern Asia.

Magyar'. See HUNGARY.

Mahâbalipûram, or **The Seven Pago'das**, a ruined city on the Coromandel or E. coast of S. India, 33 miles S. from Madras. It is celebrated for its highly ornamented pagodas, and for carvings on the rocks. The city itself is said to be covered by the sea. See Fergusson's *History of Indian Architecture* (Lond. 1876).

Mahâbhârata (probably 'the great story of the children of Bharata'), one of the two great epic poems of Sanskrit literature, containing upwards of 100,000 verses. In many respects it may be compared with the Iliad of Homer. It relates a war between the two rival families of the Kauravas and Pandavas, resulting in the supremacy of the latter in Hindustan. In this there is undoubtedly a basis of historical fact, which it is now impossible to discriminate. With the main story are mingled numerous episodes, taking up three-quarters of the whole, and forming a basis of cosmogony and philosophy for Hindu education. The author is reputed to be Vyasa; but as this name means 'distributor or arranger,' and as it is also assigned to the compiler of the Vedas, &c., it is reasonable to conjecture that the M., like the Iliad, was the growth of many minds and of many years. The complete text has been published in India. See Lassen's *Indische Alterthumskunde* (Bonn, 2d ed. 1875).

Mahâbuleshwar, a hill station and sanitarium in the district of Sattara, Bombay, British India, 30 miles N.W. of Sattara by a good carriage road, and 114 S.E. of Bombay. It is situated 4500 feet above the sea, among the highest peaks of the W. Ghauts, near the sources of the Kistna river. The rainfall is said to average 230 inches, which nearly all falls in the four monsoon months. The station was established by Sir J. Malcolm in 1828; and the climate is considered most beneficial to those suffering from the Guzerat fever.

Mahâdeo ('the great god,' or 'Siva'), a mountain range in the district of Hoshungabad, Central Provinces, British India, 4500 feet above the sea. It has given name to a peculiar formation of sandstone rock, which attains a thickness of 2000 feet, and rises very precipitously from the plain. A great religious gathering used to be held here, but is now stopped on account of its dangers.

Mahâjun (lit. 'great man'), the name throughout India of the rural money-lender, an important personage in almost every village. In some parts of Bengal it is calculated that three-fourths of the cultivators are his debtors. He never charges less than half an *anna* in the rupee per mensem, or 37½ per cent. per annum. But his advances are usually made in kind, for food or seed-grain, to be repaid also in kind after harvest, with a certain recognised addition. It does not appear that he is regarded with any special aversion by the people.

Mahânuddy (Mahanadi, 'great river'), a river of India, which rises near Rajpur in the Central Provinces, and flows in an E. course into the Bay of Bengal by a large delta, S. of False Point, in Orissa. Its total length is 520 miles, and its drainage area 43,800 square miles. It receives many tributaries among the hills, and reaches the plains at Cuttack city by a most picturesque gorge. Its maximum discharge in full flood is said to be 1,800,000 cubic feet per second. It is the husbanding of this enormous water supply that forms the problem of the Orissa canals, which have cost 2½ millions sterling. In the bed of the M. are found diamonds of fine quality. See Hunter's *Orissa* (Lond. 1872).

Mahânunda, a river of N. Bengal, India, which rises in the Himalayas above the district of Darjeeling, and flows on the whole S.E. till it joins the Ganges at Godagaree, after a course of 240 miles. In its lower part it is much used for navigation, especially near Maldah town, and its fish are celebrated.

Mahâvânsa, a Pali chronicle of Ceylon (q. v.), from the earliest ages to the time of Mahanama-thera, its first compiler, (432 A.D.), and carried on by various authors down to 1756. Like the *Dipavansa*, a still earlier history of the island, it opens with a preliminary sketch of Buddhistic India. The Hon. George Turnour published the first thirty-eight chapters (Candy,

1837), and a few others have been edited in different periodicals by Mr. Rhys Davids and others; but the Ceylon Government has now entrusted the completion of the work, from chapter 39 onwards, to the chief priest Sumangala and Batwan Tudawa Pandit, who in December 1876 had brought it down to the reign of Parakrama Bahu (1153).

Mahé, a French settlement on the Malabar or W. coast of S. India, at the mouth of a small estuary, 7 miles S. from Tellicherry, and 636 from Bombay. Area about 2 sq. miles; pop. about 2000. It was finally restored to the French in 1815. The coasting trade in 1872-73 showed an export of £2702, and an import of £2435.

Mah'mud the Ghiznevide, born at Ghuzni, 12th December 967, succeeded his father in the emirship of Khorasan and Bokhara (997), and having conquered the neighbouring provinces of Persia, made Ghuzni (q. v.) his capital, and renounced his allegiance to the califs. He next turned his arms against India, which he invaded fourteen times (1001–28), ravaging Kanoge and Mathura, and carrying off the gates of the famous temple of Somnath. The first of the Mussulman invaders, to him is due the spread of Islam in India. Among a host of men of letters attracted by the splendour of his court, the poet Firdusi (q. v.) stands forth pre-eminent. M. died at Ghuzni, April 30, 1030. See Hammer-Purgstall, *Gemäldesaal Moslemischer Herrscher* (Darm. 1837).

Mahmud II., Sultan of Turkey, son of Abdul Hamid, born 20th July 1785, ascended the throne on the deposition of an elder brother, Mustafa IV. The janissaries revolting in favour of Mustafa, he secured his position by destroying his family root and branch. Soon he was embroiled, not only with mutinous pashas and Servian rebels, but with Russia and England. He concluded peace with England in 1809, and with Russia, in the Bucharest Treaty, May, 1812. Greece revolted in 1821; and her independence followed the battle of Navarino on October 20, 1827. Thereafter the disturbances of the janissaries waxed so great that the sultan broke up the perilous force, killing some six thousand. No sooner had he concluded a second disastrous war with Russia (1829), than Mehemet Ali, pasha of Egypt, raised an insurrection; and while a second disturbance of the same kind was raging, M. died, 1st July 1839. His reign was of interest because of his determined struggle, notwithstanding continued oppositions, interruptions, and disappointments, to introduce the institutions of Christian Europe into Turkey, especially to reform his corrupt and inefficient army, and organise a juster system of taxation.

Mahog'any, an important and valuable furniture wood, the produce of *Swietenia mahagoni*, a tree belonging to the natural order *Cedrelaceæ*, a native of Central America, Mexico, and Cuba, with some of the other W. Indian Islands. The M. tree is of slow growth, but attains to a great height, and it flourishes best on a rocky soil. Its leaves are unequally pinnate, the flowers are axillary, and its fruit consists of a five-celled woody capsule, each cell containing numerous alate seeds. The bark is astringent, and is used as a febrifuge; and the wood also contains the astringent principle catechin, present in catechu. The wood has recently been employed with success in calico-printing, but its great use and value are found in qualities which pre-eminently fit it for use as a furniture wood. It is exceedingly uniform in grain, strong, and free from warping, takes a fine durable polish, and is rich and pleasing in colour. The wood obtained from Cuba and the other W. Indian Islands has generally a handsomer grain than that grown on the mainland, whence in commerce the former is distinguished as Spanish M., the latter being known as Bay M., Baywood, or Honduras M. Spanish M. is cut into veneers, and when richly mottled or possessed of a fine 'curl,' it is exceedingly valuable and costly, while Baywood is plain in appearance, and used only for solid parts of furniture. The beauty of the wood is said to have been first discovered by a carpenter on board Sir Walter Raleigh's vessel in Trinidad harbour in 1595, but it was not brought into prominent notice until the end of the 17th c., when its merits were pointed out by Dr. Gibbons, a London physician. At one time M. was much used in shipbuilding, but now, except for internal fittings, it is not so much employed. The imports of M. into Great Britain during 1876 were 80,705 tons, valued at £737,550. African M. is *Khaya Senegalensis*; Bastard M., *Ratonia apetata*; E. Indian M., *Soymida febrifuga* and *Cedrela toona*; Madeira M., *Persea indica*; and white or wild M., *Stenostomum bifurcatum*.

Mahon, Lord. See STANHOPE.

Maho'ny, Francis, better known by his *nom de plume* of **Father Prout**, was born at Cork in 1805, educated for the Romish Church, and became incumbent of Watergrass Hill. His opinions were of the most cosmopolitan kind, and during the best days of *Fraser's Magazine* he was a constant contributor to its columns. His scholarship was wide, but was utilised by him chiefly for quaint and humorous reference. 'Modest distrust of his own power to please deterred Prout from obtruding much of his personal musings. He preferred chewing the cud of classic fancies or otherwise approved and substantial stuff, delighting to invest with new and varied forms what had long gained universal recognition.' For many years he acted as Paris correspondent for the *Globe* newspaper, and for some years as Roman correspondent of the *Daily News*. Some of his lyrics are of a high order, *The Bells of Shandon* having attained a national reputation. He died at Paris, 18th May 1866. M.'s *Reliques*, collected from *Fraser* in 1836 (new ed. 1860), are the most characteristic of his writings in prose and verse. His later writings were edited by Blanchard Jerrold as *Final Reliques* in 1874.

Mahratt'as, or Marhatt'as, a powerful Hindu nation, who once contested the supremacy of India with the British. Their native country, Maha-rashtra, or the great country, is a tract centering round Poonah, the former capital of the Peishwahs. It extends N. to Guzerat, S. to Canara, and E. about as far as Nagpur; the W. is bounded by the Indian Ocean. It is watered by the rivers Nerbudda, Godavery, and Kistna; and is broken by the N. and the W. Ghauts, which supply natural fortresses. The M. were always a warlike and clever race; but they first became known in history under the leadership of Sivaji the Great, who was born near Poonah in 1627. By his audacity and valour he founded a semi-independent power over all the M. country, when the Mogul Empire was at its height, and while English merchants were settling at Bombay and Surat. His capital was the fort of Raighur, and his family continued to reign at Sattara until 1848. But from about 1712 all real power passed into the hands of the Peishwah or prime minister, who made himself hereditary mayor of the palace, and ultimately established a dynasty at Poonah, which was overthrown by the English in 1818. The last heir to this name was the infamous Nana Sahib. The Raja of Sattara and the Peishwah were always regarded as the heads of the Mahratta confederacy, which is said at one time to have had a collective revenue of 7 millions sterling, and to have been able to bring 100,000 horsemen into the field, besides infantry and guns. But the military strength lay with four great subordinate chiefs, who each carved out for his family a kingdom by arms. Of these, Scindiah was perhaps the greatest. His capital was at Gwalior in Central India, and for many years the Mogul emperor was a puppet in his hands. The capital of Holkar was at Indore, also in Central India; and the Guicowar, or cowherd, reigned at Baroda. These three families still exist as British feudatories, and are proud to maintain the old military magnificence of the M. The fourth was the Bhonsla dynasty of Nagpur, who extended their power as far E. as Orissa, and became extinct in 1853. The early M. policy was based upon hostility to the Mohammedans, and was carried out both by bravery and treachery. The chiefs often quarrelled among themselves; but it is not impossible that they would have recovered India for the Hindus, had it not been for the disastrous battle of Paniput (q.v.), the Flodden of the M., in which they were entirely defeated by the Afghans, allied with the Nawab of Oude. This was in 1761. The British first came into conflict with the M. in 1778, when Warren Hastings was governor-general. A national league was formed against the British by the Nizam of the Deccan, Hyder Ali and the M., but the alliance was short-lived, and though the war was not altogether glorious to the British arms, a creditable peace was concluded at Salbye near Gwalior in 1782. The overthrow of the M. power was the continual aim and the crowning result of the policy of the Marquis of Wellesley. The M. were divided against themselves; Poonah was attacked and plundered by both Holkar and Scindiah; but in 1802, by the treaty of Bassein, the exiled Peishwah was taken under British protection, reinstated at Poonah by an armed force, and induced to pay

£250,000 a year to support a British contingent; the Guicowar of Baroda was also brought under the same subsidiary system. This led to the second Mahratta War, in which Sir Arthur Wellesley, operating from the S., and Lord Lake in the N., completely broke the power of Scindiah and the Nagpur Rajah. The chief battles were Assaye, Argaum, and Laswari. Great cessions of territory were obtained from both chiefs, and they bound themselves no longer to employ French officers. This war only lasted four months of 1803; in the following year Holkar was conquered, also by Lord Lake. The M. were now no longer independent confederate states with disciplined armies; but the disbanded soldiers, with the connivance of their chiefs, joined the marauding Pindarees (q. v.), and became the scourge of all Central India. In 1817 the Marquis of Hastings resolved to put down this pest, and commenced what is sometimes known as the fourth Mahratta War. The Peishwah took this opportunity to attack the Residency at Poonah, but he was defeated and dethroned. The Nagpur Rajah made a similarly treacherous attempt, but his dynasty was continued for a time. Holkar and the Pindarees were overthrown at the battle of Mehidpur, while Scindiah remained a half-hearted ally. Since this date the M. have accepted the British supremacy. Much of their native country now forms an integral portion of the Bombay Presidency, and the great chiefs remained loyal even through the Mutiny of 1857–58, though the native contingents of both Holkar and Scindiah joined the rebels. Their natural abilities have been greatly turned towards commerce; in the S. Mahratta country some of the finest cotton is grown, while the states of Gwalior and Indore produce the opium of Malwa. Among other Mahratta states may be mentioned Tanjore in S. India, founded by a half-brother of Sivaji; Kolhapur, among the W. Ghauts, where a descendant of the great conqueror still governs; and the Puar Rajah of Dhar. The Rao of Kutch is also a Mahratta. It is important to recollect that the M. are not a caste, but a nationality. Sivaji and the Bhonslas claimed to be Rajputs; the Peishwahs were undoubted Brahmins; while Scindiah and the Guicowar have never concealed their Sudra descent. It was as cavalry armed with the spear, and not as infantry or gunners, that they attained their military pre-eminence, in this differing both from the British Sepoys and the Sikhs.

The *Mahratti language*, a vernacular corruption from the Sanskrit, and akin to Guzeratti, is recognised in the courts of Bombay and the Central Provinces. See Colonel Grant Duff's *History of the M.* (Lond. 1826); *Pandurang Hari, or Memoirs of a Hindu*, edited by Sir B. Frere (Lond. 1872), and *Lord Wellesley's Despatches*, edited by Owen (Oxf. 1877).

Mai, Angelo, born at Schilpario, near Bergamo, March 7, 1782, entered the noviciate of the Society of Jesus (1799), but eventually taking orders as a secular priest, became Professor of Greek and Latin at Naples (1804); keeper of the Ambrosian Library at Milan (1813), and of the Vatican Library at Rome (1819); supernumerary apostolic proto-notary (1825); prefect of the Congregation of the Index (1833); and a cardinal (1838). He died at Albano, September 9, 1854. M.'s fame rests chiefly on his discovery on Palimpsests (q. v.) and decipherment of numerous lost works of the classic authors, among them fragments of Cicero's *Orationes* and *De Republica*, and of the writings of Fronto, Plautus, Porphyrius, Dionysius Halicarnassus, Lysimachus, Isæus, and others. The results of his discoveries he collected and gave forth to the world in *Scriptorum Veterum Nova Collectio* (10 vols. 1825–38), *Classicorum Auctorum Collectio* (10 vols. 1828–38), *Spicilegium Romanum* (10 vols. 1839–44), *Patrum Nova Bibliotheca* (6 vols. 1852–53), &c. His noble library, sold for the benefit of the poor of his native village, was purchased by Pio Nono for the Vatican Library.

Maiden, The, a machine for decapitation resembling the guillotine, but without its contrivance for binding its victims. The M. was used in Scotland at least as early as 1556, when it was employed to behead one of the murderers of Rizzio, but was discontinued about the close of the 17th c. The M. used in Edinburgh is still preserved in the Antiquarian Museum there.

Maiden-Hair, a name given to *Adiantum capillus veneris*, a particularly graceful fern, from the fine hair-like stalks of its fronds. In the British Isles it is found on damp rocks near the sea in various counties from Dorset to the Isle of Man, and is again native on the W. coast of Ireland. The genus *Adiantum*, as at present defined by Mr. Basker, contains rather more than sixty species spread through all temperate and hot climates. Many of these are special favourites with fern-fanciers. A fern of another genus, namely the *Asplenium trichomanes*, has frequently the name of black M.-H. applied to it. See CAPILLAIRE.

Mai'denhead, a town of England, in the county of Berks, is picturesquely situated on the right bank of the Thames, 26 miles W. of London by rail. It has a large trade in timber, besides some malting and brewing, and is a favourite resort of Londoners. Pop. (1871) 6173.

Maid'ment, James, was born in London in the last decade of the 18th c., but his parents having settled in Scotland, he was educated at the High School and University of Edinburgh. He passed advocate in 1817. M. was in practice until recent years, and has the reputation of being still one of the best peerage and antiquarian Scottish lawyers. But his life has been much devoted to the resuscitation of quaint and curious *morceaux*, literary, genealogical, and historical, some from original MSS., others from rare and well-nigh forgotten publications. Nearly sixty such works have been edited by M., with illustrative notes, either 'edifying or diverting.' Among these are *Scotland's Complaint upon the Death of our late Soveraigne, King James of most happy memorie, by David Prymerose*, reprinted from the edition of 1625 (Edinb. 1817); *Raid of Ruthven: with Preface and Notes* (Edinb. 1822); *Nugæ Derelictæ quas colligerunt I. M. et R. P.* (Edinb. 1822); *A North Countrie Garland: a Collection of Ancient Ballads never before printed* (1824) *Scottish Pasquils or Lampoons, now first printed from the Original MSS.* (1827–28); *Reliquiæ Scoticæ: from Original MSS. and Scarce Tracts* (1828); *Nugæ Scoticæ* (1829); *Historical Fragments relative to Scottish Affairs from* 1635 *to* 1664 (1832–33); *Catalogues of Scottish Writers* (1833); *Analecta Scotica; Collections illustrative of the Civil, Ecclesiastical, and Literary History of Scotland*, chiefly from original MSS. (1834–38); *The Argyle Papers* (1834); *Ballads and other Fugitive Poetical Pieces* (1834); *Galations, an Ancient Mystery: taken down from the Recitation of the Guisards at Stirling* (1835); *The Correspondence of Sir John Gordon, Baronet* (1835); *Remains of Sir Robert Sibbald* (1837); *Court of Session Garland* (1839); *Reports of Claims preferred to the House of Lords in the Cassilis, Sutherland, and Spynie Peerages* (1840); *A New Book of Old Ballads* (1844); *Scottish Ballads and Songs* (1859); *Ancient Scottish Elegiac Verses;* Lithgow's *Poetical Remains* (1863); *The Dramatists of the Restoration* (11 vols., 1872–75).

Maids of Honour. See LADIES OF THE QUEEN'S HOUSEHOLD.

Maid'stone, an old town of England, county of Kent, on the right bank of the Medway, 43 miles S.E. of London by rail. Its notable buildings are the large Parish Church of All Saints, a fine specimen of Perpendicular Style, dating from the 14th c., the assize court and county jail, built in 1818 at a cost of £200,000, the corn exchange, cavalry barracks, town hall, W. Kent infirmary, museum, &c. The industrial products are paper, oil, farm implements, Roman cement, leather, malt, beer, spirits, and sacking. In the vicinity are extensive quarries, orchards, and hop-gardens. Pop. (1871), 26,237. M. sends two members to Parliament. It was called by the Britons *Caer Megwaid*, the town on the Medway, according to Nennius, and its later name, *Medwegston*, is modified in Domesday Book to *Meddestane*. Fairfax stormed M. in 1648.

Mai'gre (*Sciæna aquila*), a species of Teleostean fishes, belonging to the family *Sciænidæ*. It is common in the Mediterranean Sea, and occasionally occurs on the S. coasts of Britain. It is a fish of some three or four feet in length; though specimens of six feet are not uncommon. Its colour is a silver-grey above and white below, the fins being reddish-brown. The M. is valued for its flesh, but it is very notable for the purring noise or grunting sound it is capable of making, and which is audible even when the fish is in tolerably deep water. In former years the ear-bones of the M. were regarded as charms, which had the power of curing colic.

Mail. See ARMOUR AND CHAIN MAIL.

Mails and Duties, a Scotch law term, denoting the rents of an estate, whether in money or in grain. Hence an action

for the rents, or for an assignation to them, is called an action of M. and D. Under the Quinquennial Prescription Act of 1669 a tenant is not liable for arrears of rent after five years from the time of his removing from the land.

Maimatchin', a town of Mongolia, an entrepôt of the Chinese trade with Russia, on the frontier of the Trans-Baikal government, adjoining the Russian emporium of Kiachta (q. v.). It has lost much of its former importance since the Treaty of Pekin (1860), which opened the whole frontier to Russian commerce. Pop. 2000.

Maimon'ides, or **Rabbi Moses ben Maimon**, abbreviated **Rambam**, was born at Cordova in 1135, and died at Cairo 1204, or according to others 1206. He was descended from a family which had been distinguished for learning for generations; and his father, himself a writer on religion and astronomy, instructed him in all the Arabic and Rabbinical learning. The father, Maimon, had to leave Cordova with his family, in consequence of the persecution of the Jews by the Calif Abdul-Mumen, and removing to Fez he outwardly conformed to Mohammedanism, while secretly maintaining his adherence to Judaism. In 1165 he removed with his family to Acre, and thence to Jerusalem, where he died. On his father's death, M. removed to Cairo, and made a living for a time by the sale of precious stones, but afterwards took to the practice of medicine, and rose to such eminence in that profession as to be appointed physician to Saladin. His knowledge of medicine, however, was but a small part of his immense learning. Besides being a profound student of the Bible and Talmud (q. v.), he studied all the branches of Arabian science, and so much of the Greek philosophy as had been translated into Arabic. He wrote on Jewish theology and law, and on mathematics, astronomy, and medicine, besides giving lectures in the Rabbinical college. But what contributed as much as his vast learning to the extraordinary influence he gained in the Jewish community was his peculiar views regarding Jewish law and tradition. 'It had been usual up to his time,' says Dr. Jost, 'to look upon the law simply as the will of God, demanding obedience and submission, and all inquiry was directed to the ascertaining what was commanded and what was forbidden, without permitting the further inquiry, why. M. started from quite a different ground-principle. He was inspired with the conviction that the Mosaic law and the oral tradition had not been revealed to Israel to oblige them to a blind obedience; but that, as the whole of revelation consists of the highest truth, the highest excellence consists, not in the mere observance of the law, but in an observance resting upon a knowledge of its inner grounds, and that the most incumbent duty of the Israelite is to make a thorough study of it, so as to fulfil it not only according to the letter, but in the right spirit.' His chief theological works were:—*A Commentary on the Mishna* (1168), written in Arabic, but afterwards translated into Hebrew and incorporated with the Talmud; *The Second Law* (1180), which was a complete collection of Jewish law; *Guide to the Erring* or *Teacher of the Perplexed* (also first written in Arabic, but translated into Hebrew in his lifetime), which was 'a sort of key to the right understanding of the words, vocables, phrases, metaphors, parables, allegories, and all those things in sacred Scripture which, when taken in their literal sense, appear to teach something foreign to the purpose, heterodox, paradoxical, absurd, or to have little or no use.' See Jost in Herzog's *Encyclopedie*, art. M., and Rosin, *Die Ethik des M.* (Breslau, 1876), a work in which the obligations of M. to Greek, Arabic, and Jewish writers are clearly and skilfully set forth.

Main (Lat. *magnus*, 'great'), the chief part, hence the open or high sea, as distinguished from inlets, gulfs, and such like. Thomson speaks of the 'Hebrid Isles, placed far amid the melancholy *main*.' The same word enters into the composition of 'mainland,' which is so called in contrast to the small area of islands. In naval affairs, the epithet M. distinguishes the largest mast and its belongings.

Main, a picturesque river in central Germany, springs from the Fichtelgebirge in two branches, the Rothe and Weisse Main, which unite 3 miles S.W. of Kulmbach, after which it flows W. past Bamberg, Würzburg, Aschaffenburg, Offenbach, and Frankfurt to Castel, opposite Mainz, where it joins the Rhine, after a course of 304 miles. It is connected with the Danube by the Ludwigs-Kanal.

Maine, one of the old provinces of France, bounded N. by Normandy, E. by Perche and Orléanais, S. by Touraine and Anjou, and W. by Brittany. It submitted to William the Conqueror (1060), was conquered by Philippe Auguste (1204), recovered by Edward III. (1357), but given up (1360), and finally annexed to the French crown by Louis XI. (1481).

Maine, the most north-easterly state of the American union, is bounded N. by New Brunswick, S. and S.-E. by the Atlantic, E. by New Brunswick, and W. by Quebec and New Hampshire. Area, 35,000 sq. miles; pop. (1870), 626,915. The coast-line, the most irregular in the United States, is 2486 miles long, following its indentations, of which seventeen are large bays, forming excellent harbours, sheltered by islands. The N. part of M. is traversed in a south-westerly direction by the Appalachians, which attain a height in Katahdin of 5385 feet. The range is not continuous here, but is broken by the broad valleys of the Penobscot, Piscataquis, Kennebec, Androscoggin, and the Aroostook, a branch of the St. John, which forms part of the N. boundary. The lakes on the river courses have an aggregate area of 2300 sq. miles, and of these the chief is the Moosehead, 35 miles long. The rocks in the S. are mainly Eozoic, in the N., including the watershed, Silurian and Primitive. Much of this surface is covered with glacial drift. Along the coast are quarries of roofing-slate and lime, which supply most of the United States. Other minerals of economic value are iron, galena, granite, and white marble. The soil is only rich in the valleys, and some three-fifths of the surface are still under forest—in the N. chiefly pine, hemlock, and spruce, in the S. white and red oak, beech, ash, birch, and maple. Among fruit-trees are the plum, cherry, pear, and apple. M. is almost the only state where are still found the moose and carribou, and here they are fast disappearing before the hunter. The lakes and rivers abound with fish and winged game, while the mountains are the haunt of the black bear, deer, catamount, wild cat, wolf, racoon, porcupine, martin, badger, sable, &c. The climate is one of extremes, ranging at Portland from 24° to 100° F., and the average rainfall amounting yearly to 45 inches. In 1873 the produce of hay was 2,007,000 tons (value $25,087,500), Indian corn, 852,600 bushels, wheat 219,750, oats 1,305.750, barley 420,280, rye 26,010, and potatoes 2,997,100. The factory system of making cheese and butter was introduced in 1872. In 1873 there were 55,960 horses, 126,878 milch cows, 75,503 working oxen, 138,479 other cattle, 338,682 sheep, and 63,000 swine—total value, $20,096,272. In 1873 the value of cotton goods produced was $12,427,670; of woollens, $6,605,292; of boots and shoes, $8,820,986; of lumber, $9,230,222; of minerals, $4,822,050, and leather, $3,187,300. The value of all industrial products was $96,209,136. In 1875 there were 968 miles of railway. M. publishes sixty-five newspapers. Augusta is the state-capital, but the chief cities are Portland, Bangor, and Lewiston. First settled in 1623, M. was annexed to Massachusetts, and made an independent state in 1820. A dispute with Britain as to the N.-E. boundary, which was begun about 1784, and nearly resulted in war, was settled by the Ashburton treaty in 1842. In 1851 the state legislature passed the M. liquor law, prohibiting the sale of all intoxicating liquors as a beverage. Since the Civil War much has been done to encourage immigration, and a large Swedish colony is now established within the territory.

Maine, Sir Henry James Sumner, LL.D., born in 1822, entered Pembroke College, Cambridge, came out senior classic (1844), was elected a Fellow, but took his M.A. from Trinity Hall (1847), and was created LL.D. *per litteras regias*. He was appointed Regius Professor of Civil Law at Cambridge (1847), Reader on Jurisprudence at the Middle Temple (1854), and Law Member of the Supreme Government of India (1862). His powers as a jurist were evidenced during a seven years' residence in India by his introduction of many healthful legislative reforms; and, returning to England in October 1869, he received the Corpus Professorship of Jurisprudence in the University of Oxford (1870), a seat in the Council of the Secretary of State for India (1871), and the rank of a K.C.S.I. He is author of *Ancient Law: Its Connection with the Early History of Society, and its Relation to Modern Ideas* (1861); *Village Communities in the East and West* (1871); and *Lectures on the Early History of Institutions* (1873).

Maine-et-Loire, a department of France, in the lower basin of the Loire. Area, 2749 sq. miles; pop. (1872), 518,471. It is traversed from E. to W. by the Loire, which here receives the Mayenne and the Authion from the N. and the Layon from the S. In part richly wooded, it also yields cereals to the value of 61,000,000 francs. Among other products are excellent fruits and wine. There are coal and iron mines, textile industries, chiefly at Cholet (q. v.), and a trade in grain, wine, cattle, &c. The chief town is Angers.

Mai'notes, the people of Maina, a mountain region of Laconia, in the Peloponnesus, between the Messenian and Laconian gulfs. The name is first met with in the 10th c., but the M. boast their descent from the ancient Spartans, though some regard them as of Slavic origin. They remained pagan till the reign of Basil (867–886 A.D.), and were never brought completely under Turkish rule. They fought bravely for the liberation of Greece. The M. are now estimated at 60,000.

Main'tenance is the intermeddling in an action or suit that does not concern the person interfering. It is punishable by fine and imprisonment. A man may, however, with impunity maintain the suit of his near kinsman, servant, or poor neighbour.

Mainte'non, Madame de, belonged to a Huguenot family, and was born of a scapegrace father, Constant d'Aubigné, in the prison of Niort, 27th November 1635. She was baptized Françoise d'Aubigné, and educated by mother and aunt alternately as Catholic and Protestant. Forced by poverty to marry the deformed and sickly Scarron, she acted as his nurse for many years, and at his death (1660), depended solely on royal bounty for support. In 1664 Mde. Scarron became governess to Mde. de Montespan's children, and when these grew too numerous to hide, she took them with her to a large house in Paris, where she often received their father, Louis XIV. The king had been prejudiced against her; her beauty had fled, for she was now over forty, yet he declared on seeing her that to be loved by such a woman was worth a life. He bought her the estate of Maintenon, the name of which she assumed, and privately married her about the year 1685. Till his death she maintained absolute rule over him, changing him from profligate to bigot, putting upon the court the mask of decency at least, and certainly doing France a service by opposing the extravagant policy of Louvois. At her desire Louis founded St. Cyr, a religious seminary for young ladies of quality. She eagerly pressed the King to revoke the Edict of Nantes, though she professed to have no hand in the ruthless *dragonnades* that followed. M. lived a life of splendid loneliness, preserving what, for these days, was a spotless and admirable character, and on the king's death retired to St. Cyr, where she died, 15th April 1719. The first good collection of her *Lettres* was that by Lavallée in his edition of her *Œuvres* (Par. 1854 *et seq.*); the most complete is by the same writer (4 vols. Par. 1865–66). See *Histoire de Mme. de M.*, by the Duc de Noailles (Par. 1848–59), and one of the most brilliant of Sainte-Beuve's *Causeries du Lundi* (vol. iv.).

Mainz (Fr. *Mayence*), a strongly fortified town of Germany, in Hessen-Darmstadt, on the left bank of the Rhine, opposite and below the influx of the Main, 7 miles S. of Wiesbaden by rail. It communicates with the small town of Castel by a bridge of boats 600 yards long, and is defended by a principal rampart (comprising 14 bastions and a citadel), a series of advanced forts connected by a glacis, and several advanced entrenchments, all strengthened since 1866. The cathedral, founded in 978, partly destroyed six times, and finally restored in the beginning of the present century, is an imposing structure, various parts of which date from the 12th and 15th centuries. It is beautifully vaulted and frescoed, contains 14 altars and 20 minor chapels, is surmounted by two fine domes, flanked by two towers (one 324 feet high), and is richer in interesting tombs than any other cathedral in Germany. Other buildings are the Gothic Church of St. Stephen (built 1318, and restored 1857), with an octagonal tower 214 feet high; the old Electoral Palace (1627–78), containing a rich collection of Roman remains, a picture gallery, and a library of 100,000 vols.; the arsenal, the palace of the Grand Duke, the barracks, a Fruchthalle (used for concerts), a theatre, &c. A bronze statue of Gutenberg, a native of M., designed by Thorwaldsen, was erected here by subscriptions from all parts of Europe The *neue anlage*, or public promenade, commands beautiful views of the river. There are many Roman remains, including the *Eigelstein*, a sort of cairn, 42 feet high, erected in honour of Drusus, and 62 pillars of an aqueduct, several 30 feet high. M. manufactures tobacco, soap, artificial pearls, carriages, isinglass, vinegar, &c., and has a large transit trade in grain and wine. Pop. (1875), 57,847. M., the ancient *Moguntiacum*, was a Roman fortress, founded by Drusus in 14 B.C. It became the seat of the first German bishopric (751), and subsequently the centre of the powerful 'League of the Rhenish Towns,' established in 1254. It was then called 'Golden M.,' on account of its prosperity. Its university, founded in 1477, was suppressed by the French, to whom the city was ceded by the Peace of Campo Formio in 1797. In 1814 it was assigned to the Grand Duchy of Hessen, and declared an imperial fortress by the Treaty of Versailles, 15th November 1870. See Schaab, *Geschichte der Stadt M.* (Mainz, 1841–44), and Klein, *M. und Seine Umgebungen* (Mainz, 1873, new ed. 1861).

Maiol'ica, or Majol'ica. This art term, now loosely applied to all kinds of enamelled earthenware, ought properly to be restricted to the tin-enamelled lustred ware introduced into Europe by the Moors, and perfected in Italy during the Renaissance. The Italians named this peculiar ware M. because they first became acquainted with it through Majorca (then currently spelled *Maiolica*), where, as well as in Spain, the Moors had established potteries.

Maistre, Comte Joseph de, a French politico-religious thinker, was born at Chambéry, in Savoy, April 1, 1754, educated at Turin, and under the influence of his parents adopted strict Catholic opinions. By 1788 he had become a senator, but when the territories of the Sardinian king were over-run by the French, M. accompanied his master to the island of Sardinia. In 1803 he went to St. Petersburg as ambassador from the court of Turin. He remained in Russia for fourteen years, and died at Turin, 26th February 1821. His chief works, *Du Pape* (Lyon, 1821), *De l'Église Gallicane* (Par. 1821–22), *Soirées de St. Petersbourg* (Par. 1822), place him at the head of the school of 'revived Catholicism'—a school brought into existence as a protest against the anarchy which closed the 18th c. See Sainte-Beuve, *Portraits Contemporains* (vol. ii.); John Morley's *Critical Miscellanies* (first series).

Maitland, a town in New S. Wales, 93 miles N. of Sydney. It is divided into two distinct municipalities, E. and W. M., and from its low-lying position on the banks of the Hunter river, is liable to disastrous floods. The surrounding district is so fertile as to be called 'the granary of New S. Wales.' Coal and kerosene shale are abundant in the district. Pop. (1874) W. M., 5381; E. M., 2282: total, 7663.

Maitland, the name of a celebrated Scottish family. Its first distinguished member was the poet, **Sir Richard M.**, of Lethington, born in 1496, and educated at St. Andrews and in France. Before 1561, when he was made a lord of session, he had become blind. From 1562 to 1567 he was privy seal. He died 20th March 1586. M. wrote, in his later years, a number of familiar poems, printed at Glasgow in 1830 by the Maitland Club, which is named after him. He also collected 272 early Scottish poems in two MS. vols. that are now preserved in the Pepysian Library at Cambridge.—**William M.**, often called **Secretary Lethington**, the eldest son of the above, was born about 1525, and educated at St. Andrews and in France. In 1555, through the influence of Knox, he became a Protestant. Mary of Guise made him secretary of state in 1558, but in Oct. 1559 he joined the lords of the congregation, and took part in the negotiations leading to the Treaty of Berwick (Jan. 1560). On Mary's coming to Scotland, M. became one of her chief advisers, and was repeatedly her ambassador to Elizabeth. He was made extraordinary lord of session in 1561, and in 1563 led the prosecution against Knox for high treason, in which, as well as in the church debate with Knox, in June 1564, he displayed great ability, but was discomfited. His complicity in the murder of Rizzio at first cost him the queen's favour, but before the end of 1566 he was again her trusted secretary. M. was privy to the murder of Darnley, yet he joined the nobles who effected Bothwell's removal. He was present at James VI.'s coronation in 1567, and, though secretly corresponding with Mary, was with her enemies at Langside. After Mary's flight, Murray,

whom he had often offended, caused him to be arrested at the Council Board (3d September 1569), on a charge of being accessory to Darnley's murder. He was imprisoned at Stirling, then removed to Edinburgh, where by a trick his friend Kirkcaldy of Grange had him removed to the castle. M., still plotting for Mary, was proclaimed a traitor (May 14, 1571), and on the surrender of the castle in 1573, fell into the hands of Morton. He died in prison at Leith, June 9, 1573, probably by suicide. M. was one of the ablest men of his time—fertile in invention, astute, and highly accomplished, but too crafty and unscrupulous to retain the confidence of any party. Buchanan has severely censured his crooked ways in his satirical tract, *The Chameleon*.—**John M.**, the only **Duke of Lauderdale**, eldest son of John, first Earl of Lauderdale, and grandson of John, first Lord Thirlstane (brother of Maitland of Lethington), was born 24th May 1616. After a superior education under Presbyterian influences, he entered public life as a supporter of the Covenant, and as such took his seat in the famous Assembly of Divines at Westminster in 1643. In the following year M. was one of the Commissioners employed to treat with Charles I. at Uxbridge, and again, in 1647, of those sent to induce him to sign the Covenant. After this he went to Holland, where he remained till 1650. He returned with Charles II. in that year, but was taken prisoner at the battle of Worcester (1651), and kept in the Tower till released by Monk in 1660. He forthwith repaired to the Hague, and ingratiated himself with Charles. Gradually, after the fall of Middleton (1662) and Rothes (1667), all authority in Scotland fell into his hands. By arbitrary and merciless measures against the Covenanters he gained the favour of the court, and in 1672 he was created Marquis of March and Duke of Lauderdale, two years afterwards being raised to the English peerage as Viscount Petersham and Earl of Guilford, with a seat in the Privy Council. He was a member of the 'Cabal' administration, after the fall of which he still retained his power in Scotland. But at length his venality and arrogance wore out the patience of the nation; he lost the favour of the Duke of York, and in 1682 was removed from all his public offices. He died at Tunbridge on the 24th August of the same year. M. was a man of ability and learning, but of a disgusting appearance, and an imperious, passionate, and cruel disposition.—**James M., Eighth Earl of Lauderdale**, born 26th January 1759, and educated at Edinburgh, Glasgow, and Paris, was from 1780 a member of the House of Commons and a steady supporter of Fox. In 1789, on his father's death, he entered the Upper House. During Fox's ministry he was made a peer of Great Britain and member of the privy council. In 1816 he opposed Napoleon's removal to St. Helena. M. is also known for his *Inquiry into the Nature and Origin of Public Wealth* (1804), which provoked a controversy with Lord Brougham, and his pamphlets on Bullion in 1812. He died 13th Sept. 1839. See Anderson's *Scottish Nation* (Edinb. 1863).

Maize (*Zea mays*; Sp. *maiz*, from Haytian *mahiz*), a genus of grasses belonging to the tribe *Phalarideæ*. They are monœcious plants, with male flowers in terminal racemes, and the females axillary in the sheaths of the leaves. The *Z. mays*, or Indian corn—the well-known and important cereal—is on the best authority indigenous to the warmer parts of S. America; it was, however, found in cultivation in Central America at the time of the discovery of the continent, and it is supposed by some that a variety is native in the W. India Islands. Since its introduction to Europe the range of cultivation has spread to most of the warmer temperate regions of the globe, and it is largely grown in India, in parts of Africa, whilst in Australia it thrives in a marvellous manner. In favourable summers it grows freely, and ripens its 'cobs' in Britain, but the large supply required for the home consumption is chiefly imported from the United States. As a cereal it has many qualities to recommend it for culture where the climate is sufficiently warm to ripen the grain properly, growing, as it does, freely in diverse soils, and under dissimilar states of moisture and dryness. The crop is easily saved, and with ordinary care the grain is as easily preserved. Indeed Meyen calculated that the return from M. under the most favourable circumstances would be eight hundredfold, and under any circumstances it is the largest yielder amongst cereals in warm countries. As a fattening saccharine green-fodder M. is also justly appreciated. A fine flour called maizena, corn flour, Oswego flour, prepared from this grain, is now extensively used as a valuable article of light diet, and its ordinary meal mixed with other flour furnishes good bread, but by itself the deficiency of gluten renders it unsatisfactory for the purpose. (See INDIAN CORN.) In America the various dishes *hominy*, *mush*, *pop-corn*, are preparations of M., and the young 'cobs' are often boiled for the table or are pickled. Sugar, treacle, a beer called Chica (q. v.), a spirituous liquor, and vinegar, are all obtainable from this useful grass, whilst the refuse parts, such as the stalks, the dried leaves, the spathes, are further turned to profitable services. The spathes, for instance, are much used for packing oranges and lemons, and from the straw good writing and printing paper can be prepared. Five other species of *Zea* are natives of S. America.

Maj'esty (Lat. *majestas*, from the old *majus*, *i.e.*, *magnus*, 'great'), a title common to all sovereigns, except the Sultan of Turkey, who is addressed as 'Your Highness.' It was originally the term used to denote the authority and dignity of the people of Rome. On the establishment of the empire it was transferred to the Imperatores (*Augusti*), and from them it passed to the sovereigns of Western Europe. Henri II. of France was the first of these who bore the title. At the treaty of Cambrai (1529) Karl V. alone was so distinguished; but at the Peace of Crespy in 1554, 'Royal M.' was attributed both to Karl V. and François I., and at the Peace of Château-Cambresis in 1559, the title 'Most Christian and Catholic M.' was for the first time employed. In England Henry VIII. first assumed the style of M. From the idea of M. flow the so-called *Rights of Majesty*, essentially consisting in the irresponsibility of the monarch, and the sacredness and inviolability of his person.

Majesty, Letter of, an imperial or royal writ, but especially the document whereby the Emperor Rudolf II. crushed (11th June 1609) the religious freedom of the Bohemian Protestants, and removed various of their civil rights, and whose abrogation by the Emperor Matthias in 1618 occasioned the Thirty Years' War (q. v.).

Ma'jor. See SCALE, KEY, INTERVAL.

Major, in the British army, is a mounted field-officer, second to the lieutenant-colonel in command of a regiment. Before promotion to a majority a captain must pass an examination as to the manipulation of a small military force in the field. The appointment as M. to a regiment is for five years, but is renewable. There were 720 majors on full pay according to the army estimates of 1876. Their daily pay varies from 24s. 5d. in the household cavalry to 14s. 6d. in the artillery. About 200 years ago these officers were termed serjeant-majors, the title now in use for the highest rank of non-commissioned officers.

Ma'jor or **Mair, John**, was born at Cleghornie, near North Berwick, in 1469, and educated, it is believed, partly at Oxford and Cambridge, and partly at the university of Paris. In 1500 he became a doctor of the Sorbonne, and in 1519 accepted a professorship at St. Andrews, but the political discord sent him back to Paris, where he devoted himself to teaching. In 1533 he was appointed provost of St. Salvator's College, University of St. Andrews, an office which he retained till 1549. His opinions concerning ecclesiastical and secular government were of a bold and liberal order, and both upon Knox and Buchanan exercised considerable influence, though the latter speaks disparagingly of him—*solo cognomine, Major*. The *In quatuor Sententiarum lib. Commentarius* (published at Paris, 1516) won him a European reputation as a commentator, and his *De Historia Gentis Scotorum, seu Historia Majoris Britanniæ*, published at Paris, 1521 (reprint, Edinb. 1740), began to tone down the fabulous element which held so large a place in Scotch annals. He died at St. Andrews about 1550.

Major'ca (Sp. *Mallorca*), the largest of the Balearic Isles (q. v.) belonging to Spain, lies in the Mediterranean, 107 miles S.E. of the mouth of the Ebro. Area, 1420 sq. miles; pop. 262,893. It is mountainous in the N., rising in Silla de Torellas to a height of 4596 feet, but slopes to the S., where are several good harbours. With a rich soil and a climate that is a perpetual spring, it produces plentifully the cereals, fruits, and herbs of S. Europe, and also exports marble, slate, plaster, &c. The capital is Palma.

Major'ity. See AGE.

Makall'ah, a seaport of Arabia, 300 miles E.N.E. of Aden, is much visited by vessels for provisions, and exports gum, hides, senna, &c. Pop. 7000.

Makó, a town of Hungary, on the Maros, 120 miles S.W. of Pesth, has many mills, and a trade in wine, hemp, cattle, &c. Pop. (1869) 27,449.

Makrizi, Ahmed al, an Arabian writer, was born about 1360 at Cairo, his surname being derived from Makriz, a suburb of Baalbek, where his family had formerly resided. At Cairo he spent the greater part of his life, teaching jurisprudence and filling the offices of *mohtasib* ('inspector of weights and measures'), and of *khatib* and *imâm* in the mosques of Amrou and Hakem; and there he died in the early part of 1442. Of his numerous writings on Egyptian topography and history, a complete list is given in De Sacy's *Chrestomathie Arabe* (Par. 1806), and several of them have been translated into Latin, French, and German.

Malabar' (*Malayalam*, 'country skirting the hills'), the name formerly given to the entire W. coast of the Indian Peninsula, between the W. Ghauts and the Arabian Sea, in opposition to the Coromandel coast on the E. It was the scene of the first settlements of European nations, especially of the Portuguese. —The British *district* of M., to which the name is properly restricted, is in the Presidency of Madras, and is bounded N. by Canara, and S. by the State of Cochin, and is separated by the mountains from Mysore and Coorg. Area, 6002 sq. miles; pop. (1871) 2,261,750. The majority are Hindus, among whom the Nair and Tiar castes are prominent; the Moplah tribe of Arabian Mohammedans are numerous, as also are Syrian and Roman Catholic Christians. The chief towns are the seaports of Calicut, Cannanore, Jellicherry, and Cochin; and Palghaut inland. A European regiment is required to restrain the fanaticism of the Moplahs. Harbours are numerous, and the coasting trade is very large. In 1874–75 the exports were £2,253,423, chiefly coffee, products of the cocoanut-palm, and pepper; the imports were £920,913, chiefly rice, piece goods, and cotton twist. The forests produce teak, rosewood, and sandal-wood. The mountainous tracts called the Wynaud yield abundant coffee, and are said to possess gold. Other products are cordage, oil (both made from the cocoa-nut), betel nuts, arrowroot, and ginger. M. is in the presidency of Madras.

Malacca, a British settlement on the S.W. coast of the Malay peninsula, extending 40 miles along the Strait of M., and inland for a distance of 25 miles. Area, 1000 sq. miles; pop. (1871) 77,755. It is for the most part flat, and jungly, and is bounded E. by a range of hills, attaining its greatest height of 3920 feet in Mount Ophir. The climate is healthy, the temperature ranging from 72° to 85° F., and the products are rice, timber, sago, pepper, rattans, and tin from the mines in the district of Naning. Malays and Hindus constitute the bulk of the inhabitants. The capital, M., lies at the mouth of a small river, and has a pop. of some 10,000. Its church of Our Lady del Monte was founded through the exertions of St. Francis Xavier. Originally a settlement of the Portuguese under Albuquerque (1509), M. passed to the Dutch in 1642, and in 1795 to the British, to whom it was formally ceded in 1824.

Strait of M., separating the Malay peninsula on the N.E. from Sumatra on the S.W. is 520 miles long, and 25 broad at the S., and 200 at the N. extremity.

Mal'achi (prob. a contraction of *malachijah*, 'messenger of Jehovah') was chronologically the last of the Hebrew prophets, as his book is the last in the O. T. canon. He is placed by most critics in the age of Nehemiah, and if those be right who place him during Nehemiah's second visit to Judæa, then he prophesied before the 32d year of Artaxerxes Longimanus, B.C. 433 (M. ii. 10, 11, iii. 8–10, *cf.* Neh. v. 14, xiii. 10–12, 23–30), although some critics think it more probable that the book was composed under a predecessor of Nehemiah. The tone of the book is thoroughly post-exilian. The priestly and prophetic spirit struggle for mastery.

Mal'achite, a green-coloured mineral, composed essentially of carbonate of copper, and occurring associated with other ores of copper as an incrustation or stalactite. It is found in abundance in Cornwall, also in S. Australia, Siberia, Tyrol, and Cuba. It is capable of receiving a high polish, and is much used for ornaments and inlaid work.

Mal'achy, St., born at Armagh in 1094, became a priest (1119), Abbot of Bangor (1121), Bishop of Connor (1124), and Archbishop of Armagh (1134). Resigning the primacy (1137), he visited St. Bernard at Clairvaux, and Pope Innocent II. at Rome, and returned as papal legate (1139) to Ireland, where he founded a Cistercian monastery (1142), and brought the synod of Inis Padrig to recognise the supremacy of Rome (1148). He died at Clairvaux, whither he had again repaired to meet Eugenius II., in the arms of St. Bernard, his friend and biographer, November 2, 1148. The *Prophecy of St. M. concerning the Future Roman Pontiffs* is to be found in Moreri's *Dictionnaire Historique* (ed. 1759, vol. vii. p. 117). It is a clumsy forgery, written probably by some partisan of Cardinal Simoncelli (1590), and first alluded to by Arnold de Wyon (*circa* 1595).

Malacoptery'gii or **Malacop'teri** (Gr. 'soft-finned'), a group of Teleostean fishes represented by the eel, herring, salmon, trout, carp, barbel, &c. The fin-rays are *soft* and many-jointed. The swimming-bladder is always developed, and communicates with the throat by means of a duct. The scales are usually *cycloid*, although *ganoid scales* may be developed. The ventral fins may be wanting (eels, *M. Apoda*), or when present are placed on the abdomen (salmon, herring, &c.)—the latter forming the *M. abdominalia*.

Mal'aga, a province of S. Spain, bordering on the Mediterranean, and bounded E. by Granada, and W. by Cadiz. Area, 2823 sq. miles; pop. 505,010. It is partly cultivated, partly consists of high mountains and wooded hills. Corn is abundant, and the cultivation of the sugar cane yielded in 1874 219,000 cwts. (worth £189,200), though in 1875, owing to an early frost, it amounted but to 150,000 cwts.

Malaga, a fortified seaport in Spain, in the province of Malaga, on the Mediterranean, at the mouth of the Guadalmedina ('river of the town'), 100 miles S.S.E. of Cordova by rail. It is beautifully situated at the foot of the Moorish citadel El Gibralfaro, and though generally uneven and irregularly built, has some fine streets and squares, chief of which are the Calle de la Alameda, Cortina del Muelle, and Calle Nueva, the Plaza de la Constitution, and Plaza de Riego. The Moorish arsenal (the Atarazonas), and the Alcazaba, at the foot of the castle-hill, once the favourite residences of the Moorish nobility, are now frequented by the poorest. Several forts protect the town and harbour (which can hold over 450 ships). The 'Molo' is 1382 yards long. M. is a flourishing centre of trade; it has two great iron foundries, and manufactures cottons, linens, and chemicals. In 1875, 192 English vessels, of 112,153 tons, entered the port; cleared 186, of 109,933 tons. The principal imports are timber, staves, and deals, iron, steel, hardware, and machinery, tin-plates, hides, cotton, petroleum, fire-bricks, spirits, sugar, and cocoa; and exports raisins, almonds, figs, grapes, lemons, oranges, wine, oil, soap, peas, esparto-grass, and lead. *M. wines* are sweet and rich, some red, others white; of the former, Don Pedro Ximenes is the best; of the latter, M. muscatel and Lagrima di M. M., though said to have been founded by the Romans, bears a name clearly derived from the Phœnician (*malaca*, 'salt'). From 1015 to 1079 it was the residence of independent Moorish kings, but in 1487 it was taken by the Spaniards. Pop. (1860) 94,732.

Malaguett'a Pepper. See GRAINS OF PARADISE.

Malapteru'rus (Gr. 'soft fin-tail'), a genus of Teleostean fishes, belonging to the family of the sheat-fishes or *Siluridæ*. *M. electricus* is a familiar species, occurring in the Nile; *M. Beninensis* being found on the W. coast of Africa. The former is a fish with electrical organs, and capable of giving shocks of considerable power. It has a soft dorsal fin near the tail.

Mala'ria. See MIASMA.

Malay Apples. See EUGENIA.

Malay' Archipel'ago, also called **Eastern** or **Indian Archipelago** and **Malai'sia**, the largest cluster of islands in the world, lying in the Indian Ocean, Pacific Ocean, and the Chinese Sea, between the S.E. of Asia and the N.W. of Australia, in long. 95°–140° E., and lat. 19° N.–11° S. Area, about 650,000 sq. miles; estimated pop. 22,829,000. The islands,

mainly of volcanic origin, are of the most diversified shapes. They are for the most part covered with tropical forests, and traversed by lofty mountain ranges. The seven principal groups are (1) the Sunda Islands in the W. and S., including Sumatra, Java, &c.; (2) Borneo, in the centre, the largest island in the world; (3) the Celebes, E. of Borneo; (4) the Moluccas or Spice Islands, in the extreme E.; (5) the Sulu Islands, and (6) the Philippines in the N. The climate is genially tempered by the surrounding seas, and the chief products are rare plants and spices, valuable timber, cotton, tobacco, sugar, and fruits. The wild animals comprise the elephant, tiger, panther, deer, wild-hog, ourang-outang, monkey, &c. The Dutch are masters of many of the islands; the Spaniards have only the Philippines, the Portuguese, Dilli and part of Timor, and the British, Labuan and Singapore. Malays (q. v.) are the principal inhabitants; Papuans or Negritos occupy many islands to the E., and a large number of Chinese are scattered throughout the archipelago. See A. R. Wallace's *M. A.* (2 vols. 1869).

Malays' (native, *Malayu*), a name of uncertain derivation given by themselves to the dominant people in the Malay peninsula and archipelago, in a larger ethnological sense including the Polynesians and the Madecasses, or inhabitants of Madagascar. Some ethnologists (after Blumenbach) have made the M. the distinct type of a fifth or brown race of mankind, but the best recent savants class them with the Mongols. Brown in colour, and short in stature, the M. have prominent facial bones, black coarse hair, large dark eyes, flat features, and high cheek-bones. They have long been divided into three classes:—(1) the so-called civilised M., who work in gold and filigree, make weapons, sailing vessels, &c., and have a written language; (2) the *orang-laut*, a kind of sea-gypsies or pirates; and (3) the *orang-utan*, 'wild men,' or dwellers in the woods. Idle, lying, treacherous, implacable, the M. of the second class are skilful sailors, but are much given to drinking, gambling, and cockfighting. They are professed Mohammedans (since the 12th c.), and their language, soft in sound and simple in construction, is the *lingua franca* of Eastern commerce. Of the many dialects, the most refined is Javanese. The literature is meagre, and is marked by prevailing Sanskrit and Arabic influence. The alphabet used is Arabic. See Malay Grammars and Dictionaries by Marsden (1812), Crawfurd (2 vols. 1852), Dr. Pijnappel (Amsterd. 1874), and L'Abbé P. Favre (Vien. 1875), the posthumous work of Von Dewall (1876), and the *Transactions* of the Asiatic Societies of the Hague and Batavia.

Mal'colm, the name of four Scottish kings. **M. I.**, 'King of Alban,' succeeded Constantine by the Tanist law in 942, and first sought to extend his authority beyond the Spey, slaying Cellach, ruler of Moreb (Moray). By promising to perform military and naval duties for Eadmund king of England, he was allowed to annex Strathclyde (945), which became an appanage of the heir-apparent of the Scottish crown. This transaction has been interpreted by one school of controversialists as a testimony to the absolute vassalage of the king of Scotland to the king of England; by another as a token of feebleness of the English king. According to the Ulster Annals, M. was slain in 954—the Pictish chronicle says by the Men of Moerne at Fodresach (Fetteresso) in Kincardineshire.—**M. II.**, son of Kenneth, and grandson of M. I., became 'king of Alban' in 1005, and reigned for thirty years. The principal events were his unsuccessful attempt to wrest the regions north of the Spey from the grasp of Sigurd, Earl of Orkney, his invasions of the Earldom of Lothian, and his ultimate victory at Carham (1018), by which he retained the territory, doing homage for it to the English king, and his acknowledgment of Cnut (1031) as overlord. Tighernac records his death in 1034, calling him 'King of Alban and head of the nobility of Western Europe,' but in the Chronicle of Marianus Scotus (a contemporary), he is called *rex Scotiæ*—the first time the land of Alban received that name.—**M. III.** (1057–93), surnamed Canmore ('great head'), during his long reign saw the beginning of what was one of the most momentous changes in the character of Scotland. The Norman conquest of England drove numbers of Englishmen N. At one time there were as exiles at his court Eadgar the Ætheling, his mother, and two sisters. The consequence was that manners began to be transformed from the Celtic towards the English type. In support of the Ætheling, M. made a raid into Durham with the most cruel results. He also married Margaret, sister of the Ætheling. In 1072 he acknowledged William as his overlord, but afterwards broke his vassalage, and harried the country as far as the Tyne. A peace ensued till 1092, when M. again made a southern invasion. On the fifth expedition of this kind he and his son perished on the banks of the Alne, November 13, 1093.—**M. IV.**, grandson of David, reigned from the spring of 1153 to the winter of 1165. He was only twelve years of age when the crown came to him. The events of his reign are the subjection of Galloway, the treachery and antagonism of the chiefs, and the loss of the northern counties of England. See J. H. Burton's *History of Scotland*, vol. i.; Freeman's *History of the Norman Conquest*, vol. i.; and Skene's *Celtic Scotland*, vol. i.

Malcolm, Sir John, G.C.B., a distinguished political or diplomatic officer in India during the most troubled period of the British rule, was the son of a Scotch yeoman, and was born 2 May 1769, near Langholm in Dumfriesshire. He arrived at Madras as an infantry cadet before he was fifteen. In a diplomatic capacity he was present at the fall of Seringapatam, and in the Mahratta campaigns of the Duke of Wellington. M. was thrice sent as ambassador to Persia, in 1800, 1808, and 1810, and his memory is still honoured in that country. But his chief distinction is as the pacifier of Central India after the wars of Holkar and the Peishwah in 1817. From 1827 to 1830 he was Governor of Bombay; and on his return to England sat in Parliament for Launceston, as an ardent supporter of his lifelong friend the Duke of Wellington. He died in London, 31st May 1833, and was honoured with a statue in Westminster Abbey, and an obelisk on his native hills. M. wrote a *History of Persia* (2 vols. 1815), *Political History of India*, 1784–1823 (1826), and *Life of Lord Clive* (published 1836). Three of his brothers also attained knighthood in the public service. See *The Life of Sir J. M.*, by Sir J. W. Kaye (2 vols. Lond. 1856).

Mal'dive Islands ('thousand isles'), a group of coral formation in the Indian Ocean, about 340 miles W. of Ceylon. They are fertile in various kinds of palm and bread fruit. The inhabitants, who are Mahommedans of Malay origin, and are estimated at 200,000, are expert sailors, and carry on a considerable trade. They recognise a sultan, who lives on the largest island, called Mahl, and is tributary to the government of Ceylon. They bear a good reputation for kindness to shipwrecked mariners. In 1875 the exports to British India, excluding Ceylon, were valued at £29,562; the imports at £29,829.

Mal'don, a river port of England, in the county of Essex, on the Chelmer, 16 miles S.W. of Colchester by rail. It has two churches, a town-hall, custom-house, public-hall (1860), and manufactures of crystallised salt, silk fabrics, ropes, sails, farm implements, &c. The value of exports (1874) was £57,096; and 151 vessels, of 9521 tons, belonged to the port, besides 371 fishing-boats. There entered (1875) 1876 vessels, of 93,633 tons; cleared 1950, of 86,049 tons. M. returns one member to Parliament. Pop. (1871) 5586.

Male'branche, Nicolas de, the youngest of a family of ten children, was born at Paris, August 6, 1638, studied philosophy at the College of La Marche, and theology at the Sorbonne, entering in 1660 the Congregation of the Oratory. Here he studied Greek, history, and Hebrew, but the *Traité de l'Homme* of Descartes turned the course of his studies towards philosophy. The result was shown in his *Recherche de la Vérité* (1674–75), a treatise which developed the idea that the reason, absolutely untrammelled, is the principle of certainty, that divorced from the control of the senses, it approaches supreme truths, that it sees in the thought of God the primal cause of phenomena, and that phenomena themselves carry the mark of their celestial origin. Theologians accused him of extravagance and infidelity, and denied that a doctrine of free-will could be evolved from his philosophy. As an answer he published *Traité de la Nature et de la Grace* (1680), which roused the opposition both of Arnauld and Bossuet, an opposition which was carried on in an interchange of bitter treatises for six years. In 1688, M. published the *Entretiens sur la Metaphysique et sur la Religion*, 'a complete *résumé*' of all his doctrine upon the soul and its union with the body, the nature of ideas, the imperfection of sense, the vision in God, the empire of Providence, and the laws observed in the regulations of soul and body. On account of the lucidity and elegance of his style he is ranked among the French classics. M. died at the Oratory St. Honoré, Paris,

13th October 1715. See Damiron, *Histoire de la Philosophie du Dixseptieme Siecle.*

Male'sherbes, Chrétien, Guillaume de Lamoignon de, was born 6th December 1721 at Paris, received his education among the Jesuits, was returned to Parliament 3d July 1744, became President of the Court of Aids (1750), and censor of the press. He boldly denounced to the king the character of the administration under which the poorer classes were overloaded with taxation. At the same time the leniency and generosity of his exercise of the censorship gave greater freedom of speech to contemporary writers; and to his exertions are greatly due the *Encyclopédie*. M. retired at the royal request to his own estates (1771), was recalled (1774) by Louis XVI., and immediately began working at a scheme of fiscal reform, which was thwarted by the dismissal of Turgot. Once more returning to privacy he remained in it until 1793, when he volunteered to defend the king against the charges of the Convention. His devoted behaviour on that occasion sealed his own fate, for he was imprisoned in the gaol at Port Libre (December 1793), and guillotined, April 22, 1794. M. was brave, wise, and learned, besides being one of the most intelligent pioneers of freedom during the period in which he lived. See Sainte-Beuve's *Causeries du Lundi*, vol ii.

Malibran, Mdme. (Maria Felicita), daughter of Manuel Garcia (q. v.), was born at Paris, March 24, 1808. Brought to London in 1816, she made her début there as *Rosina* in *Il Barbiere*, June 7, 1825. Her visit to the United States of America, 1825–27, as one of her father's operatic troupe, was the means of introducing the Italian opera into that country. There she married Eugene Malibran, a merchant; after the dissolution of this marriage she became the wife of De Bériot, the violinist, at Paris, 1836. From 1827 to her death at Manchester, 23d September 1836, she commonly spent the winter in Paris and the spring in England, increasing her reputation as a magnificent mezzo-soprano singer and a graceful actress.

Malig'nant Pus'tule, is a disease which has been long known on the Continent, in France, Germany, Russia, Sweden, Lapland, and Italy, but its occurrence escaped general recognition in this country till 1863, when Dr. William Budd showed that it had been long known in this country as an Epizoötic (q. v.), causing every year a large mortality among English live stock. Among cattle M. P. is called *joint murrain, black quarter*, or *quarter evil*, and by the French, *charbon, quartier*, and *sang*, and by the Germans *milzbrand*. The identity of the M. P. of man with the *charbon* or *splenic fever* of cattle has been satisfactorily proved; for the disease, when contracted by man, has been communicated back to the animal by innoculation. In man the specific poison is implanted on some uncovered part, as the hands or face, and produces, in the first instance, a redness like the bite of a gnat. This is followed by a minute vesicle, and a peculiar form of gangrenous inflammation spreading to the neighbouring tissues, the death of which is so complete that sensation is entirely lost. Crops of secondary vesicles form around the erysipelatous-like areola; the lymphatics become inflamed; the breath fetid, and death follows amid all the indications of septic poisoning. At the outset the disease is local, but in a very short time general poisoning ensues, so that the disease is amenable to treatment only at the earliest stage of the disease. The disease may be communicated to man (1), by direct innoculation, as in the case of butchers, farmers, skinners, and drovers; (2), by contact with the skin or the hair of diseased beasts; (3), by eating the flesh of animals killed while affected with it, or by using the milk or butter of those thus affected; and (4), by insects which have been in contact with the bodies or carcases of diseased animals. Dr. Trousseau states that in two factories in Paris, where the horse-hair was imported from Buenos Ayres, and in which only six or eight hands were employed, twenty persons died in ten years from M. P. In 1876 there was a death from M. P. in Glasgow Royal Infirmary, the patient having been a worker in a hair factory.

Malig'nant Tu'mours. See CANCER and TUMOURS.

Malines, the French name for Mechlin (q. v.).

Malin'gering: See FEIGNING OF DISEASE.

Mall'ard (*Anas boschas*), a well-known species of *Anatidæ* or ducks, popularly known also as the wild duck. The male is brilliant or metallic green on the head and neck, the lower part of the neck being encircled with a collar of white. The back is a chestnut-brown, and the remaining tints include a grey below and various black markings. The female is of a sombre brown hue. The average length is 2 feet. The nest is made of grass, and is lined with soft down. It is placed close to the water's edge, and the eggs are large and white, tinted with green. The M. arrives in this country in October, and is snared in large numbers in nets and by decoys.

Malleabil'ity, the property which certain kinds of matter possess of extending under the blows of a hammer. It is thus opposed to brittleness, and is a property almost restricted to metals. The most malleable of known substances is gold, which can be beaten out to leaves only $\frac{1}{280000}$ of an inch in thickness. The commoner metals rank in M. as follows:—Silver, copper, platinum, iron, aluminium, tin, zinc, lead. M. varies with temperature, each metal having a particular temperature for maximum M.

Malle'aceæ, a group of *Lamellibranchiate* Mollusca, represented by the *Malleus* or Hammer Oyster (q. v.).

Mall'et, Paul Henri, historian and archæologist, was born in 1730 at Geneva, where he became Professor of History in 1760. Subsequently, on account of his researches, pensions were granted him by friendly princes. He died in his native city, February 8, 1807. Besides his histories of Denmark, Hessen, Brunswick, Switzerland, and the Hanseatic League, M. wrote *Introduction à l'Histoire de Danemarc*, translated into English by Bishop Percy under the title of *Northern Antiquities* (2 vols. Lond. 1770), a work of great merit considering the period at which it was produced. The best edition is that by I. A. Blackwell (Bohn. 1849).

Mall'et, originally **Mall'och, David,** a Scottish *littérateur*, born at Crieff, Perthshire, about 1700, was for some time tutor in the family of the Duke of Montrose, and after travelling over the continent of Europe, settled in London, where he died, 21st April 1765. He wrote several plays, *Eurydice, Mustapha*, the masque of *Alfred* (in conjunction with Thomson), a *Life of Lord Bacon*, &c., but is now only remembered, and that faintly, for his ballad of *William and Margaret*, in which some natural pathos finds expression through the conventional diction of the time. M. was an unscrupulous pamphleteer.

Mall'ow (*Malva*) is the genus from which the natural order *Malvaceæ* takes its name. In *Malva* proper there are sixteen species, all natives of Europe, temperate Asia, and N. Africa; and adding the closely-allied genera of the marsh M. (*Althæa*) and tree M. (*Lavatera*), the total number of species bearing the name of M. is forty-six. The separation of the three genera is founded on certain differences in their outer floral envelopes. *Malva* is represented in Britain by the common M., the dwarf M., and the musk M.—the last-named being so called from its slight musk odour. The common M. from its mucilaginous property is much used as a rustic (and quack) medicine. The dwarf M. is grown in Egypt as a pot herb. The tree M. bears also the name of Bass M., from growing on the Bass Rock at the mouth of the Firth of Forth—formerly in plenty, now sparsely.

Mallow', a market-town of Ireland, on the Blackwater, 19½ miles N.N.W. of Cork by rail, has a court-house, gaol, barracks, county infirmary, and a mineral spring, the hottest in Ireland. Brewing, tanning, and salt-refining are the chief industries. M. returns one member to Parliament. Pop. (1871) 4165.

Malmes'bury, a market-town of England, in Wiltshire, on the Avon, 12 miles W. of Swindon, has breweries and tanneries, and some manufactures of ribbons and pillow-lace. Its chief interest lies in its buildings—the ruined Benedictine abbey (founded, according to William of M., before the year 670) the abbey church, a 15th c. market-cross, and the house where Hobbes the philosopher was born. M. returns one member to Parliament. Pop. of parliamentary borough (1871), 6879.

Malmesbury, James Harris, First Earl of, an English diplomatist, son of James Harris (q. v.) the philologist, was born at Salisbury, 9th April 1746, and educated at Oxford and Leyden. He was Secretary to the Embassy at Madrid in 1768, Ambassador at Berlin, 1772–76, at St. Petersburg, 1777–82, at the Hague, 1784–88, and again at Berlin, 1793–97. At the last-

mainly of volcanic origin, are of the most diversified shapes. They are for the most part covered with tropical forests, and traversed by lofty mountain ranges. The seven principal groups are (1) the Sunda Islands in the W. and S., including Sumatra, Java, &c.; (2) Borneo, in the centre, the largest island in the world; (3) the Celebes, E. of Borneo; (4) the Moluccas or Spice Islands, in the extreme E.; (5) the Sulu Islands, and (6) the Philippines in the N. The climate is genially tempered by the surrounding seas, and the chief products are rare plants and spices, valuable timber, cotton, tobacco, sugar, and fruits. The wild animals comprise the elephant, tiger, panther, deer, wild-hog, ourang-outang, monkey, &c. The Dutch are masters of many of the islands; the Spaniards have only the Philippines, the Portuguese, Dilli and part of Timor, and the British, Labuan and Singapore. Malays (q. v.) are the principal inhabitants · Papuans or Negritos occupy many islands to the E., and a lar number of Chinese are scattered throughout the archipe' See A. R. Wallace's *M. A.* (2 vols. 1869).

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Malm'sey, or **Malva'sia**, is the richest and most characteristic variety of wine produced in the island of Madeira (see MADEIRA WINES). It has been cultivated for at least two centuries. There are several qualities of M., the finest being the produce of a very limited area on the S. of the island, and it is reserved for the royal table of Portugal.

Malone', Edmund, was born 4th October 1741 at Dublin, educated at the university of his native place, and called to the bar in 1767. Instead of practising, he went to London, cultivated the acquaintance of men of letters, and made literature his pursuit. In 1780 he published his researches upon the text of Shakspeare; in 1790 appeared *The Plays and Poems of W. Shakspeare*, a remarkably careful edition, with suggestive notes, and in 1797 he edited an edition of Sir Joshua Reynold's posthumous works. M.'s sagacity and discrimination were shown in the detection of Chatterton's Rowley forgeries, and the Shakspearian forgeries of the Irelands. He died in London, 25th May 1812. See Prior's *Life of E. M.* (1860).

Mal'ory, Sir Thomas, the compiler of *The Most Ancient and Famous History of the Renowned Prince Arthur*, of whom we only know that he was a knight, and that he completed his work in the ninth year of the reign of Edward IV. (1469–70). Of this quaint volume, based on the great prose romances of Merlin, Lancelot, Tristram, the Queste du St. Graal, and the Mort Artus, seven black-letter editions are known to exist—Caxton's (July 1485), of which the only complete copy is in the Earl of Jersey's library at Osterley Park, Middlesex; two by Wynkyn de Worde (1498 and 1529); Copland's (1557); two by Thomas East, one folio, the other 4to, both undated; and William Stansby's (1634), which last edition has been reprinted in *Walker's British Classics* (2 vols. 1816), by Joseph Haslewood (3 vols. 1816), and by Thomas Wright (3 vols. 1866). Of Caxton's original edition a reprint appeared in 1817, edited by Robert Southey. See ARTHUR.

knowledged William as his alian anatomist, was vassalage, and harried the arch 10, 1628. He was ensued till 1092, when isa, and Messina succes- the fifth expedition of as first physician to Pope banks of the Alne November 29, 1694. His chief David, reigned my of the skin, the kidney, and He was only of which are now known by his The events y of works upon the subjects of his treachery llected and published under the title northern .686). His *Opera Posthuma* (1697) were *Scotla* Montpellier, and his *Opera Medica et Anato-* vol. by Gravinelli.

eæ is a natural order of exogenous trees and limbing twiners, consisting of about 600 species outed throughout tropical and sub-tropical regions, part being natives of America. The climbing portion n Brazil, interlacing the trees of the forest and trailing e rocky places. Several species belonging to the order rown in hothouses for their showy flowers and creeping t. The bark of some species of *Byrsonima* is used in their native countries for tanning purposes, also for snake bites, skin diseases, &c., and the fruit of others, as also of the *Malpighia urens*, is used as food. See ALCORNOCO, and BARBADOES CHERRY.

Malpighian Bodies. See KIDNEY and SPLEEN.

Mal'plaquet, a village in France, department of Nord, on the Belgian frontier, 26 miles E. by S. of Valenciennes, where the Austrians and English, under Prince Eugene and Marlborough, defeated the French under Villars, September 12, 1709.

Mal'ström (Norw. *male*, 'grind,' and *ström*, 'stream'), or **Mos'köström**, a violent current in Lofoten (q. v.), between Moskö and Moskenæsö, which is often described as a terrible whirlpool, but is only dangerous during the N.W. winds of autumn and winter. Fifty miles S.S.E., the yet more violent **Saltström** between Godö and Strömö to Salten Fjord, at the spring-tides raises such seas as bar all vessels from entering the fjord.

Malt is barley or any other grain in which germination has been induced for the purpose of partially converting its starch into sugar, fitting it for brewing or distilling. The process of malting is described in detail under the head BEER and BREWING. During the year 1876, in the United Kingdom, 60,929,633 bushels of M. were charged with duty, amounting to £8,262,746.

Extract of M., prepared by concentrating an infusion of malt, enters into a number of medicinal preparations, and is regarded as a valuable dietetic remedy in America.

M. refuse consists of the *cornings* or rootlets which are screened from the sprouted M., and of *brewer's grains* or *draff*, names applied to the M. after the extraction of its valuable ingredients. These waste substances are useful for feeding cattle.

Mal'ta, a British island in the Mediterranean, situated 58 miles S. of Sicily, and 200 N. by E. of Tripoli. Area, 142 sq. miles; pop. (1871) 145,604. It is about 17 miles long and 10 broad, is mainly formed of limestone, and has cliffy shores hollowed by the sea into innumerable caves and grottoes, and fringed by many islets and rocks. Some 4 miles N.W. lies the smaller island of Gozzo (q. v.), and between it and M. is Comino, separated from M. by the Freghi Rhede. The Ben-jemma hills or crags, which extend across the island, do not exceed a height of 590 feet, and the surface is varied by parallel valleys, of which the most extensive is Melleha. A shallow surface-soil is well cultivated, and yields grain, cotton, sugar, wine (resembling that of Spain), oranges, figs, and olives. Other products are aloes, salt, soda, marble, alabaster, building-stones, &c. There are fine mules, asses, and goats, and birds of brilliant plumage. The climate is hot, but healthy. M. is, however, chiefly important as a military and naval station on the route to Egypt and India, and on account of the excellence of its harbours and the vast fortifications around the capital, Valetta (q. v.). Medina, ('the city'), now called Citta Vecchia, the former capital (pop. 7000), lies near the centre of the island, is still a bishop's see, and has a palace of the grand masters of St. John, a cathedral, a college, &c. The island contains numerous small towns and casals or villages. It is governed by the commandant of the garrison, aided by a council of sixteen, of whom eight are freely elected

and eight are officials. In 1874 the revenue was £175,073, and the expenditure £161,734. At the beginning of 1876 the total effective force amounted to 5143 men, and the cost of the colony to the British exchequer (1873) was £306,433. Since 1823 the language of business has been mainly English, but over the island both Italian and a corrupt Arabic mixed with words from various other languages are spoken. The prevailing religion is Roman Catholic.

History.—At a very early period the island was probably colonised by the Phœnicians. Though it became in a great measure Hellenised, there is no trace in history of *Melita* having ever fallen into the hands of the Greeks. Long a Carthaginian colony, it was ravaged by a Roman fleet, B.C. 257, and surrendered by Hamilcar, son of Gisco, to the Romans in the second Punic War (B. C. 218). In sacred history it is celebrated as the place where St. Paul was shipwrecked on his voyage to Rome, A. D. 60. The name first appears in its corrupted form of *Malta* in the Maritime Itinerary. After the fall of the Roman empire, M. was taken by the Vandals (454), and by the Goths (494), but was recovered by Belisarius in 533, and remained subject to the Byzantine empire until it was conquered in 870 by the Arabs, who called it *Maltache*. The Sicilian Normans seized it in 1090, and it subsequently passed to the German emperor by marriage-contract, was taken by Charles of Anjou, and retained by the French till recovered by the Emperor Karl V., who gave it to the knights of the order of St. John of Jerusalem, then recently driven by the Turks from Rhodes. The knights strongly fortified M., and by repeatedly punishing the fierce Barbary pirates, provoked the Turks to assaults of M. in 1557 and 1565. In the latter siege, the fame of which spread throughout Christendom, Sultan Solyman was forced to re-embark with a loss of over 25,000 of his best troops. The knights and Maltese fought gallantly with Don Juan of Austria against the Turks at Lepanto in 1571. Warring incessantly with the Moslem, the knights held M. till Napoleon made himself master of the island by treachery in 1798. It was captured in 1800 by the English, to whom it was formally ceded by the Peace of Paris. See Boisgelin, *Ancient and Modern M.* (2 vols. Lond. 1805); Bres, *M. Antica Illustrata* (Rome, 1816); Avalos, *Tableau Historique, Politique, Physique et Moral de Malte* (Par. 1830); Tullack, *M. under the Phœnicians, Knights, and English* (Lond. 1861); and Adam, *Notes of a Naturalist* (Edin. 1870).

Malta, Knights of. See JOHN, KNIGHTS OF ST.

Mal'te-Brun, properly **Malthe Konrad Bruun,** a famous geographer, born at Thisted, Jütland, 12th August 1775, was intended for the Church, but preferred literature; studied at Copenhagen, ardently advocated the principles of the French Revolution, and was banished in 1800. In Paris he devoted himself chiefly to the study of geography, an almost unknown subject then, as may be inferred from Voltaire's calling Copenhagen a city in Skaane. For several years he was joint editor of the *Journal des Débats*, and a selection of his contributions was published by Nachet (3 vols. 1828). But his fame rests on his geographical works—*Géographie, Mathématique, Physique et Politique* (conjointly with Mentelle, 16 vols. 1803–5); *Tableau de la Pologne* (1808); *Annales des Voyages, de la Géographie, et de l'Histoire* (24 vols. 1808–15); *Précis de la Géographie Universelle* (8 vols. 1810–29); *Traité Élémentaire de Géographie* (2 vols. 1830–31), &c. M., who did much for the establishment of the *Société de Géographie*, died 14th December 1826.—**Victor-Adolphe M.**, his son, born in 1816, is secretary of the *Société de Géographie* (since 1855), and the author of many admirable geographical works.

Maltese' Cross, a cross of eight points, or *patée* ('pawed,' from Fr. *patte*, 'paw'), so called from its having been adopted by the knights of Malta. See JOHN, KNIGHTS OF ST.

Maltese Dog, a species of pet dog, covered with long silky hair, of white colour and beautiful lustre. It was originally brought from Malta, and is still uncommon enough to fetch a very high price. The ears are long, and the tail curls over the back.

Mal'thus, Thomas Robert, an English economist, was born at Albury, near Guildford, in 1766. His father was a wealthy and accomplished man of studious habits; one of his tutors was Gilbert Wakefield, the pugnacious but warm-hearted correspondent of Charles Fox and Bishop Watson. After a distinguished career at Cambridge, M. took holy orders, but his clerical duties did not interfere with his studies. He travelled through the north of Europe with the indefatigable Edward Daniel Clarke, and also saw France and Switzerland during the Peace of Amiens. In 1805 M. became Professor of Political Economy at Haileybury College, where he taught till his death, 29th December 1834. M. received no preferment in the Church, but he was elected a member of the principal learned societies in Europe. He helped to found the extinct Political Economy Club and the still flourishing Statistical Society. In 1798 he published anonymously the first sketch, *Essay on the Principle of Population*, of his chief work, which he acknowledged and greatly extended in 1803 and again in 1817. It proceeds on the assumptions that population increases in a geometrical ratio, or that every generation doubles itself; and that the means of subsistence cannot increase faster, by the increased application of capital and skill, than in an arithmetical ratio. As, however, population depends on food, its growth is restrained by the want of it, either guarded against or actually felt. Hence the famous positive and preventive checks of—1. moral restraint, 2. vice, 3. misery (including starvation and disease). Hume had already discredited the 'populousness of ancient nations,' and the subject had been treated with some system by Rev. Robert Wallace (*Numbers of Mankind in Ancient and Modern Times*, Edin. 1758). On the other hand, Godwin in the *Inquirer*, and Condorcet had maintained an indefinite growth of the human race; and this view was afterwards supported by Sadler, Price, Doubleday, and to a certain extent by Carey and Senior. It has lately been suggested that procreation should be artificially prevented (*Proceedings of British Association, Plymouth*, 1877). M. also published *Principles of Political Economy* (3 vols. Lond. 1819–20; new ed. 1836), and *Definitions in Political Economy* (Lond. 1827). See Memoir by Bishop Otter, prefixed to the 1836 edition of the *Principles of Political Economy*.

Mal'ton, a market-town of England, in the N. Riding of Yorkshire, on the Derwent, 18 miles N.N.E. of York. Its chief buildings are the Priory Church, now (1878) in course of restoration at the expense (£10,000) of Earl Fitzwilliam, the Norman church of St. Michael, restored 1859, the town-hall, corn-exchange, and assembly rooms. New waterworks were completed in 1867. Brewing, tanning, iron and brass founding, and the manufacture of machinery and farm-implements, are the staple industries. M. returns one member to Parliament. Pop. (1871) 8168.

Malu'rus, and **Malurine Birds,** a group of *Incessores*, found in Australia, and belonging to the *Dentirostral* section of the order. The nostrils are open, and the tail is long and rounded. The hinder toe has a strong claw. To this group belong the emeu wrens (*Stipiturus*) and the blue wren (*Malurus*), &c.

Malva'ceæ, a large and important order of exogens which numbers about 700 species, world-wide in their distribution excepting the very cold regions. It comprises herbs, shrubs, and soft-wooded trees, with entire or variously divided leaves furnished with stipules, and the whole plant often covered with stellate hairs. Flowers usually axillary or in spikes, often with a double calyx; sepals three to five or more; petals five, and twisted in the bud. Stamens numerous, united, forming a tube. Pistils one to three or more, with myed stigmas. Fruit, a capsule, dry or pulpy, with the seeds involved in wool-like hairs. Many are of a weedy nature, but generally have pretty flowers, and others are favourite garden plants. They abound in mucilage, and are not known to possess any poisonous qualities. The bark of many yields textile materials, and cotton is the seed-covering in the most important genus of the order. The tree-mallow has lately been cultivated in the N. of Scotland for paper-making purposes. See ABELMOSCHUS, COTTON, HIBISCUS, HOLLYHOCK, MALLOW, MARSH-MALLOW, SIDA, and URENA.

Mal'vern, Great, a town of England, in Worcestershire, on the E. side of the Malvern Hills, 9 miles S.W. of Worcester by rail. Its picturesque vicinity, sheltered situation, and pure mineral springs have made it a resort of the fashionable. There

are several large hydropathic establishments, and in the centre of the town are fine promenade gardens. M. Proprietary College (founded 1865) is a Gothic building, with a façade 210 feet long, and a central tower 100 feet high, and is designed to accommodate 600 boys. Pop. (1871) 5693. Little M. is a village 3 miles to the S.

M. Hills, in the S.W. of Worcester and in Hereford, form part of the W. boundary of the Severn valley, reach a height of 1396 feet, and afford extensive views of Wales.

Malwa', the name of a former Mohammedan kingdom in India, which covered the plateau between the Nerbudda and Bundelkund, almost co-extensive with the present Central Indian Agency. Pop. 241,000. The capital was at Mandu. After the defeat of the Mahratta chiefs Scindiah and Holkar, and the dispersal of the Pindaree marauders, this tract was pacified by Sir John Malcolm in 1817. It produces the famous M. opium of commerce, on which the duty is levied at Bombay, to the amount annually of more than £2,000,000 sterling on 40,000 chests. M. is the home of the Bheels, a wild hill tribe, who have been converted into excellent soldiers. Under the W. M. Agency there are twenty-one independent chiefs, or *thakurs*, who pay tribute either to Scindiah or Holkar. The principal is the Rajah of Rutlam. See Darnall's *Chronological and Historical Chart of India* (Lond. 1877).

Mame'lukes (Arab. 'slaves'), the name given to the soldiery by which the sultans formerly governed Egypt. Their origin dates from the conquests of Genghis-Khan (q. v.). That monarch sold 12,000 of his captives, mostly Mingrelians and Tcherkesses, but also Turks and Kiptchaks, to Nejmeddin Eyyub, Sultan of Egypt, who formed them into a military force. Ever turbulent and rebellious, in 1251 they murdered the Sultan Turan-Shah, and for 266 years Egypt was ruled by a succession of Mameluke princes. In 1517 the Mameluke dynasty was overthrown by Selim I., and Egypt was henceforth governed by a Turkish pasha, the M. continuing to rule the provinces in the subordinate position of Beys. The decline of the Ottoman power in the 18th c. rekindled their ambition, and before 1770 Ali-Bey, the most powerful of the Mameluke chiefs, had made himself wholly independent of the Porte. The M. played a prominent and patriotic part during the French invasion of 1799, but in 1811 they were massacred to a man by Mehemet-Ali (q. v.).

Mamia'ni, Count Terenzio della Rovere, was born at Pesaro, in the States of the Church in 1802, came into notice (1831) in the outbreak of the Romagna against the temporal authority of Pope Gregory XVI., and took refuge in France, where he devoted his leisure to the cultivation of philosophy and poetry. In 1833 appeared his *Inni Sacri*, in 1836 his *Nuove Poesie*, the latter being an attempt to apply to the Christian legends the method of Homeric verse. During his absence from Italy he kept a watchful eye upon the political opportunities afforded in behalf of the national freedom of his native land, and at Paris he created a propagandist society. In 1848 he returned to Rome, became a member of the moderate Liberal party, and was appointed President of the Cabinet. His moderation compelled him to retire, but at Turin he founded the Society of the Union of Italy, going back to Rome to become Foreign Minister in the Galletti Cabinet. From Genoa, in 1859, he went to the Parliament of Turin, and became Minister of Public Instruction (Jan. 1860), ambassador to Greece (March 1861), Italian minister at Bern (1865). In his philosophical works M. strove to reconcile the spirit of Christianity with the last results of scientific investigation. In 1870 he started a quarterly review, *La Filosofia delle Scuole Italiane*.

Mamma'lia (from Lat. *mamma*, 'the breast'), a class, at once the highest of *Vertebrates* and of the animal kingdom, represented by the animals familiarly named 'quadrupeds,' and by man. Other animals, such as whales, 'sea-cows,' &c., are included in this type, these forms being mammals specially adapted for an aquatic existence. M. may be defined as a class characterised by having *two occipital condyles;* by being *warm-blooded;* by having a *four-chambered heart* and *non-nucleated* red blood corpuscles; a *body-covering* of *hairs;* and *mammary or milk-glands*, by the secretion of which the young are nourished for a longer or shorter period after birth. The general consideration of the class may be commenced by a reference to the body-covering. Hairs are present usually in a very perfect degree, but in some forms (*e.g.*, whales) the hairy covering may be limited to a few hairs surrounding the mouth, while in such forms as the Pangolins (*Manis*) horny scales cover the body, and in the armadillos bony plates exist. The hairy covering in others (*e.g.*, porcupines) is modified to form strong spines. The *internal skeleton* varies in the development of its various parts. Except in whales, &c., the great regions of the body seen in man are usually to be recognised. In man himself, and in some monkeys and bats, the lowest number of vertebræ is found. In man, seven cervical, twelve dorsal, five lumbar, five sacral, and three or four coccygeal or tail-vertebræ occur. The cervical vertebræ rarely exceed seven in mammals. Even the giraffe has but seven in its elongated neck; the manatee and one of the sloths (*Cholæpus*) have six only, while a three-toed sloth has nine. The back or dorsal segments number twelve as a rule, an armadillo has ten only, a lemur sixteen, while the elephants have twenty dorsal vertebræ, and the two-toed sloth no less than twenty-four. There are only two or three lumbar vertebræ in *Ornithorhynchus* and *Echidna;* as many as twenty-four exist in dolphins, but some of the so-called dorsal vertebræ may belong to the tail. The tail varies greatly in length. Thirty-three vertebræ exist in this part in the long-tailed spider monkeys; in the bats, on the other hand, only two may be developed. The *ribs* correspond in number with the *dorsal* or back-vertebræ. Twenty-four pairs of ribs exist in the two-toed sloth, and in some whales, on the contrary, only nine pairs are found. The skull is joined to the spine by means of two condyles in mammals; birds and reptiles have one condyle only. And while in the latter animals the lower jaw is of *compound nature*, and articulates with the skull by means of a *quadrate bone*, in M. the lower jaw is always of *simple* nature, and articulates directly, and of itself with the skull. The *limbs* of mammals are usually four in number, but (as in sea-cows and whales) only two fore limbs may exist in the form of swimming-paddles, whilst all four limbs are developed as swimming organs in seals and walruses. The bone known as the *coracoid bone*, in all mammals except the Ornithorhynchus, is a mere process of the *scapula* or shoulder-blade. In the Ornithorhynchus the coracoid bone is distinct and bird-like, and forms the chief support of the fore limb. The *teeth* of mammals usually number four distinct kinds, *incisors*, *canines*, *molars*, and *premolars*, but great variations (noticed in the articles relating to the various mammalian orders) exist in the form, structure, and arrangement of these organs. The great armadillo possesses no less than ninety; while over 200 are found in the dolphins. Certain teeth, such as the incisors of elephants and Rodents, grow throughout life, and form the *tusks* of these animals, while the canines of the walruses are similarly enlarged. Usually two sets of teeth are developed, but, as in dolphins and Edentata, one set only may be developed. The Guinea-pigs shed their milk teeth before birth. The *thorax* or chest of M. is completely separated from the abdomen by a midriff or *diaphragm*, and the lungs never exhibit the open structure seen in birds. The *stomach* is usually simple, but may be of complex character, as in *Ruminantia* (q. v.) or as seen in the pig, in kangaroos, &c. The *blood-corpuscles* are *non-nucleated, i.e.*, do not, as in reptiles and birds, possess a central *nucleus* or particle. The blood-corpuscles of M. are of circular shape, those of the camels, however, being elliptical in form. The *mammary* or *milk-glands* number two in man and apes, and are placed on the chest (*pectoral mammæ*). In whales there are also two mammæ, but these are *inguinal* in position, *i.e.*, are situated in the groin. In elephants, sloths, and sea-cows, two pectoral mammæ are found as in man. The Insectivorous Tanrecs have no fewer than twenty-two milk-glands. These glands unite to form the *udder* in Ruminants. The *nipples* of the glands rarely exist in an odd number, but some opossums exemplify this condition. The structure of the mammary gland is alluded to in the article BREAST (q. v.). The *classification* of M. forms a subject of great difficulty, owing to the different features which have been from time to time selected as a basis for arranging these animals. Owen has, for example, arranged the mammals in the following order, according to the form and structure of the *brain*, but this 'cerebral classification' has not been generally adopted, pre-

sumably from the difficulty of determining the brain-characters of any given series of these animals :—

Divisions.	Orders.
I. LYENCEPHALA (q. v.) ('smooth-brained').	*Monotremata* and *Marsupialia.*
II. LISSENCEPHALA (q. v.) ('smooth or even-brained').	*Insectivora, Edentata, Rodentia, Cheiroptera.*
III. GYRENCEPHALA ('convoluted-brains').	*Quadrumana, Ungulata, Proboscidea, Carnivora, Cetacea, Sirenia.*
IV. ARCHENCEPHALA (arch or 'dome-brained').	*Bimana* (*Man*).

The system of Mammalian arrangement depending on the *feet and teeth* is also defective in many respects, although forming perhaps the most readily understood of all the classifications of this group ; but probably the most satisfactory arrangement is that founded, according to De Blainville's system, on the peculiarities of the *female reproductive organs*, and on the character of the *Placenta* (q. v.) in the various groups. Thus we may divide all M. into those (*Implacentalia*) which do not possess a placenta, and those (*Placentalia*) in which that structure is developed during the process of gestation. The form and nature of the placenta serve to further subdivide the group. Thus when the placenta is cast off at birth, it is then said to be *deciduate*, and M. exhibiting this peculiarity of development are said to be *deciduate M.* When, on the other hand, there is little or no substance, either of the mother or young cast off, the placenta is said to be *non-deciduate.* A placenta such as occurs in man, apes, rodents, &c., and which presents a rounded cake-like shape is named *discoid.* That found in Carnivora and elephants, and which assumes a rounded form, is termed *zonary;* while other forms give rise to the names *diffuse* (pig, horse, whale), *cotyledonary*, &c. (See PLACENTA.) The terms *Implacental* and *Placental*, applied to those mammals in which the young are not or are connected before birth with the mother by means of a placenta, have been related by De Blainville to peculiarities in the female reproductive organs. Thus in the lowest M., in which no placenta occurs, the female generative organs are bird-like in disposition. Hence arises the term *Ornithodelphia.* In the kangaroos and their allies the *uterus* or womb is double, and such forms are named *Didelphia*, while the highest or Placental Mammals are named *Monodelphia* from the fact that the uterus is single. The following table gives the classification of the mammals, according to the systems just noticed. Detailed descriptions of the various orders will be found under such headings as *Marsupialia, Monotremata, Carnivora, Proboscidea*, &c. ; while the more prominent species of M. are described in separate articles, *e.g.*, ELEPHANT, LION, HYRAX, SLOTH, &c.

Divisions.	Sections.	Orders.
I. IMPLACENTALIA.	A. ORNITHODELPHIA.	1. *Monotremata.* Ex. Ornithorhynchus and Echidna.
	B. DIDELPHIA.	2. *Marsupialia.* Ex. Kangaroo, opossum, wombat, &c.
II. PLACENTALIA.	C. MONODELPHIA.	3. *Edentata.* Ex. Sloths, armadillos, ant-eaters.
		4 *Sirenia.* Ex. Manatee and dugong.
		5. *Cetacea.* Ex. Whales, dolphins, &c.
		6. *Ungulata.* Ex. Hippopotamus, all ruminants, horses, tapir, rhinoceros, &c.
		7. *Hyracoidea.* Ex. Hyrax, the 'coney' of Scripture.
		8. *Proboscidea.* Ex. Elephant.
		9. *Carnivora.* Ex. Lion, dog, bear, &c.
		10. *Rodentia.* Ex. Rat, beaver, squirrel, &c.
		11. *Insectivora.* Ex. Moles, shrew, hedgehog.
		12. *Cheiroptera.* Bats.
		13. *Primates.* Man and apes.

Mamm'ary Gland. See BREAST.

Mammary Gland, Diseases of. The diseases peculiar to the M. G. occur most frequently after delivery, or during lactation, in consequence of the determination of blood to the organ for the formation of milk, or from some obstruction in the lacteal tubes. Inflammation of the mamma may be excited by external injury, or cold, but it most frequently arises from excessive accumulation of the secretion within the lactiferous ducts. It generally spreads rapidly and involves a great part of the organ, terminating in the formation of abscess. It usually commences with rigors, fever, and shooting pains increased by pressure. A hard and painful tumour, often deep-seated, may be felt, and as the swelling becomes more diffused the skin becomes dusky-red, hot, and shining. *Treatment:*—At the early stage of the disease the local application of warm vinegar, persevered with for twenty-four hours, is the most certain as well as the most comforting means that can be used. If there be no abatement of pain or intumescence, leeches should then be applied around but not over the indurated nodule. As soon as the abscess points to any particular part of the surface it should be opened. From the very commencement, the M. G. should be supported, and the arm on the affected side should rest in a sling. *Excoriated* nipples frequently lay the foundation of mammary abscess, from the child not being applied to the breast owing to the pain which it occasions. Ulcerations generally commence in the form of a chap, the surrounding skin being rubbed off by the action of the child's mouth. *Treatment:*—Astringent lotions of alum or borax dissolved in rose water or almond mixture, or, better still, sulphate of zinc or of copper, or the nitrate of silver in weak solution, should be applied by a camel's-hair pencil, care being taken that the nipple is well cleansed before the child is allowed to suck. The applications may cause temporary pain, but the cure will be more certain and rapid. Whenever the child is taken from the breast the nipple should be covered by a metal shield to be constantly worn. The M. G. is liable to numerous diseases to which glands are subject. See DISEASES OF GLANDS, CANCER, CYSTS, TUMOURS, and INFLAMMATION.

Mamm'ee Apple, or S. American Apricot, is the highly esteemed fruit of a large tree named *Mamea Americana*, a native of the W. Indies and of tropical America, but now cultivated and almost naturalised in some parts of tropical Africa and Asia. The fruit is the size of a large orange, and the fleshy or edible portion is yellow, with a sweetish aromatic taste. It is eaten plain or in slices with wine and sugar, or is made into a preserve. The seeds are very bitter.

Mamm'oth (Slav. *mámant*, from Tartar *mama*, 'the earth'), or *Elephas primigenius*, an extinct species of elephants which in the Tertiary period existed in Europe and N. Asia, where its colossal tusks (Siberian ivory) of 5 feet long are often found in great numbers. Remains of this animal, revealed by the thawing of the ice in which for thousands of years they have been imbedded, show that they had a covering of hair which on the neck formed a sort of mane, and lived on the branches of acicular-leaved trees.

Mammoth Caves, the largest in the world, are situated in Kentucky, U.S., 80 miles S.S.W. of Louisville, and 10 from the railway. Formed in the sub-carboniferous limestone by the action of water, they extend over an area of 6000 sq. miles in Kentucky, besides part of Indiana and Tennessee. In the county of Edmonston alone there are 500 mouths of vast, beautiful, but little explored caves. The Mammoth Cave proper is on the left bank of the Green River, 200 feet above which is the entrance. The river penetrates the caves, and is here called the Echo River. Though the cave contains much beautiful incrustation, its most imposing effects are due to the great size of the various halls, and the majestic dignity of its domes. It has been explored for 10 miles, and varies in width from 70 feet to a mere fissure. The earth is rich in nitre, and there are twenty species of cavern-animals, including three species of blind fish, a blind cray-fish, rats, bats, &c. The temperature is uniformly 59° F., and the nitrous air, deliciously clear and pure, is beneficial in cases of consumption and asthma. See a series of papers in the *Illustrated London News* for 1877.

Man. The different races of men and their distinguishing characters having been considered under the head of ETHNOLOGY, it remains in the present article to point out some of the chief features through the possession of which man assumes the highest place in the animal series. It is worthy of remark, that regarded from an anatomical or structural aspect, there are no features which specially separate man from the highest apes or

from quadrumana at large. His body is built upon the type common to all vertebrata, while he shares the more special stucture of the quadrumana, and is linked to them by structural bonds of the closest possible kind. At the same time M. may be regarded as presenting us with the highest development or extreme of animal structure. He exhibits certain features utterly wanting even in the highest apes, and must therefore be ranked as a genus of animals widely different from the genera of quadrumana most nearly allied to him. The consideration of man's psychical or mental attributes is a totally different matter. Here no parallelism is permissible or possible between the brute and human type. Community of instincts undoubtedly does exist between these types, but the differences are certainly those of kind as well of degree. M. differs thus from all lower forms in the extreme development of *consciousness*, or the power of knowing 'self,' and of accounting to a greater or less degree for his actions. It is this particular development which chiefly distinguishes M.'s mental state from that of *Instinct* (q. v.), and which places him, regarded from a mental standpoint, at once and for ever above the entire animal creation. As regards the chief differences which are perceptible between M.'s structure and that of the apes, we may justly note his perfect adaptation to the *erect posture*. No ape can assume an erect position for any length of time, and a semi-erect posture is the nearest approach which many quadrumana can make to man's position. The curves of the human spine; the graduated form of the spinal column itself, which tapers from base to apex; the broad pelvis and sacrum, and the consequent wide separation of the heads of the thigh bones, constitute several characters of man's structure, adapted specially for the maintenance of the erect posture. The manner in which the human *skull* is set on the spine, and the conformation of the skull itself, also form characters of distinctive importance in M.'s economy. A line marking the centre of gravity of the skull of M. would pass between the *occipital condyles* or processes whereby the skull is joined to the spine. The cranium of M. is evenly balanced on the spine, and is thus kept in position without any considerable muscular effort requiring to be exerted. The hinder portion of the skull is occupied by dense brain-matter, and the weight of this portion is counterbalanced by the larger front portion which includes the face. The bones of the human face do not project beyond the cranial or brain cavity, but are situated below the brain; the face underlying the brain in fact. A glance at the extreme prolongation of the facial bones in even the highest apes will show the vast differences which exist in this respect between M. and his nearest allies. The presence of a well-defined *chin* is a very striking character of M.; and this character is most apparent in the highest races of mankind. The jaws of M. are of proportionally small size, as compared with his cranium; while his teeth are arranged in a continuous series—a feature exhibited by no other animal save a Lemur (q. v.) *Tarsius*, a form which in other respects is far removed from the human type. The highest apes have hands which are clumsy organs when compared with those of M.; the human thumb being larger in proportion to the hand generally than that of any ape, and being also endowed with a greater mobility and power of opposing itself to the other fingers than is found in any of the quadrumana. The thigh of M. is of great relative length, and his arms reach only to the middle of the thigh—these proportions being greatly exceeded in some apes (*e.g.*, *Gibbons*). M. is a truly *plantigrade* mammal, *i.e.*, he applies the whole sole of the foot to the ground in walking. M.'s foot is arched from side to side and from behind forwards, whilst the development of the heel and the placing of the heel firmly on the ground are human characters of especial value. In respect of the large relative size, and proportional development of certain parts of the brain and nervous system, M. exhibits differences from the highest apes. As regards M.'s relationship with the anthropoid or M.-like apes, it may be noted that the human structure, so to speak, is not an improved variety of the structure of any one ape, but a concentration of the characters of all the higher quadrumana. Thus the gorilla is most M.-like in the curvature of the spine, in its pelvis, in the development of the heel, in the absolute capacity of the brain-cavity, in the proportions of the leg to the foot, and of the foot to the hand. But this ape has thirteen dorsal vertebræ and thirteen pairs of ribs, and only four lumbar vertebræ, and has the teeth broken up into a discontinuous series. Occasionally in M. thirteen pairs of ribs may be developed. The orangs, of all apes, approach most nearly to M. in the number of ribs, and in the form of the cerebrum or brain-proper. The chimpanzees are most human in the shape of the skull, especially in early life, and in the length of the arms as compared with that of the lower limbs.

The *antiquity* of M. is a subject regarding which very diverse opinions exist. Much that is speculative, and little that is certain, is known. Whatever be the duration or length of the period which geology with its relative chronology may attach to the interval that has elapsed since the Post-Tertiary Period, the question of M.'s antiquity must stand or fall thereby. It *is* a matter of absolute certainty that M. existed in that period; it is still a matter of doubt and speculation as to the *time* which has elapsed since the prevalence of Post-Tertiary conditions.

Man, Isle of, an island in the Irish Sea, nearly equidistant from England, Scotland, and Ireland, being 27 miles W.S.W. of St. Bees' Head in Cumberland, 16 S. of Burrow Head in Wigtown, and 27 W. of Strangford Lough in Down. It is 31 miles long, by from 8 to 13 wide, has an area of 209 sq. miles, and a pop. (1871) of 53,763. The Calf of M., a precipitous island lying 3 miles S. of the south-western extremity, has an area of 620 acres. The I. of M. itself is traversed in a north-easterly direction by a ridge of mica-slate hills, which in Snaefell (Scand. 'snow mountain') and North Barrule (Celt. 'top of an apple') attain a respective elevation of 2004 and 1804 feet, and in which the Sulby, Neb, Douglas, and other streams take their rise. The general formation is slate resting on granite, passing on the coast into grauwacke, and the chief minerals are lead and copper ore. The Foxdale mines yield annually 1500 tons of galena; the Laxey mines, 1600 tons of galena, 1500 of copper ore, and 5000 of blende ore. Limestone, slate, clay-slate, and sandstone are also raised. The climate is mild and healthy, with a mean winter temperature of 41° F.; and the soil—a light sand resting on grauwacke or clay-slate—yields good crops of oats, turnips, and artificial grasses. The native horses resemble the Welsh ponies; the sheep, the Southdown breed; and the cattle have been much improved by Ayrshire and short-horn crossings. There are no reptiles, the Manx puffin is extinct, but grouse, partridges, and snipes are plentiful. The tailless cat of the island is well known. The herring and deep-sea cod fisheries are the staple industry, the latter—from June to October—employing from three to four hundred boats, and yielding average returns of £70,000 per annum. There are also manufactures of woollens, linen, canvas, ropes, sailcloth, &c., and breweries, paper-mills, and tanneries. The customs' duties for the year ending March 31, 1875, amounted to £42,346. Castletown (the capital), Douglas, Ramsey, and Peel are the chief towns. The *Manx dialect*, belonging to the Gaelic branch of the Celtic family of languages, is fast dying out; but the island still retains its special governor, a council of eight members, and the 'House of Keys' with twenty-four members, the two together constituting the 'Court of Tynwald' (Scand. *thing*, 'assembly,' and *vald*, 'plain'), which meets every July 5th at Tynwald Mount, a circular barrow, 2½ miles E. of Peel; and no Acts of the English Parliament extend, without special provision, to the I. of M. The bishopric of M. (founded, according to tradition, by St. Patrick, in 444) was united to that of the Hebrides (Norse, *Sudreyjar*, 'Southern Isles') in the 11th c., the two remaining dependent on the Norwegian Archbishop of Trondhjem till 1334. Hence the bishop is still styled 'Bishop of Sodor and M.' He sits in the House of Lords, but has no vote. The Anglican is the established religion, and the tithes were commuted by an Act of Tynwald (1839) for £5050. Little is known of the early history of the I. of M. (Celt. *man*, 'a district;' the *Monapia* of Pliny). It is believed to have been ruled by a Welsh dynasty from A.D. 517 to 913, and was certainly held by a succession of Norwegian jarls—twenty-one per cent. of the local names are still Norse—until 1264, when Magnus ceded it, along with the Western Isles, to Alexander III. of Scotland. During the wars between Bruce and Baliol it was occupied by Edward I., and in 1344 William Montacute, Earl of Salisbury, was crowned King of Man. From him it passed successively, by sale or grant, to Sir William le Scroop (1393), Henry Percy, Earl of Northumberland (1399), and Sir John Stanley (1403), whose great-grandson, Thomas, was created Earl of Derby (q. v.) in 1485. The island was held by Fairfax for the Parliament (1651–60), and on the death of James, the tenth Earl of Derby (1736), it passed to James,

second Duke of Athole, a descendant of the youngest daughter of the seventh earl. To check the contraband trade, which, it was estimated, involved an annual loss to the revenue of £350,000, the British Government purchased in 1765 the sovereignty of M. for £70,000, and in 1825 the manorial rights, ecclesiastical patronage, &c., for £416,114. See Sacheverell's *History of the I. of M.*, edited by J. G. Cumming (Douglas, 1859).

Manaar', an island off the N.W. coast of Ceylon, forming the E. link of the chain called Adam's Bridge, which stretches from Ceylon to India across Palk Strait. It is unhealthy, and inhabited only by a few persons of mixed Portuguese descent. M. has given name to the Gulf which indents the opposite coast of India N.E. from Cape Comorin.

Manaca', a Brazilian name for *Franciscea uniflora*, a shrub belonging to the natural order *Scrophulariaceæ*. The root, and to a less extent the leaves, are used in Brazil in syphilitic complaints. It is bitter, purgative, emetic, and in large doses poisonous.

Manacor', a town in the interior of the island of Majorca, 30 miles E. of Palma, has some trade in wine, oil, brandy, verdigris, &c. Pop. about 10,000.

Manag'ua, the capital of Nicaragua, on the S. shore of the lake of the same name, 50 miles S.E. of Leon. It has a central position, and is surrounded by rich coffee plantations. Pop. 6500.

Manass'eh (Heb. 'causing to forget,' Gen. xli. 51) was the elder of the two sons of Joseph, the Hebrew patriarch, and was counted one of the twelve tribal heads of the Israelites. The territory of the tribe, which numbered at the Exodus 32,200 (Num. i. 35), and at the next census 52,700 (xxvi. 34), was situated partly on the E. of the upper Jordan and partly on the W., between Ephraim on the S. and Mount Carmel on the N.— **M.**, the thirteenth king of Judah, succeeded his father Hezekiah in 697 B.C. His reign lasted longer than that of any other prince of the house of David, and is distinguished for nothing better than the restoration of the heathen worship, with all its abominations, which had been abolished by his father.

Manatee' (*Manatus*), an aquatic member of the class *Mammalia* (q. v.), formerly included with the whales and dolphins,



Manatee.

&c., in the order *Cetacea* (q. v.), but now with another animal, the Dugong (q. v.), forming the order *Sirenia* (q. v.), which is distinguished by several well-marked characters from the *Cetacea*. The genus Manatus is represented by several species, of which the *M. Americanus* of the Atlantic shores of N. America, and the *M. Senegalensis* of African coasts are the two most familiar. The names 'lamantin' and 'sea-cow' are frequently applied to the M. The body is fish-like and is terminated by a horizontal tail-fin. Only six neck vertebræ are developed. The nostrils are at the extremity of a well-developed snout, and can be closed at will. There are no external ears, and the body is but sparsely covered with bristles. Two upper incisors and eight molars in each side of each jaw constitute the entire armament of teeth, the incisors being small and falling out in early life. The milk glands or mammæ are two in number, and are situated on the breast. The fore-limbs alone are developed, a rudimentary pelvis being present. The M. frequents estuaries and shallow coasts, and feeds on vegetable matters. The average length is 8 feet.

Manch, or **Maunch** (Fr. *manche*, from Lat. *manica*, 'a long sleeve'), in Heraldry, represents a lady's sleeve with long hanging ends, which was worn in England under Henry I.

Mancha, La, part of the old Spanish province of New Castile (see CASTILE), included in the modern province of Ciudad Real, is world-famed as the home of Don Quixote.

Manche, a maritime department of France, is bounded N.N.E. and W. by the English Channel, E. by Calvados and Orne, and S. by Mayenne and Ille-et-Vilaine. Area, 2289 sq. miles; pop. (1872) 544,776. A range of hills, culminating in the Signal-de-l'Hermitage (1027 feet), intersects the department from S. to N., and it is watered by the Vire (50 miles), and several other streams. The Channel Islands lie off the coast, which is also fringed by Mont St. Michel, Chausey, D'Aurigny, &c. The climate is moist, the soil fertile (three-fifths of it arable), and 44,000,000 gallons of cider are produced annually. There are manufactures of linen, cloth, woollens, gloves, and glass; fishing, mining, and shipbuilding industries; and a trade in fish, cattle, horses, and agricultural produce. Two railways traverse the department, the chief towns of which are St. Lo, Cherbourg, and Granville.

Manchester, a city of England, is situated in the S.E. of Lancashire, on the Irwell, where it is joined by the Irk and Medlock, 7 miles above its entrance into the Mersey, 188 miles by rail N.N.W. of London through the Trent valley, 31 E. by N. of Liverpool, 41¼ N.W. of Sheffield, and 85 N. of Birmingham. One of the greatest railway and canal centres in the kingdom, it is unrivalled by any city in the world for the extent of its manufactures and the perfection of its industrial machinery. The Irwell separates it from the borough of Salford, which is virtually a part of the city, communicating with it by ten bridges, exclusive of the suspension bridge between Lower Broughton and Pendleton. M. covers an area of 9·9 sq. miles; Salford an area of 7·9. The situation is flat and somewhat low, and immense sums of money have been expended of late years in street improvements. After the widening of Victoria Street, St. Mary's Gate, and Deans Gate (1874), the site was sold by the corporation for £288,960, or £56 per sq. yard. M. is on the whole regularly built, the chief streets (1877) Portland Street, Mosley Street, Market Street, and Oldham Road, generally running from N.E. to S.W. and at right angles. Of the few public squares the principal are St. Ann's Square, with its bronze statue of Cobden, and the Albert Square, in which stands a canopied monument of the late Prince Consort, surmounted by a spire 75 feet high. At the foot of Victoria Street a bronze statue of Oliver Cromwell, the gift of Mrs. Heywood, was unveiled 1st December 1875. M. is well endowed with recreation grounds. Besides the Peel Park, containing the Royal Museum, the Queen's Park, also enclosing a museum, and Philips Park in Bradford township (all acquired by public subscription, 1845–46), it has the beautiful Alexandra Park, opened in 1870, and adjoining which is the Aquarium (1874); the Race Course at New Barns, 100 acres in extent, with a grand stand to accommodate 2700 people; various public gardens, of which the largest are Belle Vue, on the Hyde Road, with good zoological collections, and Pomona at Cornbrook, where are held horse and cattle shows, &c. The finest public building in M. is the new town-hall, facing Albert Square, a vast Gothic structure, covering an area of 8648 sq. yards, and containing over 200 rooms, built 1868–77, at a cost, including land, not far short of £800,000. The main front, 328 feet long, is relieved by the mass of the central tower, supporting a clock lantern, 280 feet high; the hour bell is 7 tons in weight, and a carillon of 21 bells (playing tunes in five different keys) makes up a total of above 31 tons. Other notable secular buildings are the Royal Exchange (1866–74), 4050 sq. yards in area, and containing the largest exchange room in Europe (215 by 104 feet); the Assize Courts (opened 1864), in decorated Gothic style, with a tower 210 feet high, and a beautiful interior; the Salford town-hall (1825), with an elegant Doric portico; the town-hall of Hulme (1862–66), a handsome Italian edifice; the Royal M. Institution, in Grecian style; the police courts, founded in 1868; and the gaol, occupying 7 acres, and constructed on the model of Pentonville. In M. and Salford there were in 1871 100 churches of the Establishment, 180 Dissenting chapels, 17 Roman Catholic chapels, 4 German churches, 3 synagogues, and 1 Greek church. M. was made the seat of a bishop in 1847. The cathedral, an old Gothic collegiate church, was built in 1422; the finest of the other churches is the Roman Catholic St. John's, called the cathedral, a cruciform building with a needle spire 239 feet high. M. has a School of Art, a Literary and Philosophical Society, a Royal School of Medicine (now connected with Owens College), an Academy of Fine Arts, Royal Botanical Gardens, a Free Library (opened 1852), an Hospital (called 'the college' for 40 boys), and Library founded by Humphrey Chetham in 1665, the free

grammar-school, one of the best in the country, founded in 1515, the Lancashire Independent College, a Wesleyan College, a Baptist College, the M. Commercial Schools, High School for Girls, &c. At the head of the educational system of M. stands Owens College, founded by John Owens in 1851, and having in 1877 a senate of 20 professors and 1450 students. The handsome new buildings for the college were erected in 1871–73. Among the benevolent institutions of M. are the Royal Infirmary (since 1752), a Royal Lunatic Asylum, Barnes' Convalescent Hospital, some 12 other hospitals, various dispensaries, schools for the deaf and dumb, and blind, &c. M. has many places of amusement, including 4 theatres, music-halls, the Free-Trade Hall, &c. The chief market is Smithfield, with a covered space of over 12,000 sq. yards, besides extensive butchers' shambles; a new fish and game market was opened in 1873. The market tolls and rents amount yearly to £35,000. Water is supplied to M. through iron-pipes from reservoirs at Blackstone Edge, Woodhead, distant 20 miles. Both the water and gas-works belong to the corporation. The investment in the former is about £3,750,000.

The great industry of M. is the spinning of cotton and various cotton fabrics, and for miles around, the city gives employment to the most extensive works for calico-printing, bleaching, and dyeing. Another immense industry depending on the former, is iron-founding and the manufacture of steam-looms, spinning-mills, and powerful engines, both fixed and locomotive. M. also manufactures great quantities of silks, mixed goods, 'smallwares,' and various other textiles. In 1877 M. had 80 cotton mills, about 20 silk-mills, 50 smallware mills, above 30 dye-works, and 100 machinists' workshops; a still greater number of cotton-mills, scattered over the counties of Lancashire, Cheshire, &c., belong to what are known as 'M. manufacturers,' who have only offices or warehouses in M. itself. The cotton-mills generally employ some 60,000 persons, earning wages to the amount of £30,000 a week. In the production of machinery a great proportion of the workmen are skilled and highly-paid engineers. Among the other industrial establishments are extensive flax-mills, wire-works, chemical works, paper mills, sugar refineries, printing offices, and Sir Joseph Whitworth's gun-factory. It need scarcely be added that the merchants and manufacturers of M. have commercial dealings with every trading country in the world.

M. returns three members to Parliament, and Salford returns two. In 1871 the pop. of the municipal borough and city, which included the townships of M., Ardwick, Beswick, Chetham, Chorlton-on-Medlock and Hulme, was 351,189 as against 338,722 in 1861; the parliamentary borough comprising also the townships of Bradford, Newton, and Harpurhey, was 379,374. The pop. (1871) of Salford was 124,801. M. is the *Mancunium* of the Romans. The first part of the word is probably the Celtic *man*, 'a district.' The town has an ancient though not distinguished history. Acres' fair has been held here (now on 1st October) since 1134. The manorial rights were sold in 1579 to John Lacye for £3000; they were finally bought by the corporation in 1845 for £200,000. Prince Charles Edward entered M. on the 29th November 1745. The manufacture of 'M. cotton,' a kind of woollen cloth made of unprepared fleece, was introduced in 1352. Subsequently Flemish artizans, invited by Edward III., greatly developed this industry. Fustian was one of the earliest articles of the local manufacture; Humphrey Chetham, founder of 'the College,' was a fustian dealer. It was not, however, till after the invention of the power-loom that the textile industries of M. began to assume any great importance beyond our own country. As the centre of the Anti-Corn-Law League, founded here in March 1839, M. has a solid claim to the lasting gratitude of the English nation.

Manchester, a city of New Hampshire, U.S., on the Merrimack, 16 miles S. of Concord by rail, has fifteen churches, nine banks, a free library of 18,000 vols., five public parks, seven newspapers, &c. Four spinning-mills employ 300,000 spindles and 7600 looms, and derive their water-power by two canals from the Amoskeag Falls, which, with a fall of 54 feet 10 inches, are the highest on the Merrimack. There are also manufactures of stockings, leather, machinery, edge-tools, &c. Pop. (1870) 23,536. Settled in 1722, M. was incorporated as Derryfield in 1751, assumed its present name in 1810, and was made a city in 1846.

Manchineel' is the poisonous *Hippomane Mancinella*, a tree belonging to the natural order *Euphorbiaceæ*, and about which as many fabulous tales have been told as of the celebrated Upas tree of the E. It is common in the W. Indies and neighbouring Central America, growing usually on the sea shore, and rising to 40 or 50 feet in height, bearing simple shining elliptical leaves, inconspicuous flowers, a yellowish-green fruit—tempting enough to the eye, but highly acrid and blistering to the skin—as is also the copious milky juice of the plant. Bastard M. is *Camararia latifolia*, also W. Indian and poisonous, but belonging to the Dogbane Family (*Apocynaceæ*).

Man'dalay, the present capital of Independent Burmah, on the left bank of the Irrawady river, about 450 miles above Rangoon, a little higher up than the now deserted capitals of Ava (q. v.) and Amarapura (q. v.). It is the creation of the reigning monarch, having been only commenced since 1853; but as trade in Burmah is a state monopoly, it has already gained all the foreign commerce of the country, conducted by river steamers, some of which are royal property. The exports are petroleum, saltpetre, terra japonica, sugar, and timber; the imports are rice, dried fish, and English piece-goods. Here is the palace of the king, and the residence of the British Political Agent. See Dr. Anderson's *M. and Monien* (Lond. 1876).

Manda'mus, the name of a writ issuing in the Queen's name, from the Queen's Bench Division, requiring any person, corporation, or inferior court, to do some specified act of duty, which some one has a right to have done, and has no other *legal means* of compelling the performance of.

Mandarin', the title bestowed in all European languages on Chinese officials of every grade. The word does not appear in Chinese, where *kwan* is the corresponding term, nor is it connected with the Port. *mandar*, 'to command;' being identical with the Sansk. *mantrin*, 'counsellor,' brought by the Portuguese from Indian waters.

Man'date is a contract by which one employs another to act for him in the management of his affairs, or in some special department of them. The employer is called the *mandant*, the person employed is called the *mandatory*. The mandatory acting gratuitously is not liable beyond his cash transactions, and for such diligence and attention as he would presumably give to his own affairs. A somewhat greater responsibility attaches to the paid mandatory, who must repair the damage arising from his own inadvertency. It seems to be the law in England that if a mandatory undertake an office gratuitously, and omits to do the work, he is not liable in damage; but that he is so liable, if he enters on the work, and then neglects it. In Scotch law, the undertaking of the office causes liability.

Man'deville, Sir John, an English traveller of great celebrity, was born at St. Albans, in Hertfordshire, about the year 1300, left his native land in 1322, and was absent for thirty-four years, during which he tells us he 'passed thorghout Turkye, Tartarye, Percye, Surrye, Arabye, Egypt, the highe and the lowe, Ermonye, the litylle and the grete; thorgh Lybye, Caldee, and a gret partie of Ethiope; thorgh Amazonye, Inde, the lasse and the more, a gret partie; and thorghout many othere iles, that been abouten Inde.' He took service as a soldier with the Sultan of Babylon and the Khan of Cathay, and proved himself a bold and valiant knight. On his return to England he wrote in 1356 *The Voiage and Travaile of Sir John Maundeville*, first in Latin, then in French, and finally in English, 'that every man of my nacioun may undirstonde it.' M. died at Liége, 17th November 1372. The best edition of his work is that by J. O. Halliwell, published in 1839 (reprinted 1866), with introduction, notes, and a glossary. During the Middle Ages it was immensely popular, and was translated into several languages, but after the 17th c. it began to be discredited; and for many years the phrase 'as great a liar as Sir John Mandeville' was thought to be the superlative of mendacity. An impartial study of the *Voiage and Travaile* dissipates such a notion, and shows M. to have been in the main a clear-sighted, accurate, and honest narrator of what he saw with his own eyes, and only credulous (after the fashion of the times) in regard to what he was told. His wonderful stories are matters of hearsay. The only thing that throws suspicion on his veracity is the resemblance of some parts of his work to the narra-

tive of an older Italian traveller, Odoric, a Franciscan friar of Pordenone in Friuli.

Mandha'ta, an island in the Nerbudda, district of Nemur, Central Provinces, British India, nearly a square mile in area, whose banks rise precipitously 400 feet from the river. Here are two of the twelve original 'lingas' or emblems of Siva; and the whole island and the neighbouring banks of the river are covered with ruined temples of the Sivaite, Vishnuvite, and Jain sects of Hindus. Not a single sculpture has been left unmutilated by Mohammedan fanaticism.

Man'dible, Mandibula'ta. The name M. is used in comparative anatomy to denote the chief jaws in such animals as insects, lobsters, crabs, centipedes, spiders, &c., and the large jaws in such molluscs as the cuttlefishes. In vertebrate anatomy the name M. is restricted to the *lower jaw*, as distinguished from the *maxilla* or upper jaw. All animals that have prominent mandibles, *e.g.*, beetles, are termed 'mandibulate.'

Mandin'goe, a superior negro people of Senegambia, inhabiting the N. slope of the Sudan, S. from the Gambia, and found scattered through the neighbouring lands as colonists, traders, preachers of the Koran, artists, &c. Black, well-formed, with regular features, they are singularly active, intelligent, and enterprising. Their speech is used in trade from Senegal to Timbuktu.

Man'doline (It. *Mandolina*, Mandola, prob. = Lat. *Pandura*, Gr. *pandoura*, from Pan), an old instrument of the guitar kind.

Man'drake is the name applied to two species of plants belonging to the natural order *Solanaceæ*, and constituting the genus *Mandragora*, a Greek word signifying 'hurtful to cattle.' They are natives of S. and E. Europe and W. Asia. The root is thick and fleshy, and is sometimes forked in a curious manner so as to present a fancied resemblance to the human figure; from it spring a number of simple ovate lance-shaped leaves. The flower-stalks rise from the leaves, and bear a solitary bell-shaped flower, followed by a fruit like the potatoe-apple, but larger. As with their near ally the nightshade they are poisonous. In olden times they were administered on account of their narcotic quality during surgical operations. Ancient and medieval writers record the wonderful virtues and powers of the M. The earliest mention of it is in Gen. xxx. 14.

Man'drill (*Cynocephalus* or *Papio maimon*), a species of Baboon (q. v.) found on the W. coast and in other parts of Africa, and distinguished by the prominent cheeks, which are of the most vivid blue and scarlet colour, while the natal callosities or bare hip-patches are also of bright red. The general body-colour is an olive brown, lightest on the under parts. The head is dog-like, the canine teeth prominent, and the tail short. The ears are small and destitute of fur. The M. is fierce and untamable. Its average length is 3 or 4 feet.

Mândû, the former capital of the Mohammedan kingdom of Malwa, now in the petty state of Dhar, 15 miles N. of the Nerbudda River, and 26 S.W. of Mhow. It was founded in the 4th c., and was the capital of Malwa from 1387 to 1570, when it was captured by Akbar. The circuit of the ramparts is said to be as much as 37 sq. miles; but inside all is deserted, overgrown with jungle, and the haunt of tigers. A Jumma Musjid, or great mosque, and the mausoleum of a king in white marble, are still well preserved.

Mandu'ria, a town in S. Italy, province of Lecce, 23 miles E. by S. of Taranto. Pop. (1874) 7761. M. was a Salentine city as early as the 4th c. B.C., and considerable ruins exist of its double circuit of walls. It was destroyed by the Saracens, and the inhabitants founded near by Casal Nuovo, which name at the close of the 18th c. was exchanged for the ancient M. A well is still shown which Pliny accurately described as having its water always at a uniform level.

Mândvi, the chief seaport and most populous town of the native state of Kutch, in political connection with the government of Bombay, India, on the N. shore of the Gulf of Kutch. Pop. (1872) 35,988. Ships of considerable burden anchor in the roads.

Manetho' was an Egyptian priest who lived in the reign of Ptolemy I., and compiled about B.C. 250 a history of his nation from the ancient records and memorials of the Egyptians themselves, and especially from their sacred books. The work was written in Greek, and professed to have been derived from certain pillars in the Siriadic land, which had been inscribed in the sacred dialect of Thoth before the flood. The inscriptions had been translated into Greek, and the translations laid up in the Egyptian temples by the sacred Thoth. Josephus copied some passages from M. (*Cont. Ap.*), which are all that remains of the history itself. Julius Africanus, a Christian of Alexandria (3d c.), and author of a chronology from the Creation to A.D. 221, preserved the dynasties of M. in two versions differing from each other and from Josephus. But the work of Africanus shared the fate of M.'s history, and his 'lists' have been preserved only in the Chronicon of Eusebius (q. v.). The history was divided into three parts, of which the first comprised the prehistoric or mythological period and the first eleven of the thirty dynasties; the second, the period beginning with the twelfth dynasty and ending with the nineteenth; and the last, the remaining eleven dynasties, concluding with the history of Nectabanus, the last of the native kings. The mythological period extended to 24,900 years, and that of the monarchy, from Menes, the founder, till the conquest by Alexander the Great (B.C. 332), to 3555 years. Besides his history, M. wrote a work (*Tôn Physikôn Epitomê*) on the theology of the Egyptians, giving an account of the origin of the gods, of the world, and of the laws of morality. See Bunsen's *Egyptens Stelle in der Weltgeschichte* (Hamb. 1857); Chabas' *Mélanges Egyptologiques.*

Man'fred, King of Sicily, was a natural son of the Emperor Friedrich II., and was born about 1231. On the death of his half-brother, Konrad IV., in 1254, he acted as regent for Konradin, son of Konrad, and on a rumour of his nephew's death was chosen King of Sicily. M. was a mainstay of the Ghibelline party, and the help which he gave to Farinata degli Uberti contributed to the great defeat of the Guelfs at Monteaperto in 1260. He twice suffered papal excommunication, but no real misfortune befell him till the invasion of his dominion by Charles of Anjou, brother of Louis IX. of France. After varying success M. was defeated and slain at the battle of Benevento, 26th February 1266, and the power of the Ghibellines was broken throughout Italy. See Cesari, *Storia di Manfredi* (Napl. 2 vols. 1837); Münch, *König M.* (Stuttg. 1840); Schirrmacher, *Die letzten Hohenstauffen* (1871).

Manfredo'nia, a seaport of Italy, in the province of Foggia, on the Gulf of M., and at the foot of Monte Gargano, 25 miles E.N.E. of Foggia. Its sand-choked harbour is defended by a strong castle; and at Siponto, 2 miles to the S.E., is the fine Romanesque cathedral of its archbishop. M., founded by Manfred (q. v.) in 1256, from the ruins of Sipontum, was plundered by the Turks in 1620, and has never regained its former importance. Pop. (1874) 7938.

Mangalore', the chief town of the district of S. Canara, in the Madras Presidency, British India, on the Malabar coast, 440 miles S.E. of Bombay, and 370 W. of Madras. Pop. (1871) 29,712. The military cantonments lie N. of the town. M. is the port of Mysore and Coorg. In 1874–75 the exports were valued at £505,847, chiefly rice, timber, and coffee; the imports at £272,704. M. is an old town. It was repeatedly captured by the Portuguese in the 16th c. In 1784 a treaty was concluded here with Tippoo Saib.

Manganese' (atomic weight 55; symbol Mn), a metallic element somewhat resembling iron in its chemical and physical properties. Three distinct oxides are known; and the existence of other two is probable, though they have not yet been obtained in the anhydrous state. The *protoxide* (MnO) is obtained as a green powder by heating the carbonate of M. in an atmosphere of hydrogen to prevent oxidation. The *sesquioxide* (Mn_2O_3) forms the mineral *braunite*, and with water the mineral *manganite*. It is a weak base; and its compounds readily decompose when heated, being reduced to the corresponding salt of the protoxide. The *red oxide* (Mn_3O_4) is the most stable of all the oxides, and is produced when any of the others is heated in the air. It occurs in nature as *hausmannite*, but its chief source is by heating the binoxide. The *binoxide* is the chief form in which M. is found in nature. It is the essential constituent of *pyrolusite*, *psilomelane*, and *wad*, and in commerce is ordinarily known as the black oxide. It yields oxygen when heated, and is the source of all the compounds of M. It does not combine with acids, but if heated with sulphuric acid it loses half its oxygen, and is reduced to the protoxide, which then unites with the acid to form sulphate of M. Manganic acid

(MnO_3) and permanganic acid (Mn_2O_7) have never been obtained separate. They are known by their hydrates (H_2MnO_4, and $HMnO_4$ respectively), the latter of which is a thick syrupy liquid of a greenish colour. It is one of the most powerful oxidising agents known, instantly igniting combustible bodies with which it is placed in contact. Both of these acids form salts, which are known as manganates and permanganates. The only manganate of importance is the potassium salt (K_2MnO_4), which is formed by heating to redness a mixture of caustic potash and binoxide of M. Its solution in cold water is at first green, but it rapidly changes colour, passing through various intermediate hues till it becomes red. Hence its old name—*mineral chameleon*. Manganate of soda, or *Condy's green disinfecting fluid*, is used as a bleaching agent. The permanganate of potash ($KMnO_4$), prepared by heating a mixture of potassium chlorate, caustic potash, and the black oxide, is remarkable for its great colouring power, and for the ease with which it decomposes many organic substances. Consequently it is extensively used as a disinfectant under the name of *Condy's red disinfecting fluid*. M. appears to form three chlorides, $MnCl_2$, Mn_2Cl_6, $MnCl_4$, but of these only the first is stable. It is obtained in large quantity as a waste product in the preparation of chlorine in the manufacture of bleaching powder; and may be prepared on a small scale by dissolving any oxide of M. in hydrochloric acid.

Medicinal Properties of M. M., in the form of the *black oxide*, is used for producing chlorine. As a medicine it is *not official* in the British Pharmacopœia; but the *magnesii oxidum præparatum* is an admirable remedy for gastrodynia, pyrosis, &c., in doses of from 10 to 30 grains. The *sulphate* of M. is useful, as a purgative, in gouty affections; but its taste is disagreeably styptic, and its action is somewhat uncertain. M. is associated with iron in several recent preparations, as Syrupus Ferri Phosph. c. Manganesio.

Mange. See ITCH MITE.

Man'go, a genus of trees belonging to the natural order *Anacardiaceæ*. The *M. Indica* grows abundantly in India, and is now cultivated in most hot countries, together with numerous varieties. It is from 30 to 40 feet in height, of a spreading rounded form, with dense foliage of lance-shaped leaves about 7 inches long: the panicle, of numerous, small, fragrant flowers, is large, branched, and divaricating. The fruits are about the size of a large pear, and in the good varieties of M. are much esteemed; in the inferior kinds they possess a strong turpentine flavour. They are eaten plain, or sliced with wine, sugar, and nutmeg; or they may be boiled; or different preserves prepared from them. A very palatable spirit too may be obtained from the juice of the fruit. In the unripe state they form a very excellent pickle, and constitute an ingredient of tarts. The light and friable wood is used in India with sandal wood in burning the bodies of persons of distinction. A gum resembling gum tragacanth is obtained by wounding the stem and branches.

Mango Fish (*Polynemus paradiseus*), a Teleostean fish belonging to the family *Sciænidæ*. The name is derived from the bright yellow colour of the fish, which resembles that of the ripe fruit of the same name. The M. F. occurs in the Bay of Bengal and in other parts of the Indian Ocean. It has seven thread-like or filamentous appendages borne beneath the pectoral fins, the uppermost projecting beyond the tail. An allied species, *P. multifilis*, has fourteen. The flesh of the M. F. is usually eaten in a preserved and salted state. In India it is known under the name of 'burtah.' Isinglass is prepared from the air-bladder of the M. F. In form the fish somewhat resembles the perch.

Man'gold-Wurz'el (Ger. 'beet-root'). Most writers consider the M.-W. and the Beet (q. v.) as produced from *Beta vulgaris* as their wild stock, but Dr. Hooker says that *B. maritima*, a frequent British coast plant, is probably the origin of both. At any rate the M.-W. is evidently so closely related to the beet of cultivation, that it cannot be considered as more than a large and coarse variety of it. It is only quite recently that the cultivation of M.-W. as a field crop has become general, good books of sixty years ago not making any mention of it as a fodder root, though it is stated to have been introduced into England in 1786. Its advantage over the turnip is that it yields a much larger produce, is not subject to alarming diseases nor extensive attacks of insects, and is more patient of a high temperature. The mode of culture does not materially differ from that of the turnip. Usually the crop is ready during October, and the roots being raised without bruising, are stored for spring use in protected pits or clamps. When their harshness has passed away by keeping, they form an excellent, palatable, and nutritious food for stock of all kinds.

Man'gonel. See BALISTA.

Mangosteen' is the fruit of *Garcinia Mangostana*, belonging to the same genus as the Gamboge (q. v.), and is considered one of the most delicious fruits known, being peculiarly cool and grateful to the taste. The tree is about 20 feet high, with opposite horizontal branches, and firm, smooth, elliptical leaves; the flowers, about two inches across, have four deep red petals; the fruit, about the size of a small orange, is crowned with the persistent rays of the stigma, its rind containing a powerful astringent gum. M. is a native of Molucca and other Spice Islands, and has become naturalised in Java, Singapore, and other parts of the East.

Man'grove is the name by which the trees belonging to the genus *Rhizophora* ('root-bearer') are known—the type genus of the natural order *Rhizophoraceæ*. The chief point of interest connected with the M. arises from its peculiar mode of growth and germination. Inhabiting sea-side mud swamps in tropical countries, it makes continuous advances ocean-ward, by the branches of each tree sending down roots into the mud, which in time become independent trees, and further, by the aërial germination of the seeds, which only drop from the parent after they have assumed dimensions sufficient to take possession of the mud below, in advance of the parent tree. By these means 'a complicated labyrinth is at length formed,' constantly extending and advancing mile upon mile along low shores, and giving rise to the dreaded term 'M. swamps'—an equivalent of malaria and fever. An abundance of tannin exists in the M., and the fruit of *R. Mangle*—the typical species—is said to be sweet and edible.

Ma'ni, Ma'nes, or Manichæ'us, the founder of Manichæism, was born somewhere in the Persian empire about A.D. 250. Educated among the Magi (q. v.), if he did not become a member of that fraternity, he was at the court of Sapor, as physician, astronomer, artist, philosopher, and poet, at the time when Christianity was being persecuted by that monarch, and Zoroastrianism, after a period of adversity under the Parthians, was triumphantly restored, but divided into two hostile factions. The Magusians, to which faction M. belonged, maintained the primitive creed, according to which Ormuzd and Ahriman were the sole deities; the other, or Magian faction proper, maintained that there was a third and supreme deity, *Zarvana-akarane* ('time without bounds'), the source of all being whatsoever. M. now offered Christianity to the Persians as the pure Magusian creed, but the prejudices of his countrymen, especially the jealousy of the Magians, were too strong for him, and he was obliged to flee. From that time he assumed the *rôle* of a prophet and apostle, professing to be the Paraclete promised by Christ. From the place of his exile he sent out missions to all parts of Asia, and here he produced his sacred book, the *Ertenghi Mani*. On the death of Sapor, his successor Hormisdas recalled M. and gave him a strong castle for a residence; but under the successor of that prince, Varanes I. or II., he lost his life. Being inveigled into a disputation with the Magi, on his defeat he was flayed alive and his carcase thrown to the dogs, A.D. 277.

Ma'nia (Gr.), in its primary sense, means raving madness, and the term may be used with propriety as its English synonym. The premonitory symptoms of M. are gloom and despondency, sometimes deep stupor, the reverse of the excitement which follows. The physical symptoms are impaired health, insomnia, deranged liver, slight or acute febrile symptoms; and, sometimes, decided indications of cerebral congestion.

When M. is fully developed, the perceptions of the patient, whether they be primarily or secondarily affected, may convey to him a hallucination or illusion sufficient to determine his conduct. Such illusions and hallucinations, when believed in and acted upon, imply the existence of corresponding delusions, and give rise to the most extraordinary and violent language and acts. Ordinary *Acute* M. may yield rapidly to treatment; may terminate in death from exhaustion; may recur in intermittent paroxysms; or may terminate in Melancholia or

Dementia (q. v.) of an incurable nature. The most important influences predisposing to M. are, hereditary tendencies, a delicate mental organisation, and an unbalanced mind. Among the exciting causes are inflammation of the brain or its membranes, intemperance, the puerperal state, disordered health, disturbed affections, &c.

Manichæ'ans, the religious sect founded by Mani (q. v.). After the death of that teacher his opinions spread throughout Persia, Syria, and Egypt. About A.D. 296 Diocletian issued severe edicts against Mani's followers as a Persian sect hostile to the empire. After being apparently extinguished, their opinions were resuscitated in the Eastern Church in the 7th c. by the Paulicians, and in the Western in the 11th c. and 12th c. by the Cathari, Paterini, &c. The system of Mani resulted from a fusing together of Zoroastrianism and Gnostic Christianity. According to the dualism of the former, he maintained that there are two eternal principles of good and evil. Ormuzd, the good principle or deity, has five ministers—light, air, fire, bright water, and gentle winds; Ahriman, the evil principle, has also five—darkness, fire, smoke, foul water, and tempestuous winds. When the realm of light was discovered by the powers of darkness, they immediately invaded it. For its defence a spiritual emanation, 'the first man,' was produced, but the spiritual armies under his conduct were defeated by Ahriman; and in consequence the beings made in the likeness of this Adam were of an evil nature. Another emanation of light, 'the Spirit of Life,' taking the command of the defeated armies, gained a partial victory over the powers of darkness, and was able so to blend the spiritual and the material that the light possessed the means of ultimate escape. Thus in every human being there is a soul of darkness derived from Ahriman, and a soul of light from Ormuzd, while the material body is necessarily evil and vicious. Salvation is the freeing of the soul of Ormuzd from the dominion of Ahriman. Ormuzd, the first person of the Christian trinity, produced the Christ, surnamed Mithras by the Persians, and the Holy Spirit. Christ descended upon the earth to draw upwards the souls of light; his body, however, being a mere phantom (see DOCETÆ), and his sufferings only apparent. Those who confess Christ must renounce Jehovah, the servant of Ahriman and fashioner of the material universe, and seek the freedom of the immaterial heaven. The souls which achieve this salvation must undergo a twofold purgation after death, the first by water in the moon, the second by fire in the sun. Those who have lived in sin must either undergo another life, or be consigned to the demons of the air; and when all but the irrecoverable are purified, all matter will be consumed. The members of the sect were divided into two classes, the Elect or perfect, and the Hearers or learners. The former obeyed a rule of most severe asceticism, and were solemnly admitted by a baptism of purification. For the latter the rule of morality was the same as for the former, but they were not bound to the same ascetic life. See Neander's *Kirchengesch.* (Eng. trans. 1858), Gieseler's *Handbuch d. Kirchengesch.* (Eng. trans. 1865), Baur's *Das Manich. Religions-System* (Tüb. 1831).

Mani'la, or **Manill'a**, the capital of the Philippines, and residence of the Spanish viceroy, on the S.W. shore of Luzon (q. v.), at the mouth of the Pasig, and on the deep Bay of M. The city proper lies between the river and the bay, is defended by walls and a citadel, and is laid out in fine broad streets and spacious public squares, ornamented with fountains and tropical foliage. The chief buildings are the large cathedral (built 1654–72), the magnificent palaces of the viceroy and archbishop, the Hall of Audience, and extensive colleges and barracks. A splendid promenade on the ramparts is much frequented in the evenings. Biondo, a suburb on the N. bank of the Eider, is the seat of commerce, and here are to be seen representatives of almost all countries in the world, especially Spaniards, Englishmen, Americans, Chinese, and Malays. On account of its position and excellent harbour, M. has long been the entrepôt for all the Philippines. The principal exports are hemp, tobacco, rice, sugar, cotton, coffee, cordage, sapanwood, buffalo hides, gum-mastic, indigo, and tortoise-shells; the imports are English textiles and iron wares, and Chinese silks, nankins, vermilion, &c. M. cheroots and cigars are world-famous, and their manufacture, a government monopoly, employs 2000 hands. Of M. hemp many fabrics are made, noted for delicacy of texture. In 1875 the exports amounted to 15,727,262 dollars, of which 6,085,697 were to Great Britain. There entered the port (1875) 262 vessels of 143,969 tons. M. has a good climate, the average temperature being 82° F., but earthquakes have been frequent, the most destructive being those of 1824 and 1863. Pop. of the city proper 15,000, with suburbs 150,000. M. was founded by Legaspi in 1571, and is one of the four ports of the Philippines open to foreign commerce.

Manin, Daniello, an Italian patriot, was born at Venice, May 13, 1804, graduated at Padua in his seventeenth year, and being ready for the profession of advocate before the law allowed him to practise, he spent the interval in studying Roman law and languages. In 1831 he issued a proclamation which was distributed among the people in the interests of Italian independence, and from this date was recognised as one of the leaders of the national party. On the 21st of December 1847 he got up a petition which declared that the Lombardo-Venetian kingdom was national and Italian. He was arrested 18th January 1848, but in the March following was liberated by the Revolution. M. immediately proclaimed a republic, after which he proceeded to announce reforms in law and finance, and to organise a scheme of military resistance. In vain he appealed to England and France for assistance against Austria. On the 24th August 1849 the capitulation of Venice had to be signed. M. retired to Paris, where he died 22d September 1857. He was one of the most enlightened and self-devoted of Italian advocates for national unity. See Martin's *Daniel M.* (1859). In 1860 F. Planat de la Faye issued a French translation of the unpublished papers of M. under the title of *Documents et Pièces Authentiques laissés par Daniel M.*

Man'ioc, Man'dioc, or **Cassava**, is prepared from two Euphorbiaceous plants belonging to the genus *Manihot* (formerly *Jatropha*), viz., *M. utilissima*, the bitter; and *M. Aipi*, the sweet. Both in growth are slender and shrubby, rising from long, thick, fleshy roots, and bearing seven-parted and five-parted leaves respectively. They are extensively cultivated in tropical America and the W. Indies for their parsnip-like roots, which contain a great quantity of farina. This is obtained by 'maceration and filtering in water,' and on being dried forms the wholesome and nutritious food known by the three names heading this article. The roots of *M. utilissima* are, however, in their raw state highly poisonous—the poison being removed by pressure of the moist grated mass; those of *M. Aipi* are wholesome. Tapioca is manufactured by heat from the starch which settles in the water used in the preparation of the meal. The meal formed into small oatmeal-like cakes is known as C.-bread, and from it, after mastication, and subsequent fermentation and boiling of the ejected material, an intoxicating drink, called by the Indians 'piwarrie,' is formed, which is said, on good authority, to have an agreeable taste, however disgusting the process of preparation may appear. An approved sauce termed Casareep (q. v.) is made from the concentrated and boiled poisonous juice above referred to, the poisonous property being dissipated by the boiling.

Man'is, a genus of Mammalia belonging to the order *Edentata* (q. v.), and natives of Africa and India. They have a body-covering of horny, overlapping scales, and thus resemble the armadillos. The long-tailed M., or pangolin (*M. tetradactyla*), attains a length of 5 feet, of which the tail measures 3 feet. It is found in W. Africa, and feeds on the white ants and other insects. No teeth exist, but the tongue is very long and protrusible. The *M. pentadactyla*, or short-tailed pangolin, is a native of India.

Maniss'a, a town of Asia Minor, vilayet of Aïdin, on the Sarabat (*Hermus*), 28 miles N.E. of Smyrna, with which it is connected by rail. It has thirty-two mosques, an Armenian church, 3 Greek churches, and four synagogues, and extensive manufactures of cotton, tobacco, salt, &c. It exports much grain and wine. M. is a favourite retreat of the English and German residents at Smyrna. Pop. 23,000. M., the Lydian *Magnesia*, was the scene of Scipio's victory over Antiochus III. of Syria, and the residence of several Turkish sultans.

Mantio'ba, an independent province in the Dominion of Canada, is bounded S. by Minnesota and Dakota, and on its other three sides by the N.W. Territory, extending from the

parallel of 49° on the United States frontier to that of 50° 30′ N., separating it from Rupert's Land. It is sometimes regarded as including the vast unorganised N.W. Territory, which is in a sense dependent upon it, being subject to the governor of M. This larger M. has an area of 2,891,734 sq. miles, and a pop. (1871) of 11,963, but the organised province as already defined is only 14,340 sq. miles in extent. The province is entered in the N. by Lakes Winnipeg and M., from the former of which the Red River flows S. to form the boundary between Minnesota and Dakota, receiving its great affluent, the Assiniboine, from the W. The fertile plain of M., in great part covered with tall grass, is almost a dead level near the Red River. In the E. the country is more broken and woody, but almost everywhere it produces abundantly wheat and most other crops. In winter one of the coldest inhabited parts of N. America, in the rather short summer very warm, M. is remarkably healthy. The rain and snow are very light, and the air is delightfully clear. M. is well stocked with game, including the buffalo, and the waters teem with valuable fish. Cattle, horses, and sheep are extensively reared, and among the exports are flour and furs. The country suffers occasionally from the visitation of grasshoppers. Most of the inhabitants are Indian half-breeds—5757 French-speaking, 4083 English-speaking—while 1565 are whites, and 558 are Indians. The capital is Fort Garry. The government is vested in a lieutenant-governor and an executive council of five; the legislature consists of a council of seven, appointed for life, and an assembly of twenty-four elected members. Either French or English may be spoken in the legislature, and the public documents are printed in both languages. The common law of England prevails, subject to statutory modifications. M. sends two senators to the Dominion Parliament, and four elected members to the lower house of that body. There is (1877) no provincial debt. The Roman Catholic religion was fairly established here by early missionaries to the Indians. There are many Scottish Presbyterians. St. Boniface is the seat of a Roman archbishop, and Fort Garry of the Anglican bishop of Rupert's Land. The board of education consists of equal members of Protestants and Catholics. St. John's College (Anglican) and St. Boniface's College (Roman Catholic) were incorporated in 1872. In 1872 M. had three weekly newspapers. M. is the N. part of the country purchased from the Hudson Bay Company in 1810 by Thomas Douglas, Earl of Selkirk, who planted here the famous Red River Settlement, called also Pembina, and later Assiniboia. The first settlers were Gaelic-speaking Highlanders from Scotland, and these were joined by a band of Canadians in 1815. When the United States boundary was fixed, a part of the colony was found to lie S. of the line. The government of the colony subsequently reverted to the Hudson Bay Company, and was vested in the 'council of Assiniboia' till 1871, when the Dominion completed the purchase of the territory of the Company. The colonists, especially the French Canadians, protested against the colony being treated as dependent territory. Under Louis Riel they openly rebelled and seized the public treasury, but submitted on the appearance of a military force. The government was, however, induced to erect part of the newly acquired territory into the independent province of M. See NORTH-WEST TERRITORY.

Manitou'lin Islands, a group in the N. of Lake Huron, belonging to Britain, have an area of 1870 sq. miles, and a pop. (1871) of 2000, mostly Indians. The Great Manitoulin is 90 miles long, and from 5 to 30 broad, and is of irregular shape. The group is covered with vast pine forests. Eleven of the small islands belong to Michigan, and are inhabited by 891 Mormons.

Mann, Horace, LL.D., born at Franklin, Massachusetts, May 4, 1796, graduated at Brown University, Providence (1819), was called to the bar (1823), and elected (1827) to the legislature of Massachusetts. In 1836 he became President of the State Senate. As Secretary of the Board of Education (1837–48), M. visited the schools and colleges of Europe (1843), and published his *Lectures on Education* (1848). He was a member of Congress (1848–53), and President of Antioch College, Yellow Springs, from 1852 until his death, August 2, 1859. M.'s ardent advocacy of the abolition and temperance causes is set forth in his *Letters and Speeches on Slavery* (1851) and *Lectures on Intemperance* (1852). See his *Life*, by Mrs. M. (1865).

Mann'a, a kind of sugar obtained from the Manna Ash, a tree growing in the mountainous parts of Southern Europe, particularly in Sicily. M. incisions are made with a knife in July or August, day after day, beginning near the root and gradually ascending to the branches. From these incisions the M. slowly exudes, and hardens into flakes. It is a light porous substance of a yellowish colour, and is of some commercial importance. It consists chiefly of a sugar that can be crystallised, called Mannite (q.v.), and of another that cannot be crystallised—the latter being used medicinally as a mild purgative. Among other M.-yielding plants, besides the ash, may be mentioned the *Eucalyptus mannifera* of Australia, and the common or European larch. The M. of the Israelites is represented in Scripture as a special and miraculous gift of God, and not as an ordinary product of nature. Yet it is only proper to note that in the region through which the wanderers passed there still grows a substance called M. by the Arabians. It is collected in the month of June from the tamarisk shrub (*Tamarix gallica*). Burckhardt, who travelled through the peninsula of Sinai, states that it drops from thorns on the sticks and leaves that cover the ground, and must be gathered early in the morning, before the sun's rays melt it. The Arabs cleanse and boil it, strain it through a cloth, and put it into bottles, where it can be kept for years.

Manna Croup consists of the grain of a species of grass, *Glyceria fluitans* (Manna Grass), deprived of its husks, and prepared for use in soups, and for puddings, the same as the semolina of hard wheat. The grass is a native of Great Britain, growing in marshy places; but M. C. is prepared chiefly in Poland and Hungary. The name is frequently given to Semolina (q. v).

Manna Grass is applied to *Glyceria fluitans* on account of its sweet seed, the scientific name of the genus being selected by Brown for a like reason when he separated it from *Poa*. The plant has a wide distribution, and is common through Britain by the sides of ditches, ponds, and most watery places. It has also received the name of float or flote-grass, from its stems often reclining in the water, its leaves floating on the surface, and further, as Dr. Prior says, from its general abundance in irrigated or 'floted' meadows. In Central Europe the seeds are collected, and when husked, are used as an ingredient of soups, &c. They cannot, however, be obtained in large quantity, owing to the promptitude with which the individual seeds fall from the spikelet as they become ripe. (See MANNA CROUP.) Another and handsome species of the genus is *G. aquatica*, also widely distributed, and in Britain frequent in watery places. It grows to 6 feet high, is available for the landscape-gardener, and is useful for fodder, litter, and minor thatching purposes.

Mann'heim, or **Man'heim**, a town of Germany, Grand-Duchy of Baden, at the confluence of the Neckar and Rhine, 51 miles above Mainz, and 35 miles N. of Karlsruhe by rail. It is divided into 112 squares, with broad streets between. Noteworthy buildings are the Schloss (1720–29), with fine art collections, the theatre, where Schiller's first pieces were performed, Schiller's Monument (1862), the Jesuits' Church (1733), the Observatory, Arsenal, and Kaufhaus, all dating from about 1750. The Rhine is crossed by a handsome railway bridge (1867), and the Neckar by a suspension bridge (1845). M. is the chief commercial town of the Upper Rhine, and has important manufactures of tobacco, leather, india-rubber, woollens, carriages, furniture, machinery, toys, and beer. Pop. (1875) 46,452.

Mann'ing, Henry Edward, Cardinal, son of the late W. Manning, Esq., M.P., was born July 15, 1808, and educated at Harrow and Balliol College, Oxford. He became Vicar of Lavington in 1834, and Archdeacon of Chichester in 1840. He was a select preacher at Oxford during the Tractarian movement, of which he was an eloquent leader. M. published 2 vols. of sermons in 1842 and 1846, and three series of sermons preached before the University in 1844, 1848, and 1850. On the Gorham decision regarding baptism, in 1851, he seceded from the Church of England and joined that of Rome. Ordained priest in 1857, he then became Superior of the House of Oblates of St. Charles Borromeo, Bayswater. M. succeeded Cardinal Wiseman in the Archbishopric of Westminster in 1865, and attended the Œcumenical Council at Rome in 1870. A Roman Catholic University was opened under his auspices at Kensington, October 15, 1874; and on March 15, 1875, he received a Cardinal's hat. M. is an uncompromising Ultramontane, and has been incessant in his appeals to his country to return to

the bosom of the early Church. He has worked hard for the better education of the Roman Catholic poor, is an ardent supporter of the temperance cause, and has taken a prominent part in various national movements unconnected with his own communion. His very numerous published writings include *The Grounds of Faith* (1852), *The Temporal Power of the Pope* (1866), *England and Christendom* (1867), *Ireland—a Letter to Earl Grey* (1868), *Petri Privilegium* (pastoral letters on papal infallibility, 1871), *Sermons on Ecclesiastical Subjects* (1872), *The Vatican Decrees*, a reply to Mr. Gladstone's *Expostulation* (1875), and the *Glories of the Sacred Heart* (1876). *The True Story of the Vatican Council* appeared from his pen in the *Nineteenth Century*, in four parts, March–June 1877.

Mann'ite, or Manna Sugar is a sweet crystallisable substance allied to sugar, obtainable from Manna, from mushrooms, and various other vegetable sources; and it can also be artificially made from a solution of cane sugar by the action of sodium amalgam. It is distinguished from true sugars by being incapable of undergoing alcoholic fermentation. It is used for coating nauseous medicines and as a sweet.

Manoel, do Nascimento, Don Francisco, one of the chief modern lyrists of Portugal, was born at Lisbon in 1734. He wrote under the *nom de plume* of 'Filinto Elysio' a large number of odes, sonnets, and epistles, whose liberal principles awaking the resentment of the Inquisition, he fled to France, and died at Paris, 25th February 1819. His *Obras Completas*, among which are translations of La Fontaine's *Fables*, Chateaubriand's *Les Martyrs*, and Wieland's *Oberon*, appeared at Paris (11 vols.) in 1818–19.

Man-of-War, a general term, of unknown origin and antiquity, for all line-of-battle ships, frigates, corvettes, &c., of the British navy, which made up a total (1875) of 241. It corresponds to the Ger. *kriegsschiff* and the Fr. *vaisseau de guerre*.

Man-of-War Bird. See FRIGATE BIRD.

Manom'eter (Gr. *manos*, 'rare,' *metron*, 'a measure'), an instrument for measuring the pressure, and therefore the density of air or other gas. The barometer, the steam-gauge of a steam-engine, and the pressure-gauge of an air-pump, are particular forms of manometers.

Man'or, in English law, is a freehold estate held by the Lord of the M. Manors are as ancient as the Old English constitution. Part of the land on which the lord resided was cultivated as his demesne land for the use of his household; the rest being distributed among his tenants-in-fee for life, or for so many years. Manors were formerly called *Baronies*, and they are still called Lordships. Each lord was empowered to hold a court, called the *Court-Baron*, for redressing misdemeanours, and for settling disputes among the tenants.

Manre'sa, a town of Spain, province of Barcelona, on the river Llobregat, 30 miles N.W. of the city of Barcelona. It has cotton and silk manufactures. Pop. 9000.

Mans, Le, the chief town of the French department of Sarthe, on the river of that name, 51 miles N.N.W. of Tours by rail. Its chief buildings are the cathedral of St. Julien (1216–1434); four stately churches; the theatre (1839–42), one of the finest in France; the prefecture, containing a public library of 50,000 volumes; the hôtel-de-ville, lyceum, natural history museum, &c. M. is at the junction of five railways, and carries on an active trade in linen, hemp, poultry, and candles, and among its industries are spinning, weaving, bleaching, dyeing, bell and machine founding, and the manufacture of hosiery. Pop. (1872) 39,548. The *Suindinum* of the *Cenomani*, it became, under Karl the Great, one of the first cities of the kingdom; but from the reign of Hlodwig down to that of Henri IV. it is said to have suffered twenty-four sieges. General Marceau defeated 60,000 Vendéeans here (December 12, 1793); and here, in 'a week of battles,' Prince Friedrich Karl and the Duke of Mecklenburg, with 120,000 men, defeated 200,000 French under General Chanzy (January 10–17, 1871), taking 18,000 prisoners, two colours, and twenty guns, with a loss to themselves of 180 officers and 3470 men.

Mansard or Mansart, François, a French architect, born in Paris in 1598, died there in 1666. He first designed the curb-roof named after him, which is formed with an upper and an under set of rafters, the latter less inclined to the horizontal than the former.—**Jules Hardouin M.**, nephew of the above, born at Paris in 1645, died at Marly in 1708. He was the architect of the palaces of Versailles and Trianon, and the dome of the Hôtel des Invalides.

Manse (Norm. *manse*, from Lat. *mansio*), in Scotland, is the designation of the dwelling-house of the minister of the Established Church. Every rural parish minister is entitled to a M., and to have it upheld by the *heritors* (see HERITOR); and where there is no M. the minister is entitled to have half an acre of ground designed to him by the Presbytery (q. v.) for a M., offices, and garden, and to have the heritors ordained to erect a M. and offices upon it (see GLEBE). The M. includes a dwelling-house, stable, barn, and cowhouse.

Man'sel, Henry Longueville, D.D., born at Cosgrove, Northamptonshire, October 6, 1820, and educated at Merchant Taylors', became a scholar and fellow (1842) of St. John's College, Oxford, and in 1843 took a double-first, and was ordained. He was successively appointed Reader in moral and metaphysical philosophy at Magdalen College (1855); Bampton Lecturer (1858), when his lectures on the *Limits of Religious Thought*, applying to Christianity the philosophy of the Conditioned (q. v.), involved him in a controversy with Professor Maurice; Waynflete Professor of Logic (1859); Regius Professor of Ecclesiastical History, and a Canon of Christ Church (1866); and Dean of St. Paul's (1868). He died at Cosgrove Hall, July 31, 1871. A follower of Hamilton, whose *Lectures* he edited conjointly with Professor Veitch, M. was the author of *Prolegomena Logica* (1851), *The Philosophy of the Conditioned* (1866), and of a posthumous work on the *Gnostic Heresies of the First and Second Centuries* (1874), to which is prefixed a sketch of his character by Lord Carnarvon.

Mans'field, a town of England, in the county of Nottingham, within the ancient bounds of Sherwood Forest, 14 miles N. by W. of Nottingham by rail. It has large iron foundries, and lace thread mills, besides some machine stocking-knitting, limestone and sandstone quarrying, &c. The Thursday market is supplemented by a stock market monthly. Pop. (1871) 11,824.

Mansfield, William Murray, Earl of, fourth son of Viscount Stormont, was born at Perth, 2d March 1705, studied at Westminster and Oxford, travelled in France and Italy, called to the bar 1731. His first case earned him a great reputation for oratory, and within a couple of years he was conducting appeals at the bar of the House of Lords. In 1738 he married a daughter of the Earl of Nottingham, entered Parliament as Solicitor-General in 1742, charged Lords Lovat, Balmerino, and Kilmarnock with high treason in 1746, became Attorney-General in 1754, and in 1756 was made Chief-Justice of the King's Bench and elevated to the peerage. He was created an earl in 1776, but his administration of justice rendered his name so unpopular that during the riots of 1780 his house was burnt down. M. retired from office in 1788, and died 20th March 1793. He was buried in Westminster Abbey. See Campbell's *Lives of the Chief-Justices of England*.

Man'slaughter is, in English law, the killing of one man by another without deliberate intention.

Mant, Richard, D.D., born at Southampton, February 12, 1776, passed from Winchester School to Trinity College, Oxford, and was elected a fellow of Oriel (1798), taking his M.A. in 1800, and D.D. in 1815. Ordained in 1802, he was successively vicar of Great Coggeshall, Essex (1810); Bampton Lecturer (1812); chaplain to Archbishop Manners Sutton (1813); rector of St. Botolph's, Bishopsgate (1815); and of East Horsley, Surrey (1818); bishop of Killaloe and Kilfenora (1820), and of Down and Connor (1823). He died at Ballymoney Rectory, in the county of Antrim, November 2, 1848. M.'s best-known work, prepared in conjunction with the Rev. George D'Oyly, D.D., is his edition of the Bible, with notes selected from the Anglican divines (3 vols. Lond. 1817; New York reprint, with additional notes by Bishop Hobart, 2 vols. 1818–20). He also published an annotated *Book of Common Prayer* (1820), a *History of the Church of Ireland* (2 vols. 1839–40), *Ancient Hymns from the Roman Breviary* (new ed. Oxf. 1873), &c. See his *Life*, by Archdeacon Berens (1849), and a complete list of his works in vol. xxxi. new series, of the *Gentleman's Magazine*.

Mantchu'ria, the most northerly part of the Chinese empire, is bounded S. by Corea and the Yellow Sea, W. by Mongolia, and N. and E. by Asiatic Russia, from which it is separated by the rivers Amoor and Usuri. The country, which is little known, extended formerly to lat. 58° N. and long. 142° E., but that part of it lying N. of the present boundary rivers was ceded to Russia in 1860. The area is now estimated at 370,000 sq. miles, the pop. at 3,000,000. M. is divided into the three provinces of Liaotung or Shin-king, Girhin, and Saghalin-ulu, and the capital is Mukden (q. v.). The country is for the most part plateau land, bordered in the S. by the Shan-Alin mountains, and in the W. by the Khingan range, which rises to a height of 15,000 feet. It is traversed by several great valleys, that of the Sungari, an affluent of the Amoor, being the most remarkable. The plateaus in the S. are covered with dense forests, the haunts of many valuable fur-bearing animals. The rivers yield abundantly salmon, sturgeon, &c., and the natural products are barley, wheat, millet, ginseng, rhubarb, and tobacco. On the prairies there is much rearing of horses, sheep, and cattle. The Mantchus belong to the Tungusian family of the Mongols, and in appearance closely resemble the Chinese, but are lighter in complexion, stronger in build, and more intelligent and enterprising. According to Williams, they are the most improvable race in the centre if not in the whole of Asia. In the beginning of the 17th c., they invaded China, and in 1643 seized Pekin, and placed their chief, Shunche, the first of the present dynasty, on the throne of the Celestial Mings. (See CHINA.) Agriculture in M. is mainly carried on by the Chinese, while the Mantchus have become the dominant people throughout the empire as officials, soldiers, handicraftsmen, and merchants. For Chinese they gradually dropped their own language, the basis of which was Tungus, but which contained many Mongolian, Turkish, and Chinese words. Their written speech, formed from the Mongolian in 1599, runs perpendicularly like the Chinese. See a dictionary by Amiot (Par. 1789), and grammars by Gabelentz (Altenb. 1832) and Kaulen (Regensb. 1856), and Mantchu translations of the *Se-Schu*, *Schu-King*, and *Schi-King*, with a Mantchu-German dictionary by Gabelentz (3 parts, Leips. 1865).

Mantegn'a, Andrea, a famous Italian painter and engraver on copper, was born at Padua in 1431, studied under Squarcione, married a daughter of Giacomo Bellini, and opened a school in Mantua which acquired a wide celebrity. He died in 1509. M.'s best works are the frescoes in the Church of the Eremitani (Padua), and in the Castello di Corte (Mantua), the altar-piece of St. Zeno (Verona), the 'Dead Body of Christ' (Berlin), and the cartoons of 'Cæsar's Triumph' (Hampton Court). M. is considered the head of the 'Paduan School,' which is distinguished by its close but servile study of the antique, and its comparative neglect of nature. His colouring is almost always dry. The most notable of his pupils were Correggio and Raibolini. M. had three sons, all of whom were painters.

Mantell, Gideon Algernon, an English geologist, was born at Lewes in Sussex in 1790. He practised first as a physician, settling in Brighton in 1835, and at London in 1839; but his later years were wholly devoted to geology. M. especially directed his attention to the fossils of the Wealden beds, his rich collection of which he ultimately sold to the British Museum. He discovered many new forms, especially the *Iguanodon*, the *Hylæosaurus*, the *Pelorosaurus*, and the *Regnosaurus*, four of the five great Dinosaurian reptiles. For his researches he obtained from the Royal Society the Wollaston medal in 1835, and the Royal medal in 1849. He died at London, November 10, 1852. M. was a voluminous author, his chief works being *The Fossils of the South Downs* (1822), *Illustrations of the Geology of Sussex* (1827), *The Fossils of Tillgate Forest* (1827), *Geology of the South-East of England* (1833), *Wonders of Geology* (1838), and *Medals of Creation* (1844), besides numerous memoirs in the *Philosophical Transactions* and other scientific publications.

Mantes', an old town of France, department of Seine-et-Oise, on the left bank of the Seine, 33 miles W.N.W. of Paris by rail. Its church of Notre Dame dates from the 13th c., and St. Maclou has a tower of the 14th. Flour, leather, and beer are manufactured, and there is some trade in corn and wine. Pop. (1872) 5332. M., surnamed *La Jolie*, was burned (1087) by William the Conqueror, who here sustained the injury which caused his death.

Manteuff'el, a noble family of Germany, which from Pommern has spread over Mecklenburg, Brandenburg, Saxony, Livonia, and Courland, and of which several members took part in the Thirty Years' War and the Seven Years' War. The two Manteuffels most conspicuous in the 19th c. are: (1) **Otto Theodor, Freiherr von M.**, born February 3, 1805, at Lubben, became Vice-president of the government at Stettin in 1843, and member of the 'Staatsrath' in 1844. In the first United Diet (1847 and 1848) he was one of the chief members of the Conservative party, on the 8th November of the latter year receiving the direction of home affairs in the ministry '*Der rettenden That*.' On the 28th November 1848, he represented Prussia at Olmütz, after which Prussia was for a few years largely directed by the bureaucratic and retrograde policy of M., who was little liked by the people, and whose removal from office, October 1, 1858, was hailed as the beginning of a new era. (2) **Edwin Hans Karl, Freiherr von M.**, cousin of the preceding, born at Magdeburg, February 24, 1809, became an adjutant of the king in 1845, and in 1857 chief of the so-called military cabinet of the ministry of war, in which position he had great influence in the appointment of officers. In 1864 he was in the war against Denmark, in August 1865 held the chief command in Slesvig, and opened the war of 1866 by forcing the Austrians out of Holstein and surprising Stade. He afterwards was put at the head of the main army, of which the real leader was Falckenstein, and after the war was made by royal favour general of cavalry. In January 1867 he went to Russia on a diplomatic mission, and was next year made general of the first division, which command he held in the war of 1870. On the 14th August M. undertook the attack on the retreating French army, on the 18th August took part in the battle of Gravelotte, and was afterwards among the besiegers of Metz, where he drove back the sorties at Noiseville of the 31st August and 1st September. After the surrender of Metz, M. led the army sent to the N., defeated Faidherbe at Amiens and Hallue, and occupied Normandy. On the 8th January 1871, he was set over the army in the S., and ended the war by forcing Bourbaki to enter Swiss territory on the 1st February, and on the 20th June became Commander-in-Chief of the army in France. On September 19, 1873, M. was made General Field-Marshal.

Man'tidæ. See MANTIS.

Man'tiger, or **Mantègre**, in Heraldry, a horned monster with the body of a lion and the head of a man.

Mantine'a, an important city of ancient Greece, in Arcadia, on the borders of Argolis, famous for a great battle between the Spartans and Thebans, B.C. 362, in which Epaminondas (q. v.) met his death. Its extensive ruins are now called *Palæopoli*.

Man'tis, a peculiar genus of *Orthopterous* insects, distinguished by the great length of the first pair of legs. These being bent when at rest, the insect appears in a kneeling posture; hence its French name, the 'Prieu Dieu.' It is also known as the 'Soothsayer' and as 'Prophet,' and even the scientific name of the familiar European species—*M. religiosa*—has been suggested by the peculiar shape of the fore-legs. The Hottentots worship the M. as a tutelary deity. Its head is of horizontal conformation, and triangular in front. The feelers are long and delicate, and the prothorax gives the insect the appearance of having a long neck. The wings are broad, and have straight veins. American species are the *M. Carolina*, and *M. argentina*, the latter occurring in Buenos Ayres. The M. is carnivorous and raptorial. It preys upon other insects; and the *M. argentina* even seizes and eats small birds. The Chinese keep M. in cages for the amusement of watching the combats which take place between them.

Man'tle (Ger. *mantel*, It. *mantello*, Lat. *mantilum*, originally a towel for the hands, *manus*), a loose cloak worn over other garments. The long M. worn over their armour by knights in the middle ages was an important part of their insignia. Noble ladies usually had their mantles adorned with the impaled arms of themselves and their husbands.

In *Malacology*, M. denotes the external fold of the skin of the molluscs.

Mant'let, in Fortification, a musket-proof shield of wool, metal, or rope, used to shelter gunners at embrasures, or to cover the advance of sappers or riflemen. It is now almost superseded by the Gabbion (q. v.).

Mant'ling or **Lambrequin**, a small velvet or silk mantle, generally crimson and lined with ermine, fastened by tassels to the helmet, and covering the wearer's shoulders. In heraldry, the M. frequently forms the background of the shield and its belongings, the whole constituting an achievement or Hatchment (q. v.) of arms.

Man'tua (Ital. *Mantova*; probably from the Celtic *man*, 'a district'), a town of Italy, capital of the province of the same name, 40 miles E. of Cremona by rail, stands on an island 5 miles in circumference, in the middle of a lagoon formed by the Mincio, nature and art combining to render it the strongest fortress of the Quadrilateral (q. v.). Chief of its many buildings erected or adorned by Mantegna and Giulio Romano, are the cathedral of St. Pietro, the church of St. Andrea (1472), with a white marble façade and a dome (1782), the Corte Reale (1302) or Palazzo Vecchio of the Gonzagas, now partly used as barracks, the Castello di Corte, and just outside the S. W. gate, the famous Palazzo del Tè, so called because built in the form of a T. Other edifices are the Accademia Virgiliana, with frescoes and sculptures, the Liceo, with a library of 80,000 volumes, the museum, theatre, &c. M. has manufactures of leather, linen, silk, woollens, and paper. Pop. (1874) 26,687. An ancient Etruscan city, and the birthplace of Virgil (B.C. 70), M. was ruled by the house of Gonzaga (q. v.) from 1328 to 1708, when it was seized by the Austrians. It was captured by the French in 1797, and again in 1800, and having been held by Austria from 1814 to October 11, 1866, was finally surrendered to Italy, in accordance with the Treaty of Vienna.

Mánu (*Manu* = 'thinker,' probably derived from the same root as the English *man*; comp. also Egyptian *Men* and Greek *Minos*), the traditional lawgiver of the Hindus, and founder of the caste system. Being merely a metrical *resumé* of older materials, the Institutes of M. are to be regarded as representing rather the ideal order of society, such as the sacerdotal caste would wish, rather than a code of legislative enactments. In this respect they may be compared with the Mosaical law. The sanctity attributed to the Brahmins, and the severity of the penalties by which this is enforced on the lower castes, are almost incredible. Besides social regulations, there are embodied a cosmogony, a system of metaphysics, and a theory of the transmigration of souls. The date cannot be fixed with any approximation to certainty. It is intermediate between the Vedas and the epic poems, and probably contemporaneous with the settlement of the Aryan-speaking race in the upper plains of Hindustan. Translation by Sir W. Jones (2d ed. Lond. 1825); Elphinstone's *History of India*, vol. i. (4th ed. Lond. 1864).

Man'uel I. Comne'nus. See BYZANTINE EMPIRE.

Manure' is used in agriculture for accelerating the growth and increasing the production of cultivated crops. Any substance which, when mixed with soil, promotes vegetable growth comes under the designation of M. The name is derived from the Lat. *manu operare*, 'to work by the hand, to till,' through the French *manœuvre*, 'tillage.' The bulk of the organic structure of plants is composed of the elements oxygen, hydrogen, nitrogen, and carbon, which, in the several combinations of carbonic acid, water, and ammonia, are drawn from the atmosphere and the soil. Besides these constituents, however, certain minerals form part of the constituents of plants, and are, therefore, essential to their existence. These earthy substances comprise potash, soda, lime, magnesia, alumina, phosphoric acid, sulphuric acid, oxide of iron, silica, &c., and since they are found, in variable proportions, in the ash of plants, they are termed *ash-constituents*. On the sufficiency of ash-constituents in the soil, depends the full development of a plant, and deficiency in any one essential results in unhealthy and limited growth. Were the same crop, as wheat, to be grown year after year on the same soil it would, on account of the annual abstraction of the essential ash-constituents, eventually become infertile; provision must therefore be made for returning the abstracted constituents to the soil. A rotation of crops is generally practised by British agriculturists, wheat or other cereals being succeeded by root crops and grass, which take up from different depths of soil and in variable proportions the mineral constituents necessary to their growth. The exhaustion of the soil is thus in a manner retarded, but the ultimate result of infertility is the same, unless the soil be re-enriched by artificial means, in other words, by M. M., then, exerts a fertilising influence on the soil, by supplying mineral constituents, but in addition it furnishes a supply of nitrogenous matter, which maintains the soil in the highest state of productiveness.

Liebig's 'mineral theory' of agriculture sets forth that the efficacy of M. is due to the available amount of ash-constituents, which stimulate in direct proportion the assimilation of carbonic acid and ammonia from the atmosphere, and therefore it is superfluous to supply nitrogen in M. This theory, however, is contrary to facts, for elaborate and prolonged experiments at Rothamstead by Messrs Lawes and Gilbert (*Journal of the Royal Agricultural Society*, 1847–64) with mineral M. and nitrogenous M., separately and combined, proved, especially in the case of wheat, that a vast increase of produce attended the use of M. rich in nitrogen, whereas Liebig's wheat M. used alone failed to yield good crops.

Natural manures, consisting of *farmyard M.*, or the excreta of animals kept on the farm, vegetable refuse of all kinds, the offal of slaughter-houses, and occasionally, near towns, human *dejecta*, formed the staple fertilisers down to a comparatively recent period. In seaboard districts, fish offal and seaweed, and in inland parts wood ashes, soot, &c., were also resorted to. Farmyard M. is most valuable for all kinds of crops, since it contains all the constituents assimilated by them, and for certain crops its value and amount may be enhanced by a proper regard to the animals' food. Guano (q. v.), experimentally used in Great Britain early in the present century, formed an important addition to natural manures, and it eventually rose to the first rank among fertilisers. Subsequently a number of other natural products were imported for use as M., and gradually the manufacture of artificial or *specific* manures arose, and has developed into one of the most important and prosperous of British industries. In Great Britain especially, with its dense population and limited area of arable land, extended means of stimulating the productiveness of the soil so as to obtain the maximum amount of produce were greatly desiderated, and this want specific manures have been found to supply. In the preparation of them, the M. manufacturer has regard to the nature and proportion of the constituents specially affected by particular kinds of crops, and for the provision of these constituents very diverse materials are laid under contribution. Besides the natural manures already enumerated, chloride of ammonia, sulphate of ammonia, nitrate of potash, nitrate of soda, dried blood, nitrogenous refuse of certain factories, as tar, hair, leather, glue, horn, shoddy, woollen rags, &c., are made use of in compounding nitrogenous manures, which are specially valuable for cereals, and generally useful on account of the presence of phosphates and alkalies. Phosphatic manures are chiefly used for root crops, and into their composition bones, phosphatic guano, apatite, phosphorite, coprolites, &c., enter (see SUPERPHOSPHATE OF LIME). To heavy clay soils and others deficient in lime, slaked lime is applied, or marl, chalk, and gypsum are incorporated with the artificial M. In 1876 Great Britain imported:

	Tons.	Value.
Bones of Animals and Fish for Manure only	85,129	£524,769
Guano	199,291	2,295,744
Manures, unenumerated	204,707	543,165

Man'uscripts (Lat. 'what are written with the hand,' also *M. libri*, or *codices manuscripti*) is the name given to all books written with the hand, before and after the invention of printing. The reading and proper use of these forms the chief part of the science of Diplomatics; their preservation, cataloguing, &c., develops and tests the knowledge of the librarian. All old M. still extant are written either on parchment or paper. The paper is partly Egyptian, made from the papyrus plant, the use of which for M. ceased in the West in the 9th c., partly cotton or silk (*charta bombycina*), invented in the East about 706 A.D., which was used until the invention of linen-paper in the 13th or 14th c. Pens are first mentioned in the 7th c. Black ink was most common. It consisted chiefly of oven black, soot of rosin and pitch, burned ivory, ground coal, &c., and in the earliest times was not mixed with vitriol. Red (*rubrum*) ink is also found in very old M. The opening letters, the first lines, and the index were written in it, hence the expressions *rubrum*, *rubric*, and *rubricator*. Blue ink was seldom used; green and yellow still less so. In respect of their outer form M. were divided (1) rolls (*volumina*), the oldest kind, and (2) stitched books, the *codices* proper. Among the ancients writers of M. (*scribæ* or *librarii*) were freed men or slaves; in later times the monks, the

Benedictines, by the rules of their order, were bound to undertake the task: correctors and rubricators afterwards amended and embellished the manuscript text. The internal characteristics, especially the peculiarities of the handwriting and of the letters, are of far greater importance than the external signs for judging of the age, value, &c., of M. Walter's manuscript *Lexicon Diplomaticum* (3 vols. Gött. 1745–47) is still of great value for this division. The age of Greek M. is less easily determined by the character of the writing than the Latin. In general it should be noted that the characters of Greek M. are lighter, more pleasing and flowing the older the M. are, and that they become stiffer and stiffer in later times. The want or existence of the Greek accents decides nothing. Greek M. older than the 7th or 6th c. will not be easily found. The characters of Latin M. have been classified partly according to their largeness or smallness (*majuskeln* or *minuskeln*), partly according to the different shape and aspect which they assumed among different nations, or at certain periods (*Scriptura Romana, antiqua, Merovingica, Longobardica, Carolingica*, &c., to which, after the 12th c., was added the so-called *Gothic*, which is a skilfully sharpened and corniced *Minuskel*), and for each of these kinds of writing rules have been framed by which the age of M. can be determined. Before the 8th c. punctuation is seldom seen, and even after its introduction in the 13th and following centuries, M. are found without punctuation, but with the separation of the word. M. which have small capitals or other divisions are always old. The so-called direction-word, or the first word of the following sheet, at the end of the foregoing, belongs to the 12th and following centuries. The fewer and lighter abbreviations a manuscript has, the older it is. In the oldest M. the words usually follow each other uninterruptedly, without any division; it is only since the 9th c. that the division of words has become general. The form of the Arabian letters, which one first finds in the beginning of the 12th c., also contributes to fix the age of M. Many M. distinctly state at the end when and by whom they have been written. The genuineness of these subscriptions must not be accepted without investigation, as they often appear only on one part of the M., or are pure forgeries. Nor can one determine with certainty from these the age of the M., as later writers often copy such notices from the originals before them. M. from which the original writing has been effaced by a new and later writing, are called Palimpsests (q. v.). See Ebert, *Handschriftenkunde* (2 vols. Leips. 1825–27); Kirchhoff, *Die Handschriftenhändler des Mittelalters* (Leips. 1853); Leon de Rosny, *Recherches Historiques et Philologiques sur l'Écriture des Différents Peuples, Anciens et Modernes* (Par. 1857–58).

Illumination of M.—Egyptian illumination, the earliest of which we have any distinct trace, consisted in the use of a vermilion colour for the first character in each leading passage. There is little good decoration in the oldest Latin MSS., such as the Vienna Roman Calendar and the Vatican Virgil, both of the 4th c. They contain coarse illustrations, with an occasional red border, figures shaded in bistre with a pen, and outlines filled in with heavy colours. There are also, however, some cases of golden lettering on rose-stained vellum (*e.g.*, St. Jerome's *Preface to Book of Job*). It is in the Byzantine MSS. of the 5th c. that we first find gold borders surrounding white or stained vellum, ogrund, the letters being golden, or black or of some other colour, and the ground being sometimes golden. Only one exception may be made in favour of the *Codex Argenteus* of Ulfilas (A.D. 360) preserved in the Royal Library, Upsala, the earliest Mœso-Gothic version of the Gospels, written in silver and gold letters on a purple ground. Passing over the MSS. known as the Vienna gold, silver, and purple Gospels, we come to the period of the Emperor Justinian (6th c.) when a distinct Persian influence is said to appear in the Byzantine illuminations, as well as in the contemporary architecture. Instead of the symbolism of the Catacombs, we have the elaborate realism which appears in the square and oblong framed pictures of the Eusebian Canons and the Syriac Gospels. These patterns were carried through Europe by the Christian missionaries, but an entirely original style seems to have been used by the early Irish Church, who formed their initial letters and borders and tesselated pages by means of small compartments filled with diagonal lines, concentric spirals, interlaced ribbons, rows of red dots, and a great variety of lacertine animals and birds. This style, of which the *Book of Kells* and the *Durham Book* are the finest specimens, was extensively spread by Columba, Aidan, Boniface, and Kilian. Gold is sparingly used, and there are no body colour pictures. The Augustinian books present a combination of the Irish decoration with Old English writing and Latin pictures well shaded and done with the brush. A later combination, in which gold is more profuse, and the letters other than initial are Roman rustic capitals, is shown in the Utrecht Psalter. It is marked, too, by pen and ink drawings from the coloured Latin miniatures formerly prevalent. Even in England, though gold writing and rose-staining were not generally practised, MSS. as splendid in coloured decoration as any in Byzantium were occasionally produced. Such, among many others, was the *Benedictorial* of St. Ethelwold, the work of the famous painter-monks (*illuminatores, notarii*, and *librarii antiquarii*) of Hyde Abbey [Winchester New Minster]. When black ink was used for liturgies, red ink was used for title-page and headings, hence *rubric*. Green, yellow, and blue inks were chiefly confined to capitals. Azure and vermilion were favourite colours for the pure decoration, some of which are so brilliant and durable as to suggest the use of oil, though white of egg was more probably employed. The work of the *Scriptorium*, which Alcuin says is better than field work, as profiting both soul and body, was not confined to gospels, missals, anthems, but included some leading classics. From the fusion of the Roman or Pictorial, the Byzantine or Golden, and the Hiberno-English or Intricate, sprang the Romanesque and ultimately the medieval. In the Caroline writings, *e.g.*, the *Evangelistiarium* of Toulouse, and the products of the great abbey of St. Martin at Tours, we have the beginnings of the eclectic French school, in which purple vellum and gold lettering are sometimes found along with Kufic borders, Latin figures, Old English fretwork, and an outline style quite different from the fluttering outline of the penticule sketches of the Hiberno-English. There is also the odd broken-backed letter called from its birthplace *Lombard brisé*. This French movement was probably helped by the dispersion of Greek artists under the Iconoclastic emperors. At Byzantium itself, the revival under Basil the Macedonian was ultimately overlaid by Saracenic and Moorish decoration. In Italy classical traditions were for long wholly lost until recovered under the teaching of Cimabue and Giotto. In the German MSS. of the 12th c. (under Barbarossa) we find, in connection with the Caroline knotted ends to initials, the profuse, but stiff, foliation which, so far an imitation of nature, prepares the way for the medieval or Gothic of the 13th, 14th, and 15th centuries. This foliation, the work of the pen more than the brush, has a close similarity to the black lead lines of stained glass painting. One sign of the transition to medieval is the restriction of the enormous Arabesque initial to the corner formed by the top and side ornaments. The medieval reached its climax in the 14th c., Jean Duc de Berri and the Duke of Bedford being two of its greatest patrons. It varied in different countries just as the Gothic architecture did. In England the colouring was fuller and deeper than in France, and the action of the figures was more intense, a vein of caricature appearing in secular MSS. There also appeared the diapered background of burnished gold, which latterly under the influence of the Italian and of the Van Eycks became an architectural and then a landscape background. The principal English products may be seen in the catalogue of William of Wykeham's library. In Italy, illumination, which Dante mentions as an art belonging to Paris, was revived in the 13th c. by Oderigi and Bolognese. To these succeeded Fiorentino, Fra Angelico, Memmi (of Sienna), Cosme of Ferrara, and many others. Of these *quatro* and *cinque cento* works, all inspired by a mystical religious sentiment, the finest are the choir books of Sienna Cathedral. Some have been chromo-lithographed by the Arundel Society. Among the authors of arabesques and miniatures on secular subjects, the greatest names are Girolamo and Giulio Clovio. In the first block-books spaces were left for illuminated initials, &c., to be filled in by hand, but these were afterwards reproduced (except in colour) from blocks or movable types, as in the Mainz Psalter. At the Reformation vast quantities of illuminated MSS. were destroyed as 'superstitious books.' (See Bale's account of this.) The principal authorities on this subject are: Humphrey's *Illuminated Books of the Middle Ages;* Tymm's and Wyatts' *Art of Illuminating;* Agincourt, *Histoire de l'Art par les Monuments;* Kugler, *Handbuch der Kunstgeschichte;* Sylvestre and Champollion's *Paléographie Universelle;* Shaw's *Illuminated Ornaments*. Practical information will be got in the works of De Lara, Lucien, Harrison,

Audley, Meme, and *The Illuminator*. Special works are Westwood's *Palæographia Sacra Pictoria*, and Chassants' *Manuel des Abbréviations*.

Manu'tius (Ital. *Manuzzi* or *Manucci*) **Aldus**, a famous early printer, also often called 'Aldus the Elder,' was born at Bassano in 1449. From his press at Venice, established 1488, came the celebrated Aldine Editions (q. v.), so called after Aldus, which instantly acquired a great reputation for improved typography, and are still highly prized for their accuracy. M. was a good classic, and was assisted in his editorial work by many other scholars, who joined him in forming the Aldine Academy. He printed twenty-eight *Editiones Principes* of Greek authors, compiled a Greek-Latin lexicon, and died at Venice, 6th February 1515. The printing establishment was kept up till the death of his grandson, 'Aldus the Younger,' 28th Oct. 1597. See Renouard, *Annales de l'Imprimerié des Aldes* (3d ed., Par. 1834), and Schück, *Aldus M. und seine Zeitgenossen* (Berl. 1862).

Man'wyne, a town in the Chinese province of Yunnan, bordering on Independent Burmah, the scene of the treacherous murder of Mr. Margary, an enterprising British diplomatic officer, on 22d February 1875. See *Journey of A. R. Margary from Shanghae to Bhamo, and back to M.* (Lond. 1876).

Manzo'ni, Alessandro, a great Italian author of noble parentage, was born at Milan in 1784, educated at Milan and Paris, went to Paris in 1805, where he showed his first poem upon the death of Carlo Imbonati to the poet Fauriel. In 1808 he married the daughter of a Geneva banker and retired to the neighbourhood of Milan. Five years after he published some hymns of a religious caste, which obtained a great popularity, and in 1826 appeared the tragedy *Il Conte di Carmagnola*, a work which forestalled the *Hernani* of Victor Hugo in its spirit of romanticism and scorn for the historical unities. In 1827 M. published what remains his masterpiece, *I Promessi Sposi*, a novel dealing with scenes and characters at the beginning of the 17th c, and modelled to a certain extent upon the plan of Sir W. Scott. No modern work has been more widely read. Up till the year 1877, 116 Italian editions had been issued; 17 translations in German, 19 in French, and 10 in English. It is an eloquent, dramatic, and picturesque novel, and will long preserve the name of its author. M. was nominated an Italian senator in 1860, and died May 22, 1873. A complete edition of M.'s works, in 5 vols., was published by Tomaseo at Florence, 1828–29. See Sainte-Beuve's *Portraits Contemporains* (vol. ii.).

Mao'ri (*i.e.*, 'native'), the name of the race by whom New Zealand was inhabited when discovered by Europeans. The M. belong to the Malayan family of mankind, but are evidently of mixed descent, their features manifesting the greatest diversity of type. In some of the leading tribes the physiognomy, complexion, and hair of the chiefs closely resemble those of Europeans; but the mass of the people incline more to the negro type, much modified and improved. They are of square build, averaging 5 feet 6½ inches in height, and muscular, though inferior in this respect to Europeans.

The origin of the M. is enshrouded in much uncertainty. The native traditions—on which little reliance can be placed—relate that the M. came to New Zealand about 500 years ago in two canoes, named the Arawa and Tainui, from Hawaiki, which some ethnologists identify with Hawaii, in the Sandwich Islands (q. v.), while others identify it with the much nearer island of Savaii, in the Samoan group. Mr. J. T. Thomson, of Otago, has made an elaborate attempt to trace the M., through the Malays, to the ancient inhabitants of Barata, in Southern India, basing his arguments principally upon linguistic evidence. His theory is supported by the discovery, some years ago, of a Brahminical bell, bearing an inscription in the ancient Tamil character, in the North Island. In 1877, too, there were discovered, in the Weka Pass Ranges in the Middle Island, some remarkable rock paintings, representing animals foreign to New Zealand, weapons and dresses of semi-civilised people, together with inscriptions in a character resembling the Tamil. In the Chatham Islands (q. v.) there lingers a small remnant of a race called the Morioris or Maiorioris, which some believe to have been the aboriginal race of New Zealand. The Morioris are a shorter and feebler race than the M., by whom and epidemic disease their number has been reduced to 140.

The M. are a brave and intelligent, but revengeful and treacherous race, their moral perceptions being as dull as their intellectual faculties are acute. They are close observers of nature, and when first known were found to have a surprisingly correct system of botanical classification of their own. War of the most cruel and relentless kind was their principal occupation, and in its track slavery and cannibalism followed. The latter the M. assert to have been unknown to their ancestors before their arrival in New Zealand. At one time universal, this horrible practice is now extinct, no case having occurred since the war in 1869. Infanticide, polygamy, tattooing, and *tapu* (taboo) were also M. customs which are now obsolete, or nearly so. By the last the priests declared certain persons or objects to be consecrated and inviolable, and Mr. Colenso states that 'the stoutest and fiercest of the New Zealand chiefs bowed like an infant before it, and dared not disobey its behests.' Though without any definite form of religion, the M. in their pagan condition were much under the influence of sorcerers who traded on their superstitions. The M. idea of a spirit was confined to that of an *atua*, or evil demon, whom he sought to propitiate. Only one tribe worshipped idols, and another trees, but the rainbow was everywhere an object of veneration, and the spider and lizard were regarded with awe. The progress of Christianity among the M. has been much checked since 1863 by the outbreak of the *Hauhau* religion, a singular medley of Scripture truth and fanatical superstition.

The M. system of government was tribal, the country being divided between large clans, of which there are eighteen in the North Island, and these being in turn subdivided into numerous small tribes or *hapus*. The titles to land were most complicated, and gave rise to endless bloodshed. Since 1858 an influential section of the M. have kept aloof from Europeans, yielding allegiance only to a king chosen by themselves, and the Queen's writ does not run in their territory. This movement caused two fierce wars in 1860 and 1863. A third war, in 1868–69, had its origin in a massacre of colonists by M. prisoners who had escaped from the Chatham Islands.

The M. are excellent sailors and fishermen, while their military skill and oratorical powers are remarkable. They are too indolent, however, to attain success as agriculturists or artisans, though they raise large quantities of potatoes, and display much skill in weaving and carving. Schools are now common among them, and they also own and publish two newspapers. A few have risen to affluence by leasing their land, and live in the best European style, while M. members sit in both houses of the Colonial legislature. Nevertheless the M., as a people, have made little real progress in civilisation beyond dropping their barbarous customs and adopting the European dress, while they have acquired the vices of civilised races with a fatal readiness. Through the operation of these, and of epidemics, especially influenza, the M. are rapidly decreasing in numbers. In 1874 the M. population of New Zealand was officially estimated at 46,016, of whom 43,408 were in the North Island.

The M. language is a branch of the great Polynesian tongue, and is divided into ten dialects. It contains only fifteen letters—five vowels and ten consonants—and is both euphonious and expressive. Every syllable ends in a vowel. The language was first reduced to writing by the missionaries, and the Scriptures and other books have been translated into it.

See Dr. Dieffenbach's *Travels in New Zealand* (Lond. 1843); Rev. R. Taylor's *Te-Ika-a-Maui* (Lond. 1855); Sir G. Grey's *Polynesian Mythology* (Lond. 1855); Dr. A. Thomson's *Story of New Zealand, Past and Present* (Lond. 1859); Dr. Karl Scherzer's *Voyage of the Novara* (Lond. 1863); Judge Manning's *Old New Zealand, by a Pakeha-Maori* (new ed. Lond. 1877); and valuable papers by various authors in the *Transactions of the New Zealand Institute* (Wellington, New Zealand) vols. i., iv., v., and vi.; in the *Journal of the Ethnological Society of London* (1869), and in the *Journal of the Anthropological Institute of Great Britain and Ireland* (vol. v.).

Map (Lat. *mappa*, 'a cloth') is usually applied to the delineation of the whole or of a portion of the earth's surface upon a plane sheet. The name is also used to designate a similar representation of the celestial vault, or of the surfaces of the planets or satellites as they appear through a powerful telescope. The first scientifically constructed maps seem to have been those of Claudius Ptolemy of Alexandria, who flourished in the 2d

c. of the Christian era; but attempts had been made at a much earlier date by Anaximander of Miletus (600 B.C.), by Eratosthenes of Cyrene (250 B.C.), and Hipparchus of Bithynia (200 B.C.). In the 3d c. A.D. the Romans showed their appreciation of the value of mapping by the construction of the famous Pentingerian table, which represented the then known world, with the principal roads. During the middle ages, the construction of maps for useful purposes was quite unknown in Europe, and no true improvement in this respect was made until the 14th and 15th centuries, when the growing commerce of Italy rendered mapping a necessity. The great geographical discoveries of the 15th and 16th centuries, and the introduction of the cylindric projection of the sphere by Mercator in 1556 gave mapping a powerful impulse. The elaborate atlases of Blaen (1650), De Wit (1680), and Sanson, geographer to the French king (1690-96), are the most important contributions of that age. In the beginning of the 18th c. the survey of the Chinese Empire by the Jesuit missionaries was undertaken, and their M. has formed the basis of all subsequent maps. With the improvement of methods and instruments, the construction of maps has now attained great perfection. The Ordnance Survey maps of the British Islands, and the similar maps of other civilised nations, are marvels of accuracy. In the delineation of maps, it must be remembered that the earth is spherical, and that by no process of development can a portion of a sphere be made to coincide with a plane. The representation of terrestrial configuration upon a plane must be effected by some method of projection or approximate development. Of the methods of projection, the *stereographic* and *orthographic* are the most important, both giving a true perspective view of a portion of the globe. In the former, the eye is conceived to be placed on the surface of the sphere opposite the part to be delineated. In the latter the eye is supposed to be at an infinite distance, so that the rays from all parts of the surface are parallel. The stereographic method contracts the centre of the M. and enlarges it towards the circumference, while the orthographic gives an almost accurate representation of the centre, but very much contracts the circumference. By a combination of these two projections, the ordinary *globular* projection of a hemisphere is obtained. The methods in common use, however, as affording a more accurate representation than these, are those of approximate development. The configurations of the surface are projected from the centre of the sphere upon a circumscribing cone or cylinder, whose axis is coincident with the polar axis of the earth, and the cone or cylinder is then developed into a plane. The former, or *conical projection*, is very convenient for small portions, and with modifications for larger tracks, even such as whole continents. The latter, or *cylindric projection*, known best as *Mercator's projection*, is invaluable in the construction of maps for purposes of Navigation (q. v.), and as being the only method by which the whole of the earth's surface can be represented on one sheet.

Map, or Mapes, Walter, the most brilliant literary genius of the 12th c., was born on the Welsh border about 1143, studied for the Church at the University of Paris, and on his return to England entered the service of Henry II. In 1173 he presided at the Gloucester Assizes as one of the King's Justices in Eyre, and subsequently acted as royal chaplain during Henry's wars with his sons. He represented his sovereign at the court of Louis VII., attended the Lateran Council at Rome in 1179, was made canon of St. Paul's and precentor of Lincoln, and finally, in 1196, archdeacon of Oxford. He does not again appear in history, but is supposed to have died about 1210. M. wrote mostly in Latin, but his matter is as thoroughly English as if it had been couched in the vernacular. His work falls naturally into three divisions—The *Poems of Golias*, the *De Nugis Curialium*, and his Contributions to the Arthurian Romance. The first of these, edited by Mr. Wright for the Camden Society in 1841, is a collection of sparkling and stinging satires on the corruptions of the clergy, put into the mouth of a certain Bishop Golias, a bibulous and gluttonous voluptuary. One of the pieces, the *Confessio Goliæ*, contains the famous verses beginning 'Meum est propositum in taberna mori,' which probably suggested the misleading phrase 'the Anacreon of the 12th c.' applied to M. by Lord Lyttleton. The *De Nugis Curialium* ('On the Trifles of Courtiers'), edited by Mr. Wright, from a single MS. in 1850, is a prose miscellany in five books, called *Distinctiones*, and is full of anecdote and gossip of all kinds, with stories of heretics, hermits, &c., pictures of popular manners, and of the English court, fairy tales, and satirical sketches of the monkish orders. His additions to the Arthurian Romance constitute the noblest part of that heroic legend, and include the story of Lancelot of the Lake, the Quest of the Holy Grail, and the Mort Artus. See Morley's *History of English Literature*.

Ma'ple, a genus of exogenous trees of the tribe *Aceriæ* of the great tropical order *Sapindaceæ*. It consists of some 50 species of large or small trees spread through the N. hemisphere, of which only a few of the most important can here be specified. The common M. (*A. campestre*) gives a compact and fine grained wood, sought after for choice furniture; grows to 40 feet, but can be trimmed down for hedge purposes.—*A. saccharinum*, or sugar M. of N. America, is a large tree, with strong wood, which when well seasoned is used for axle-trees, spokes, also for chairs; when knotty or curly it furnishes the bird's-eye or curly M.-wood; from this tree the chief supply of saccharine fluid so extensively converted into M.-sugar, is obtained by tapping; the autumnal leaf colouring is superb.—*A. rubrum*, or red M. of N. America; a handsome tree attaining 80 feet; wood useful for furniture; yields about half the quantity of sugar as the preceding.—*A. dasycarpum*, or white M. of N. America; a most beautiful tree of rapid growth, attaining 50 feet, and sometimes 9 feet in diameter; wood pale and soft, but much praised for street planking; sugar supply same as red M.—*A. pseudo-platanus*, the sycamore M. (the Scotch plane-tree), native of mid Europe and W. Asia but thoroughly naturalised in Britain, reaches 100 feet; wood compact and firm, valuable for turnery, &c.; makes superior charcoal; will stand exposure to sea-air.—*A. platanoides*, or Norway M., a tree of imposing appearance, recommended for ornamental gardening; its pale wood much used by cabinetmakers.—*A. palmatum*, a beautiful tree, and a native of Japan, in which country probably 25 other species are indigenous, most of them highly ornamental.

Maqui, the French name for *Aristotelia M.*, a small tree belonging to natural order *Tiliaceæ*. It is a native of Chili, where the wood is used in making musical instruments, for which the tough bark supplies the necessary strings. The berries are edible, and a wine for use in malignant fever is prepared from them.

Mar'abouts, a semi-priestly caste among the Mohammedan Berbers of North-Western Africa, are the descendants of the dynasty of the Almoravides (q. v.). Their office is hereditary; they are accredited with prophetic and miraculous gifts, and from their knowledge of the Koran are esteemed the interpreters of the civil and religious law. Their influence culminated in the person of Abd-el-Kader (q. v.), and was greatly weakened in 1856 by Robert Houdin, who, on the invitation of the French government, competed with and far excelled them in their feats of jugglery.

Maracay'bo ('the headland on the sea'), now called **San Carlos**, a city of Venezuela, capital of the state of Zulia, on the W. side of the channel which connects the lake and gulf of M. It is defended by three forts, and has a good harbour, which can only be reached, however, by vessels drawing less than 10 feet. There is some shipbuilding, and a trade in cacao, cotton, fustic, coffee, cattle, &c. In 1870 the imports (chiefly manufactured goods from the United States) amounted in value to £285,536. The port is now (1877) closed to foreign trade, except in the two articles dye-wood and fustic. Pop. (1873) 21,954.—The *Lake of M.*, in the N.W. of Venezuela, is 100 miles long from N. to S. and 70 broad, and communicates by a channel, 20 miles long and 5 broad, with the *Gulf of M.*, an inlet of the Caribbean Sea. The lake is deep, but its mouth is obstructed by bars. During the N. winds of April and May its waters become brackish. The fortified entrance was the last spot held by the Spaniards, and was relinquished on the 9th November 1823.

Mar'agha, an old walled town in Azerbijan, Persia, 232 miles N.W. of Teheran, on a feeder of Lake Urumiah, distant 10 miles. It has glass works, and a handsome public bath, and some distance off are the famous M. marble pits. The M. marble, much prized throughout Persia, is nearly transparent

when in thin plates, and is thus used for windows to the baths of Tabreez. Pop. 15,000 of the Turkish tribe of Mukadam.

Ma'rah (Heb. 'bitterness'), the name of a place in the wilderness of Shur, three days' journey from the point where the Israelites crossed the Red Sea. The waters were so bitter that it was impossible to drink them, but they were sweetened by Moses casting in a tree which 'the Lord showed him' (Exod. xv. 23–25).

Marajo', an island of Brazil, belonging to the province of Pará, and formed by the estuaries of the Amazon and Pará, is 180 miles long and 125 broad. It is low-lying, but in parts rocky, and in the S. is covered with dense forests. On the northern pastures are reared immense herds of cattle and horses. Pop. 20,000, mostly Indians and Mestizoes.

Maranha'o, or **Maranham**, a province of Brazil, is bounded N. by the Atlantic and Pará, S. and E. by Piauhy, from which it is separated by the river Paranahyba, and W. by Gozaz. Area 141,651 sq. miles; pop. (1872) 359,040, of whom 74,939 were slaves. It produces rich crops of sugar, cotton, and rice, much fine timber and dyewood. In the S.W. are several ranges of low hills, yielding iron and lead ores and antimony. The inhabitants are chiefly a mixed race of Indians, negroes, and whites, but there are a few pure Indian tribes.—**M., San Luiz de**, capital of the above province, on an island at the mouth of the M. River, is a handsome thriving city, with many fine buildings. It is built on two hills, and the streets are generally too steep for carriages. The seat of a bishop, it has a large cathedral, many convents, a lyceum, &c. The harbour is commodious, though somewhat difficult of entrance. Pop. (1872) 31,604.

Mara'no, an old town of Italy, 8 miles N. of Naples, has many interesting antiquities. Pop. (1874) 7143.

Maranta'ceæ, a natural order of Endogens, of about 160 species, all tropical, and mostly natives of tropical America. In an economic point the order is valuable for its large starch supply. (See ARROWROOT.) Besides the various species of *Canna* (q. v.), the *Marantas* and *Calatheas*, with beautifully mottled and streaked foliage, seen in our hot-houses, belong to the M.

Maraschi'no, a delicate and valuable liqueur, distilled from the ripe fruits of the Marasca cherry, a sweet dark coloured fruit cultivated in Dalmatia. The liqueur is further flavoured and sweetened after distillation. The finest is the M. of Zará, and is imported in square wickered bottles or flasks.

Marat, Jean Paul, was born at Boudry, May 24, 1744. The earlier part of his career is only indifferently known, though it has been held to be proved that in 1774 he was in England, where he published the *Chains of Slavery*, that he gave lessons in Edinburgh (1775), and that (1776) he was committed to prison for stealing medals from the Oxford Museum. It is at least certain that he tried several careers before becoming (1789) one of the moving spirits of the French Revolution, through the advocacy of the poor against the rich in *L'Ami du Peuple*. This advocacy degenerated into a propagandism in behalf of massacre and spoliation. To him were due the systematic assassinations on the 20th June, the 10th August, and in September 1792. After the king's death he wrote, 'massacre 270,000 partisans of the *ancien régime*; reduce to a quarter of their number the members of the Convention!' The Convention were outraged by some of his advices, but a revolutionary tribunal acquitted him when an accusation was brought against him by the Girondins. M. was killed in his bath by Charlotte Corday, 13th July 1793; the honours of the Pantheon were decreed to his remains, which were afterwards removed amidst popular execration. M. wrote numerous legal and scientific treatises, besides an immense mass of political *brochures*, none of which are worth rescuing. See the Histories of the French Revolution by Thiers, Michelet, Louis Blanc, and Carlyle, and (for the alleged facts of M.'s English experiences) *Notes and Queries* (Sept. 27, 1859).

Mar'athon, a plain in the N.E. of Attica, about 6 miles long and 3 broad, open to the sea upon the E., shut in by mountains on the W., and bounded on the N. and S. by marshes. It contained in ancient times four places, forming the Tetrapolis, one of which, named M., is supposed to have occupied the site of the modern *Vrana*. M. is famed in history as the scene of the defeat of the Persians by the Athenians under Miltiades (B.C. 490).

Marave'di, an old Spanish coin, was in the early part of the middle ages the *weight* by which the booty taken from the Moors (*Morobotin*) was divided amongst the soldiers. As a coin it was introduced by the Moors, and was at first of gold or silver, of value now unknown. From 1474 till its abolition in 1848, the M. was struck in *vellon* ('copper'), of value equal to ⅓ths of a farthing.

Mar'ble, in popular language, is any limestone which is capable of being polished. Geologically, the name is restricted to those varieties of carbonate of lime which have a granular or crystalline structure, and which have probably resulted from metamorphosis of the original limestone. The finest varieties are pure white in colour, and are used for statuary. The best statuary M. comes from the Italian quarry at Carrara. The ancient Greeks and Romans obtained their M. from the quarries of Paros, Samos, Lesbos, and Pentelicus. The clouded white marbles are much more abundant than the pure white, and are used for architectural purposes. The best varieties of these are suitable building material, not being exceeded in durability by even granite. Coloured and variegated marbles are very abundant in Italy, Greece, France, Spain, and Portugal, and many when polished are of rare beauty. The *rosso-antico* M. of Libya is deep blood red with minute white dots; the *giallo-antico* of Milos is yellow with black or yellow rings; the *brocatello* of Sienna is yellow with large purplish spots or veins; the *portor* of Genoa is deep black beautifully veined with yellow; the *mandelato* of Luggezzana consists of yellowish white spots in a light red paste; the *paragone* of Bergamo is a fine black, somewhat resembling the *nero-antico* of the ancients. *Verde-antico* or verd antique M. is a clouded green colour, and consists of a mixture of serpentine and limestone. In Genoa and Tuscany it is much valued for its beauty.

Marblehead, a seaport of Massachusetts, U.S., 20 miles N.E. of Boston by rail, has eight churches, three banks, one newspaper, and numerous boot and shoe factories. The fisheries have declined, but it is becoming a favourite watering-place. Pop. (1870) 7703.

Mar'bling is the art of imparting variegated patterns to sheets of paper or book edges. The colours, previously mixed up with wax and ox-gall, are superimposed on each other on the surface of a solution of gum contained in a shallow trough, and the particular pattern required is arranged by drawing a rod or comb through them. A sheet of paper is then laid flat on the colours and removed without disturbing their arrangement; the marbled paper is afterwards calendered. Book edges are dipped into the trough, and when dry are burnished with agate. Germany exports much marbled paper.

Mar'burg (*Mar* is an old German word for a horse; comp. Eng. *mare*), a town of Germany, in the province of Hessen-Nassau, on the Lahn, 51 miles N. of Frankfurt by railway. It is built in a semicircle round the precipitous Schlossberg (876 feet), and contains many interesting buildings—the Elizabethkirche (1235–83), with the tomb of St. Elizabeth (q. v.), and two towers 310 feet high; the Rathhaus (1512); and the Schloss (1065), in the *rittersaal* of which Luther and Zwingli held a religious conference (1529). There are also numerous educational and benevolent institutions, potteries and tanneries, and manufactures of pianos and surgical instruments. Pop. (1875) 9658. The University of M., founded (1527) by Philipp the Generous, possesses a library with 120,000 volumes, anatomical and zoological museums, an observatory, &c. It has numbered among its students Tyndale, Patrick Hamilton, and Johann von Wolf, and in 1876 had 65 professors and teachers and 401 students.

Marcell'us was the name of an illustrious family of the Claudia gens, of which the most distinguished member was **Marcus Claudius M.**, born about B.C. 268, who early won high reputation by his martial exploits. He became curule ædile, B.C. 226. During his first consulship, B.C. 222, the Gallic war was terminated, in which the prowess of M. was displayed in slaying with his own hand Britomartus or Viridomarus, the Gallic leader, whose spoils were dedicated in the temple of

Jupiter, the third and last occasion in Roman history on which *spolia opima* were so offered. M. was appointed one of the prætors, B.C. 216, and after the disastrous defeat at Cannæ, succeeded in reviving the dispirited Romans by a repulse of the Carthaginians at Nola, an achievement which he twice successfully repeated. In 214 B.C., M. was appointed consul for the third time, and despatched to Sicily, where he greatly increased his military renown by the capture of Syracuse, B.C. 212, in which pestilence and treachery enabled the assailants to overcome the skill and science of Archimedes. The city was plundered, and many works of art carried off to Rome. After the commencement of his fourth consulship, B.C. 210, the verdict of his countrymen on his conduct in Sicily was challenged by Sicilian deputies, with the result that he was withdrawn from Sicily, and sent to the army in Apulia. He now resumed his opposition to Hannibal, whom he met in an indecisive contest near Numistro, but the campaign of B.C. 209 was so fruitless, if not unfavourable, that M. was compelled to return to Rome to defend himself. This, however, he accomplished so well, that he was elected consul for the fifth time, and took command of the army at Venusia. Here he fell into an ambuscade and was killed, B.C. 208.

March, a military term meaning the moving of troops from one place to another. The M. may be in slow time, quick time, or double time. In the first, 75 paces are taken in a minute, in the second, 110, and in the third, 150.

The M., *in music*, is usually a simple tune in the common time. In regard to its composition it is impossible to lay down any general rules. Many celebrated pieces of the great masters are in this style, *e.g.*, the M. of the priests in *Zauber-flöte*, that of the peasants in Weber's *Freischütz*, and above all Beethoven's Funeral Marches.

March (Lat. *Martius*, the 'month of Mars'), the first month in the Julian and the third in the Gregorian calendar, corresponding to the Attic Elaphebolion and the Jewish Nisan or Abib. Before the introduction of the New Style in 1752, the English legal year did not commence until March 25, whence the practice in old records of writing all dates falling before that day either as March 24, $174\frac{4}{5}$, or March 24, 1745–46.

March, a market-town in Cambridgeshire, England, 88 miles N. by E. of London. It lies on both sides of the Old Nen, at the junction of five railways, has a fine square and town-house, and a church dating from the 14th c. M. trades in corn, coal, and timber, and has derived much advantage from the draining of the fen country. Pop. (1871) 5854.

Marchan'tia, or **Liverworts**, formerly a genus, but now nearly equivalent to a section (*Marchantiaceæ*) of *Hepaticæ* (q. v.). *M. polymorpha*, common on shady walks, damp rock cuttings, the soil of garden pots, &c., which it covers with a dark green sheet, is a familiar example.

Marche'na ('the marshy place'), a town of Spain, province of Seville, on the Galapagar, 80 miles N.E. of Cadiz by rail, in a district rich in corn and olives, and with celebrated sulphur springs. Pop. 12,208.

March'es. See MARK.

Mar'cion was a Gnostic heretic of the 2d c., and the founder of a sect called the Marcionites. He was a native of Sinope, a wealthy shipmaster, and a man of good character, although Epiphanius, according to the uniform practice of making heretics out to be bad men, says he was the son of a bishop, and had been excommunicated by his father for immorality. He came to Rome some time shortly before the middle of the 2d c., and remained in communion with the Church for about forty years, although excommunicated for a time more than once. The orthodoxy of the time was a Judaizing compromise, in opposition to which Gnosticism (q. v.) was making way, and M. took up a position directly in opposition to that of the Judaizing party, and maintained that Christianity was something distinct from Judaism altogether. In his doctrinal system M. assumed three principles:—(1) The Almighty and holy God; (2) Matter existing from eternity, part of which resists altogether the power of the Demiurge and produces evil, which is all concentrated in Satan; (3) The Demiurge, intermediate between good and evil, who is in perpetual conflict with matter, seeking to fashion it according to his own ideas, while both hold men's souls, which are of divine origin, in bondage. In order to free them the supreme God sent his son clothed in the shadow of a body. Finding some things in the Old Testament contrary, as he believed, to Christianity, M. denied that it could have come from the supreme and good God, the author of the New Testament. It was from the Demiurge, and therefore he rejected it. But he also rejected a part of the New, all but the Gospel of Luke, which he made to begin with chapter v., and ten of the Epistles of Paul:—Gal., 1 and 2 Cor., Rom., 1 and 2 Thess., Eph., Col., Phil., and Philemon. The heresy seems to have spread in Europe, Asia, and Africa, and maintained a struggling existence down to the 8th c. See Blunt's *Dictionary of Sects* (1874).

Mardin', a picturesque town of Asiatic Turkey, in the vilayet of Diarbekir, on the steep S. slope of the M. Hills (*Mons Masius*), 60 miles S.E. of Diarbekir. It is commanded by an old castle on a rock, has some trade in cottons, linens, leather, &c., and is the seat of several Jacobite (q. v.) institutions, including a library. The gates of the citadel are enriched with splendid Arabesque carving. Pop. 15,000, of whom half are Kurds.

Maree', Loch, a beautiful Scottish lake, in the W. of Rossshire, extends 13 miles in a N.-westerly direction, and is little more than 2 miles at its broadest point, where are situated several islands, of which the largest is Isle Maree. Its scenery lacks the richness of vegetation, but its mountain-line is infinitely varied, here soft and undulating, there abrupt and rocky, and towering in the barren grandeur of Slioch to a height of 4000 feet. The fishing is excellent, and there is a good inn at Talladale.

Maremm'a ('country contiguous to the sea,' a corruption of *maritima*), the name of a marshy part of Italy, bordering on the Tyrrhenian Sea, and extending between the rivers Magra and Volturno. It is 1000 sq. miles in extent, and is mainly divided into the Tuscan and Roman M. There are few villages or even roads in the M., and the pestilent exhalations affect even the slopes of the Apennines. The Tuscan M. has been somewhat improved by extensive draining and tree-planting, and by the recent construction of railways. The more fertile portions are cultivated by peasants, who descend in summer from the mountains of Lucca, the Sabine Hills, and the Abruzzi.

Maren'go ('the marshy field'), a village of Piedmont, 1½ miles E. of Alessandria, near which Napoleon, with 28,000 troops, defeated 35,000 Austrians under Melas, June 14, 1800. Désaix (q. v.) fell in this battle, and it led to the re-establishment of the Cisalpine and Ligurian Republics.

Mareo'tis, Lake (mod. *Birket-el-Mariût*), a marsh or salt lake of Lower Egypt, 30 miles long and 25 broad, separated from the Mediterranean by a peninsula and sand-spit, on which is situated Alexandria. It is connected with the Nile by the Mahmudieh and Abu Dibab Canals. In ancient times its shores and isles were celebrated for their growth of fine papyrus, and were luxuriantly covered with olives and vines. The canals have fallen into disrepair, and much of the lake become a sandy waste, when the English, during the war with Napoleon, dug a passage through the isthmus and let in the sea (1801). This channel was subsequently closed by Mehemet Ali.

Mar'garet, St., was the elder sister of Eadgar the Ætheling, and fled with him in 1068 to the court of Malcolm Canmore (q v.), whom she shortly after wedded. Pious and learned, trained in the higher culture of an English court, she did much to soften the native barbarity of her husband and his subjects, and introduced many reforms into the Scottish Church—the keeping of Lent at the canonical season, the due observance of Sunday, and the more frequent celebration of the Eucharist. She also founded the monastery of Dunfermline, and rebuilt the church at Iona. Dying November 16, 1093, she left four sons and two daughters, one of whom, Matilda, married Henry I. We have a life of her, ascribed to her confessor, Turgot, a monk of Durham, though Papebroch, the editor of the Bollandist *Acta Sanctorum*, attributes it to a later hand.

Margar'ic Acid ($C_{17}H_{34}O_2$), an acid which appears to be composed of stearic ($C_{18}H_{36}O_2$) and palmitic acids ($C_{16}H_{32}O_2$). It may be separated into these by repeated crystallisation from alcohol, when the palmitic acid is left in solution. Its fusing point is 65° C. It is formed by saponification of *margarin*

which is a fatty oil obtained by exposing *sweet oil* of crushed olives to a temperature of 0° C. The margarine solidifies out.

Margari'ta ('the pearl isle'), an island in the Caribbean Sea, belonging to Venezuela, 35 miles N. of Cumana. Area, 441 sq. miles; pop. 20,206. It is 40 miles long from E. to W. The surface is mountainous, and the climate hot but healthy. Rice, fruits, salt, and poultry are the chief products, and there are important coast fisheries. M., discovered by Columbus in 1498, was famed for its pearl fisheries down to the 17th c.

Mar'gary, Augustus Raymond, a young Englishman, educated at Brighton College, who was appointed to a student interpretership in China at the age of twenty-one, and devoted himself to the study of the Chinese character and language. In 1874 he was selected for the important task of traversing S.W. China to the Burmese frontier, to meet and escort the mission sent by the Indian government from that quarter. This duty he successfully accomplished with admirable energy and tact; but in February 1875, while proceeding in advance of the Burmese party, he was treacherously killed at the Chinese town of Manwyne, in Yunnan, where he had just before been hospitably entertained. It was more than twelve months before retribution for this murder was exacted by diplomacy from the Chinese authorities. See *The Journey of A. R. M. from Shanghae to Bhamo, and back to Manwyne* (Lond. 1876).

Mar'gate ('the sea-gate'), a seaport and watering-place of England, on the N. coast of the Isle of Thanet, Kent, near the N. Foreland, 4 miles N. by W. of Ramsgate, and 73 miles E.S.E. of London by rail. It has a fine sandy beach, and a promenade, formed by Marine Terrace and Royal Crescent, 2500 feet long, protected by a strong sea-wall. There are also piers, large bathing establishments, libraries, bazaars, a theatre, &c. During the season M. is inundated by about 100,000 visitors. There is a small shipping and fishing industry, and a bi-weekly market for provisions. The Royal Alexandra Almshouses were erected in 1866 to commemorate a visit of the Princess of Wales, who on July 19, 1875, opened an asylum here for 150 deaf and dumb children. Pop. (1871) 11,995.

Margre'te Val'demarsdatt'er, queen of Scandinavia, born in 1353, was the youngest of the six children of Valdemar IV. Atterdag and his wife Helvig. At six she was betrothed to the Norwegian king Hakon VI., but the ill-feeling between the two countries nearly causing the rejection of M. in favour of Elizabeth of Holstein, Valdemar made use of Hakon's unwilling stay in Denmark to bring about the marriage, 9th April 1363. Three years afterwards M. went to Norway, where in 1371 she had a son, named Oluf, who became king of Denmark after his grandfather, and obtained the crown of Norway on his father's death in 1380. After Oluf's death she was chosen queen of Denmark (1387), and Norway (1388). Then forming friendship with the Swedish nobles, who were displeased with the bad government of Albrecht of Mecklenburg, M. sent an army into Sweden, which gained a decisive victory (24th February 1389) at Leaby, near Falköping, over Albrecht, who was taken prisoner. Gradually she gained all Sweden, but not till seven years after did she take Stockholm, and give relief from the Rostock and Wismar pirates, notorious as 'Victual-brothers.' On the 20th July 1397, she effected the famous Union of Kalmar, which joined together the three kingdoms, and at which her grand-nephew Erik of Pommern was crowned king, though M. still held the reins of power, till her sudden death on shipboard in Flensborg harbour, 28th October 1412. M. pleased the clergy by her munificence and piety, and the turbulent nobles acquiesced in the firmness of her prudent rule. The union of three peoples sprung from one root, which it was her life object to secure, her feebler successors were unable to maintain.

Marguérite d'Anjou, daughter of René d'Anjou, titular king of Naples, was born at Pont-à-Mousson, Lorraine, 25th March 1429, married by proxy to Henry VI. of England in the spring of 1445, married in person at Lichfield in May, and crowned at Westminster in June of the same year. In 1453 she gave birth to a son, Edward; by 1455 the influence she had exercised over the affairs of the country had entirely departed, owing to the practical ascendancy of the Duke of York; in 1460 she took up arms for the claims of her son, and is said to have been at the battle of Wakefield, where York was slain, and on the following year at the battle of St. Alban's. M. took shelter in Scotland (1463), and received assistance from the Borderers, but after many adventures, was compelled to retire to the duchy of Bar in Lorraine. In 1471 she joined her husband in his prosperity, but was taken prisoner at Tewkesbury; she was ransomed by Louis XI. in 1475, and retired to her own country, where she died August 25th, 1482. M. was a woman of much beauty, great courage and force of character. See Gairdner's *Lancaster and York* (1835), and Miss Strickland's *Lives of the Queens of England.*

Marguerite de Valois (also known as M. d'Angoulême or de Navarre), daughter of Charles Comte d'Angoulême and Louis de Valois, and sister of François I., was born at Angoulême, April 11, 1492; and on December 1, 1509, wedded Charles III., Duc d'Alençon, who died in 1525. She followed her brother into his captivity at Madrid, and shortly after his release was married (January 1527) to Henri d'Albret, king of Navarre—a marriage, like the first, *de convenance*—to whom she bore a son (died 1530) and Jeanne d'Albret, mother of Henri IV. A patroness of the Renaissance in the person of Marot (q. v.), M. was drawn by the zest of novelty so dangerously near the Reformation that her *Miroir de l'Ame Pécheresse* (1533) fell under the censure of the Sorbonne; but, though she always protested against the horrors of persecution, she died a Catholic, December 21, 1549. There appeared, in her lifetime, *Marguerites de la Marguerite des Princesses* (Lyon, 1547), a collection of poems; and, posthumously, her *Heptaméron des Nouvelles* (1559, and twenty-four reprints; Eng. trans. with memoir, 1855), an imitation of Boccaccio, with all his grossness and little of his point. See the *Lettres de M.* (1841) and *Nouvelles Lettres* (1842), both edited by M. Génin; and Miss Freer's *Life of M.* (2 vols. Lond. 1855).

Mari'a Christi'na, daughter of Francis I., king of the Two Sicilies, was born at Naples, April 27, 1806, married to Ferdinand VII. of Spain, December 11, 1823, and appointed regent in October 1832. For seven years civil war raged between the followers of Don Carlos and the adherents of the Queen-Regent, and in 1840 she took refuge in France, where she remained until 1843. Meanwhile she had secretly married Fernando Muñoz, her chamberlain, and the marriage was publicly acknowledged October 13, 1844. Upon the coming of age of Isabella II., M. returned to Spain, where she exercised a most baneful influence upon her daughter's thoughts and conduct. In 1854 she again took refuge in France, where she invested a considerable fortune. Ten years later she was in Spain, but again withdrew (1868). Her husband by morganatic marriage died 13th September 1873. M., who has ten children to him, has within recent years been wandering restlessly from the cities of France to those of Italy.

Mari'a Loui'sa, eldest daughter of Franz I., Emperor of Austria, was born at Vienna, 12th December 1791, and was married to Napoleon I., April 1, 1810. In 1811 she gave birth to a son, named the King of Rome; in 1812 she accompanied Napoleon to Dresden, where extraordinary fêtes were given in her honour; in his absence (April 1813) she discharged the duties of Empress-Regent with marked indifference. She departed for Vienna April 25, 1814, and next year lodged a protest at the Viennese Congress against the restoration of the Bourbons to France. To her were assigned the duchies of Parma, Placenza, and Guastalla, of which she took possession in company with the one-eyed Count Von Neipperg, to whom she bore several children, fruits of a morganatic marriage. M. died December 18, 1847.

Maria'na, Juan, a Spanish historian, was born at Talavera in 1537. Educated by the Jesuits, he was sent on an important mission to Rome when twenty-five, and afterwards to Paris and Toledo. His later years were entirely given to literature. His *De Rege et Regis Institutione, De Ponderibus et Mensuris* (aimed at the Duke of Lerma), and *De Morte et Immortalitate,* were too freely written for the times, and brought on their author persecution and imprisonment. He likewise wrote seven unimportant theological treatises, and a paper, published posthumously, entitled *De Erroribus quae in formâ Gubernationis Societatis Jesu occurrunt.* But his fame rests chiefly on his wondrously graphic and entertaining *Historiæ de Rebus Hispaniæ Libri* XXX. This famous work was published in 1592, translated into Spanish in 1609. It ended with the accession of Karl V.,

but the author added a condensed continuation to 1621, and further additions have been made by Sabau and Blanco. M. died 17th February 1624. See Ticknor's *History of Spanish Literature*, vol. iii.

Maria'nus Sco'tus, a Scottish or Irish chronicler, born in 1028, came to Germany (1052), entered the Benedictine Order at Köln (1058), was an inmate of the Abbey of Fulda (1059–69), and taught mathematics and sacred literature at Regensburg and Mainz until his death at the latter place (1086). Besides several unprinted treatises in the Regensburg Library, he wrote a *Chronicon Universale a Creatione Mundi usque ad Annum Christi* 1083, published by Jean Hérold (Basel, 1559). It is of considerable value for the Scoto-Irish history of the 11th c. See Hausen, *De Antiquissimo Codice Chronici Mariani Scoti* (Frank.-am-Oder, 1782).

Mari'a There'sa, eldest daughter of Karl VI. was born, 13th May 1717, at Vienna, appointed her father's heir by the publication of the 'Pragmatic Sanction' (1724), and married Francis Stephen, Grand Duke of Tuscany (1736). Before the death of her father the Austrian domains were menaced at all points by claimants who declined to admit her rightful succession. Bavaria, Spain, and Saxony each claimed the whole inheritance. The king of Sardinia wanted a share of the Italian fiefs, the king of Prussia demanded four duchies in lower Silesia, and the elector of Bavaria was a candidate for the imperial crown. In 1748 the dispute was adjusted by the Peace of Aix-la-Chapelle which, though it deprived M. of more territory, gave her husband the title of emperor. At the conclusion of the war, every encouragement was given to commerce, by the establishment of manufactories, and the opening of ports. Schools of instruction, observatories, colleges, and hospitals were founded, and military academies organised for recruiting the army. In 1755 M. tried hard to strike up an alliance with France against Prussia, and in the following year began the Seven Years' War. In August 1764, the Archduke, Joseph, son of M., became emperor. In 1771 M. declared in behalf of Turkey against Russia, but in 1772 joined Russia and Prussia in the partition of Poland. She died November 29, 1780. M. earned for herself the title, Mother of the Country. She was a woman of strong nature, and was possessed of considerable faculty for governing. See Duller, *M. und ihre Zeit* (1844); Arneth, *M.'s erste Regierungsjahre* (1863–70).

Mariazell', the most frequented shrine in Austria, is situated among beautiful wooded mountains, on the N. border of Styria, 58 miles S.W. of Vienna. It is visited yearly by seventy great and many minor processions (that of Vienna on 1st July, that of Gratz on 14th August), comprising some 250,000 pilgrims. The church occupies the site of a chapel erected in 1200, and contains a miraculous image of the Virgin and Child. The 900 inhabitants of the village are mostly keepers of inns, booths, &c.

Marie Antoinette de Lorraine, Josèphe Jeanne, youngest daughter of the Emperor Franz I. and Maria Theresa, was born at Vienna, 2d November 1755. In her fourteenth year she was asked in marriage for the Dauphin of France, and in 1770 the nuptials were celebrated. Her Austrian education fitted her but poorly for the elaborate system of courtly etiquette which she had to encounter. In 1774 she became queen, and by that time had gained complete control over her husband, with the most disastrous results. She made life one continuous pageant at court, and the freedom of her manner gave occasion for endless rumours as to her infidelity to the king, none of which have stood investigation. But her name steadily became odious to the people of Paris, who attributed to her the accumulation of public debts and much of their own misery. In 1785 occurred the scandal about the Diamond Necklace (q. v.) which inflamed the hatred of the people. When the Revolution (1789) broke out, her life was menaced (October 6) by a mob which pressed through the palace of Versailles to her bedroom. She tried to regain popular esteem by visiting manufactories and lavishing gifts upon the operatives. But no good came of it. In the king's captivity at the Tuileries, which she shared, she urged him over and over again to take refuge in flight, and (20th June 1791) they escaped to Varennes, where they were recognised and brought back. In 1792 M. again became the object of detestation, by reports being spread that she was the centre of an Austrian Committee. Amidst the tumult of the Revolution of this summer M. behaved with great personal courage, and would have fought against the mob had the king been sufficiently decided. Removed to the prison of the Temple (August 13), she was separated from her husband (20th January 1793). On the 14th October 1793 she was carried before the Revolutionary Tribunal, condemned to the guillotine, and executed (October 16). M. was proud, beautiful, and ignorant, full of lightness of spirit and showy frivolity, but neither wicked nor designing. See Mme. Campan, *Mémoires sur la Vie privée de Marie Antoinette; Life of Marie Antoinette, Queen of France*, by Charles Duke Yonge; Kitchin's *History of France* (vol. iii. 1877).

Marie de Medicis, daughter of Francis I., Grand-Duke of Tuscany, was born at Florence, 26th April 1573, and was married by proxy to Henri IV., 5th October 1600, who was greatly disappointed with her appearance. Very soon her jealousy was quickened by her husband's devotion, first of all to the Marquise de Verneuil and then to Mdlle. de Montmorenci. In 1610 M. got herself appointed Queen-Regent, and wished to be crowned and consecrated so as to increase her dignity in the absence of Henri. No sooner was this accomplished than Henri was assassinated, and there is a strong suspicion that M. had a hand in the plot. A *coup d'état* in her behalf followed. She gained the king's treasure, and the attachment of public men followed its free distribution. But the young king grew tired of her jurisdiction; and she had to retire to Blois (1617), which became a centre for intrigues that terminated in a party rallying round the Queen-Regent. In 1620, through Richelieu, she became reconciled to her son, and refrained for a time from ambitious scheming, but by 1631 she had divided the court, owing to her detestation of the mastery then obtained by the Cardinal. She was then exiled, and led a wandering life until her death at Köln, 3d July 1642. See Sismondi's *Histoire des Français*, vols. xxii. and xxiii.; Kitchin's *History of France* (vol. ii. 1877).

Marie Galante (named after Columbus' ship in 1493), an island of the Lesser Antilles in the W. Indies, belonging to the French colony of Guadaloupe, and lying 17 miles S.E. of the island of that name. Area, 59½ sq. miles; pop. 13,000. The coasts are steep, and skirted with coral reefs; the soil produces abundant coffee, cotton, and sugar. Marigot (pop. 2000), Capesterre, and Vieux-fort-Saint-Louis are its market-towns.

Mari'enbad, a favourite spa in Bohemia, 35 miles N.W. of Pilsen by rail, in a valley surrounded by pine-clad heights. It is visited by some 9000 persons annually, and the waters contain Glauber's salt, and resemble those of Karlsbad, but are cold, having a temperature of from 48° to 54°. This charming watering-place has sprung into existence within the last sixty years. Pop. (1869) 1600.

Mari'enburg, a town of W. Prussia, on the Nogat, 31 miles S.E. of Danzig by rail, has three churches, a Gothic *Rathhaus* of the 14th c., and a lively trade in wood, grain, quills, and bristles. Pop. (1875) 8538. Its *Schloss*, the noblest medieval building of the kind in Germany, was founded by the Teutonic Knights in 1274, became the residence of their Grand Masters (1309), was sold to the Poles (1457), but returned to Prussia (1772), and having fallen into decay, was restored (1817-20). See *M., das Haupthaus des Deutschen Ordens* (Königsb. 1854).

Mari'enwerder, an old city of Prussia, on the Nogat, 2 miles E. of its confluence with the Vistula, and 50 miles S.S.E. of Danzig by rail. It was founded by the knights of the Teutonic Order in 1233, and has a castle long the residence of the grand master. Pop. (1875) 7627.

Mariette', Auguste Eduard, a distinguished French Egyptologist, was born at Boulogne-sur-Mer, 11th February 1811, and was attached to the *Musée Egyptien* at the Louvre in 1847, where he devoted himself to the study of hieroglyphics. Sent on a scientific expedition to Egypt in 1850, he discovered Saggarah on the border of the Libyan range, and in the midst of the burial-grounds of ancient Memphis, a temple of Serapis engulfed in the sands of the desert, but rich in relics of Greco-Egyptian art. On a second visit to Egypt in 1858, the Viceroy put 1500 workmen at his disposal, and M. prosecuted explorations from Memphis to Elephantine, cleared away sand and

debris that had entombed numerous temples, and thus made vast additions to our knowledge of Egyptian antiquities. M. has finally for many years been resident in Egypt, where he holds the office of Inspector-General of Monuments, and is also director of the museum at Boulak, with the title of Bey. His published writings are exclusively memoirs and papers relating to the work in which his life has been spent.

Mar'igold, a name applied to various plants bearing yellow flowers. The common M. is *Calendula officinalis*, an old cottage-garden favourite, formerly enjoying repute as a domestic remedy. It is one of a genus of annual and perennial *Compositæ* occurring as weeds in the Mediterranean countries. The so-called African and French M. of the gardens are two species of *Tagetes*, namely, *T. erecta* and *T. patula*—they are natives of Mexico, Peru, and Chili, the gardener's names are therefore strangely misapplied. The corn M. is *Chrysanthemum segetum*, its abundance among young corn in some districts rendering the fields at a distance a perfect sheet of yellow. In England, by better farming, the weed is becoming scarcer: in Scotland, through the later seasons, it sheds seed before the crops are cut, and so holds its ground.

Marine' Insu'rance. See INSURANCE.

Marines' are soldiers for sea-service. Every war-ship carries a complement of M., who are exercised in the use of arms, act as sentinels, and perform various duties, but do not go aloft. In naval actions they fire from tops and decks, and repel any attempt at boarding at the point of the bayonet. They are also employed in making descents on the enemy's coast. In the beginning of the 18th c. six regiments of M. were raised, and the number was gradually increased. In every war from the Seven Years' War to that with Russia, the M. have played a gallant part. The present number of M. (1877) is 14,000 men, being eight on the general staff, 2901 in the artillery, and 11,091 in the line infantry. This number has been greatly exceeded in time of war. The wages of the force in 1876 was £458,024. The uniform is scarlet, with blue facings. Their post in the line is between the 49th and 50th regiments. They are under the control of the Admiralty.

Marine Stores. Dealers in M. S. are bound to keep books in which they are to enter the name and address of all persons with whom they deal, with the price of the articles purchased by them. They are also bound to have the words 'Dealers in M. S.' with their name painted on their warehouse, in letters at least six inches long, under a penalty of £20 for omission.

Mari'ni, or **Marino, Giovanni Batista,** an Italian poet, born at Naples, 18th October 1569; driven from his father's house because he would not study law, after various adventures settled for a time at Turin, where he acquired some fame by writing sonnets and panegyrics. In France, whither he had betaken himself on the invitation of Queen Marguerite (1615), he published his most famous poem, the *Adone* (1622). On his return to Italy the Umoristi elected him president of the Academy. He died at Naples, 25th March 1625. M.'s works are little read except by the learned and prurient, for he wrote with disgusting filthiness. He did much to hasten the corruption and decline of Italian literature, not merely by his licentiousness, but by using and sanctioning all manner of extravagances in style, giving his name to the *stile Marinesco*, corresponding to the contemporary *cultismo* of Spain, and *euphuism* of England. The 17th c. produced numerous biographies of M.

Mari'no, a walled town of Italy, finely situated on a slope of the Alban Hills, 11 miles S.E. of Rome by rail. It was the seat of the Orsini family till the 15th c., when it passed to that of Colonna, still the great proprietors in the vicinity. It has a fine duomo, and many interesting antiquities. Pop. (1874) 6509.

Marino, San, the oldest and smallest republic in the world, is situated in Italy, 12 miles S.W. of Rimini, on the border between the provinces of Forli and Urbino, and includes Monte Titano (2500 feet high), with its surroundings. Area, 238 sq. miles; pop. (1874) 7816. The constitutional laws of the republic, collected in the *Statuta Illustrissimæ Reipublicæ Sancti Marini*, date from the 13th c. The sovereignty was originally exercised by the whole community, but from the end of the 14th c. to the year 1847 the legislative power was in the hands of a *General Consiglio Principe* ('sovereign grand council') of sixty. By the altered constitution of September 1847 the legislature is vested in a *Camera dei representanti* of sixty life-members, who annually appoint a committee of twelve to be the supreme judicial court. Two secretaries of state have the direction of home and foreign affairs, and a treasurer-general of finance. From 1865 to 1872 the revenue averaged £4503 per annum; expenditure, £4386. There is no public debt. The troops of S. M. are eight companies of foot, including 950 men. The republic, now under the protectorate of King Vittorio Emmanuele (formerly of the Pope), is said to have been founded in 469 by a hermit named Marinus, who had been a mason in Dalmatia before retiring to this spot.—The town of **S. M.** lies at the top of Titano, and has a castle said to have been fortified by the Lombard king Berengar. It consists of several groups of houses built on the declivities, and has seven churches (the largest also called S. M.), a monastery, nunnery, and theatre. Pop. (1874) 1460. See Delfico, *Memorie della Republica di S. M.* (Milan, 1804; 2 vols. Flor. 1843); A. J. C. Hare, *Cities of Northern and Central Italy* (1876).

Mar'io, Giusepp'e, twenty years ago the first tenor singer on the stage, was born at Turin, of noble parentage, about 1812, and, after a short period of military service in Sardinia, studied music professionally at the Paris Conservatoire, 1836–38. In December 1838 he was engaged at the Paris opera for 1500 francs a month, and started on a brilliant career in company with Rubini, Lablache, Malibran, Grisi, &c., the last-named afterwards became his wife. A Russian tour (1845–50) was succeeded by ten years' (1850–60) successful acting in London and Paris in the operas of *Don Giovanni*, *Il Trovatore*, &c. On June 18, 1871, he acted for the last time in London in *La Favorita* (Donizetti). He has sung since then, but his voice is not what it was.

Mariol'atry (Gr. *Maria* and *latreia*, 'adoration') means properly the sin of rendering to the Virgin Mary that worship which is due to God alone, but the term is loosely applied by Protestant writers to all invocation whatever of the Virgin made by Roman Catholics. M. proper, which is regarded as a sin by orthodox, moderate Roman Catholics, consists in raising the intercession of the Virgin to a rank above that of other saints, making her merits parallel with the merits of Christ, her will with his will, which is one with the supreme will, assigning to her a co-operation all along in our Lord's own proper work of our redemption, or in short, in its last extreme, maintaining that Mary, the Mother of God, has been assumed into the Trinity, as its complement, and so as to make it a quaternity. As to M. in the looser sense referred to above, the reverence for Mary always increased the clearer became the expression of the conditions of the divine nature of Christ. In the 4th c. no peculiar reverence was paid to her above other saints, except that, according to ascetic ideas, her perpetual virginity began to be maintained. Epiphanius even includes in his list of heretics certain women (Collyridians) who paid extravagant adoration to her. After the Nestorian controversy in the 5th c., however, she was put at the head of the host of saints as the 'Mother of God.' This reverence went on increasing during the middle ages. Saturdays and other vigils were devoted to the 'Queen of Heaven.' To the festivals of the Church were added, during the 6th and 7th centuries, those of the Purification or Candlemas (February 2), of the Conception or Annunciation (March 25), of her Nativity (September 8), and of her Assumption or Ascension (August 15). Paschasius Radbertus about 850 had taught the miraculous delivery of Mary, and her sinlessness, although not that she had been conceived without sin; and about 1140 certain canons of Lyons instituted a festival in honour of the Immaculate Conception. The observance of the festival in honour of her conception spread, but the doctrine sought to be established was not received by theologians of any standing during the 13th c., greatly owing to the opposition of St. Bernard and Thomas Aquinas. But being taken up by Duns Scotus it was adopted in the 14th c. by the Franciscans. About the 10th c. the daily office of St. Mary or Lesser Office was introduced, and some time between the 10th c. and 13th c. the Rosary (q. v.) and Crown of St. Mary—the former consisting of fifteen repetitions of the Lord's Prayer and 150 salutations of St. Mary; the latter of six or seven repetitions, and sixty or seventy salutations.

Marionettes' are puppets representing men and women, which are moved mechanically by a concealed person, who also varies the voice so as to give a dramatic performance, somewhat after the manner of Punch and Judy, but more elaborate. They are of great antiquity, having been favourite amusements of the Greeks and Romans, and extremely popular both for religious and secular purposes during the middle ages. See Charles Magnin, *Histoire des M. en Europe depuis l'Antiquité jusqu'à nos Jours* (Par. 1852).

Mariotte', Edme, a celebrated French physicist, was born in Burgundy in the beginning of the 17th c. He lived at Dijon, was priest of St.-Martin-sous-Baune, and was one of the first members of the Academy of Sciences. M. died May 12, 1684. As an experimentalist he was a worthy successor to Galileo and Torricelli. The most interesting of his investigations are those relating to the concussion of bodies, to diffraction of colours, to the motions of fluids, and to the variation under pressure in the volume of a gas. This last is given in his *Traité de la Nature de l'Air* (1676), where is found the enunciation of the law discovered seven years previously by Boyle (q. v.). On the Continent, consequently, Boyle's Law is usually spoken of as M.'s Law. A collected edition of his works was published at Leyden (2 vols. 1717).

Mar'itime Courts. See ADMIRALTY COURT.

Marit'za (the anc. *Hebrus*) a river of Turkey, 300 miles long, rises on the Rilo Dagh in the Balkans, flows E. to Philippopolis and S.E. to Adrianople, where it becomes navigable, and bends S., receiving the Tunja from the N. and the Arda from the S. It is joined by the Erkeneh from the E. before entering the Ægean at the Gulf of Enos. With its tributaries it waters the whole plain to the S. of the Balkans, and its entire valley is traversed by the railway to Sofia.

Mariu'pol, a town of Russia, government of Ekaterinoslav, and after Taganrog and Berjansk, the chief port on the Sea of Azov, lies at the mouth of the Kalmius, 55 miles N.E. of Berjansk. In 1873 the exports (wheat, linseed, wool, &c.) amounted to 8,065,464 roubles, and the imports to 81,372. M. was founded by Greeks from the Crimea in 1779. Pop. (1870) 9037.

Ma'rius, Caius, was born of humble origin at Cereatæ, a village near Arpinum, B.C. 157. In early life he won the favour of Scipio Africanus by his services with the army in Spain. He became tribune of the people, B.C. 119, and commenced his life-long career of unrelenting hostility to the aristocratic party. He was elected a prætor, B.C. 115, and soon after married Julia, aunt of Julius Cæsar. He accompanied Metellus to Africa as his legate, B.C. 115, and by his devotion to military duty during the Jugurthan War became highly popular both with the army and at Rome. In B.C. 107, he was amid enthusiasm elected consul for the first time, and received Numidia as his province. In B.C. 106, the war was terminated, and Jugurtha betrayed into the hands of M., and at the close of B.C. 105, the Roman power in the country was fully established. While still in Africa, M. was elected consul for B.C. 104, as he alone could save the state from destruction by the barbaric hordes who had overrun Gaul and vanquished the Roman armies sent against them; and for the same reason he was thrice re-elected consul, B.C. 103–1. He succeeded, B.C. 102, in defeating the Teutones in a terrible battle, fought near Aquæ Sextiæ (Aix), the number of slain being variously stated from 100,000 to 200,000. In B.C. 101, the united forces of M. and Catulus overwhelmed the Cimbri in a like defeat at Vercellæ, near Milan. Fortunate, says Niebuhr, would M. have been, had he died on the day of his triumph for this victory. The fame well won by the courage and capacity of his earlier years was obscured by the corruption, perfidy, and cruelty that stained the close of his life. His sixth consulship, secured only by a disgraceful alliance with the demagogues Saturninus and Glaucia, was followed by a retirement of ten years, during which the popularity of his great enemy Sulla steadily increased. In B.C. 88, Sulla was elected consul, and obtained the command of the war against Mithridates. Stirred by rage and ambition, M. made a fierce effort to wrest this honour from his rival, but the wild attempt ended in shame and suffering to himself, and for a time he took refuge at Carthage. A conflict broke out (B.C. 87) between the consuls Octavius and Cinna, partisans respectively of Sulla and of M. The latter joined Cinna, and after a brief campaign Rome surrendered. The cruel spirit of M. took fearful vengeance on his patrician foes. The noblest blood of Rome was foully shed by his body-guard of slaves. When his appetite for slaughter was appeased, M. proclaimed himself and Cinna consuls for B.C. 86, but M. died of pleurisy on the eighteenth day of his seventh consulship.

Mar'ivaux, Pierre Carlet de Chamblain de, was born at Paris, 4th February 1688, received but a poor education, and always affected a contempt for classical writers. In 1716 appeared his *L'Homère Travesti*, a foolish satire upon the *Iliad*. He was a voluminous writer for the stage, his comedy *Le Jeu de l'Amour et du Hasard*, which appeared in 1730, having firmly established his reputation among his contemporaries as an analyst of the eccentricities of the passion of love. His dialogue is invariably brilliant, but his discrimination of character weak. In the romance of *Marianne* (1731–36), he reached higher ground, being freed from the laws of the drama, under which his power of developing plot and character was hampered. It is still looked into by French readers. M. died at Paris, 12th February 1763. His *Œuvres Complètes* were published at Paris in 12 vols. 1781. A more careful but less complete edition is that of Duviquet (10 vols. Par. 1827–30). See Sainte-Beuve's *Causeries du Lundi*, vol. ix.

Mar'joram (*Origanum*), a genus of *Labiatæ* numbering about twenty species, spread through the temperate regions of the Old World. Common M. (*O. vulgare*) is frequent in Britain, in the chalk districts appearing as one of the commonest ornamental wild plants. Its properties are aromatic, bitter, balsamic, and an oil prepared from it, called oil of thyme is sold for the use of farriers, &c. Sweet M. and pot M. (*O. majorina* and *O. onites*, natives of southern Europe, are commonly grown in gardens for domestic purposes, the young tops and leaves, either green or dry, being used for seasoning soups and other culinary purposes. *O. dictamnus* and *O. sipyleum* from Greece, both with woolly leaves and drooping spikes of flowers, are grown for ornament.

Mark, a coin which has been used in several European countries, and which is now the standard of the gold coinage established for the whole German Empire. In England, where it is now out of use, the M. equalled $\frac{2}{3}$ of a pound; in Scotland $3\frac{3}{4}$ less. In Germany, as early as 1042, a M. was $\frac{1}{2}$ of a Köln pound of pure silver, and this coin gradually came to be the universal standard of reference. By a law of the 4th December 1871, a common coinage is introduced throughout Germany. From the German pound (=500 grammes) of fine gold is struck $139\frac{1}{2}$ 10-M., or $69\frac{3}{4}$ 20-M. pieces, the M. being equal to $\frac{1}{3}$ thaler (=1 English shilling=$\frac{1}{2}$ Austrian gulden), and divided into 100 pfennige.

Mark (Old Eng. *meare*, mod. Eng. 'march'), a term in German geography denoting originally the limit or border of a land or district, and afterwards the territory that adjoined that limit. In this later sense the word has become historical in connection with the Germano-Roman empire. Ever since the time of Karl the Great, the aim of all the great emperors was to extend their authority N., E., and S., and especially to bring into subjection their Slavic and Magyar neighbours. Their conquests in these regions were called *marken* ('border-lands'), and the *grafen* or counts placed over them were named *markgrafen* ('border earls,' see MARQUESS). Hence the origin of the marks of Austria, Brandenburg, Lausitz, Schleswig, Moravia, Steier (Styria), &c. But even before Karl's time, as early as the Teutonic conquest of Gaul, the word was used, and the first markgrafen were probably those charged with the safety of the western conquests. The same office was assigned on the English and Scotch borders to the Percys and Douglasses, Wardens respectively of the English and Scottish Marches. In early English history *Mercia* (*Mearcena-land*) was the land that bordered on Wales, and there was a Warden of the Western as well as the Northern Marches. See Maurer, *Geschichte der Markverfassung in Deutschland* (Erl. 1856).

Mark, St., if the same as the John of Acts xiii. 5–13, and John M. of xii. 12, 25, and xv. 37, was a native of Jerusalem and a son of Mary, and, according to Col. iv. 10, a nephew of Barnabas. He accompanied Paul and Barnabas on their first missionary journey, but returned to Jerusalem from Pamphylia. In consequence of this Paul refused to have anything to do with

him on the second journey, although he afterwards expressed his confidence in him (2 Tim. iv. 11). According to tradition he was with Peter at Rome, went to Egypt, where he founded several churches, and died A.D. 61. The traditional view that M. was the writer of the Gospel that bears his name is set aside by many modern critics, chiefly on the unsatisfactory ground that 'it is not copious or remarkable in particulars relative to Peter.' The time of writing the Gospel has been fixed variously from 40 to 120 A.D. As to the place, the weight of ancient authority is in favour of Rome.

Market Drayton. See DRAYTON-IN-HALES.

Market Overt. English law recognises the principle that property may, in some cases, be transferred by sale, although the seller has no right of property in the goods. Thus it is held that the sale of anything vendible in M. O., without fraud on the part of the purchaser, transfers the property to him, though the vendor has stolen the thing sold. In Scotland, the real owner of the goods may reclaim at any time. M. O. in the country is held only on special days, by charter or custom; but in the city of London, every day except Sunday is a market day.

Markets. See FAIRS.

Marl, in Geology, is a mixture of clay and carbonate of lime in various proportions. As a manure it is much used on the Continent and in certain parts of England—notably Norfolk. It improves sandy soils by making them more compact and more retentive of moisture.

Marlborough, a market-town of England, in the county of Wilts, on the Kennet, 22 miles E.N.E. of Devizes by rail. Its principal buildings are the Norman church of St. Mary, St. Peter's (restored 1863), and M. College, founded (1845) for 500 pupils, half of whom by the charter of 1849 must be sons of clergymen. The College has a beautiful chapel (St. Michael), redecorated by Butterfield in 1872. Sack and rope making, brewing, tanning, and wool-stapling are the chief industries of M., which returns two members to Parliament. Pop. (1871) 5034.

Marlborough, John Churchill, Duke of, son of Sir Winston Churchill, was born at Ashe, in Devonshire, June 24, 1650, went to court in his twelfth year, and became page to the Duke of York, got a commission in the guards (1666), first saw service at the siege of Tangiers, and on his return home was presented by the Duchess of Cleveland with £5000. In the Dutch War he distinguished himself as an officer of the English troops in French pay, and after the battle of Enygheim obtained the praise of Turenne (1673). After his return he was created lieutenant-colonel, gentleman of the bed-chamber, and master of the robes to the Duke of York, whom he attended to Holland and Scotland. In the spring of 1678 he married Sarah Jennings, maid-of-honour to Princess Anne, and in 1682 was made a Scotch peer, under the title of Baron Eymouth. Lord Churchill of Sandridge was a title bestowed on him in 1685. After perjuring himself profusely to James II., he went over to the side of William of Orange (1688), was rewarded with the earldom of Marlborough and the membership of Privy Council. In 1689 he was serving in the European war against France, and beat D'Humières at Walcourt near the Sambre. Suddenly M. was deprived of his honours (1694), owing to the king's well-grounded suspicions that he was intriguing with James II. Not until the War of the Spanish Succession broke out was he thoroughly reinstated in favour and power. William died in 1702, and in that and the following year M. secured Holland against attack, cleared the Spaniards from the northern districts, and made his footing secure in the Provinces and Lower Germany. In 1704 he planned the 'grand campaign,' which successfully culminated in the battle of Blenheim. In May 1706 the battle of Ramillies occurred; in July 1708, Oudenarde; in September 1709, Malplaquet. Meanwhile he had during these years been created a Duke, received the estate of Woodstock, and got Blenheim Palace built for him. By 1712, however, misfortune fell on him. His wife's influence over Queen Anne came to an end. The triumph of the Tories at St. James's operated in behalf of peace, and M. was ignominiously superseded by the Duke of Ormond, being at the same time accused of the misappropriation of public funds. This charge drove him into retirement, from which he emerged (1714) to receive at the hands of George I. the chief offices of which he had been deprived. He died June 17, 1722, having been for six years out of his mind. M. is perhaps the greatest general produced by England, distinguished as much for prudence as for daring, but the depths of meanness to which he could descend almost rival in distinction his qualities as a soldier. See Coxe, *Memoirs of John Duke of M.* (3 vols. Lond. 1818); Murray, *Despatches of the Duke of M.* (5 vols. Lond. 1845–46), Alison's *Military Life of John Churchill*, Macaulay's *History of England*, and *Letters of Sarah, Duchess of M.* (Lond. 1875).

Marline-Spike, a pointed iron pin averaging 1 foot in length, used on shipboard to separate the strands of a rope in splicing or in winding one small rope round another, termed *marling*.

Mar'low or **Mar'lowe, Christopher**, son of John M., clerk of St. Mary's, Canterbury, and possibly shoemaker, was baptized 26th February 1564, two months before Shakespeare's birth. He was educated at King's School, Canterbury, and took the degree of B.A. at Benet (Corpus Christi) College, Cambridge, in 1583, commencing M.A. in 1587. By this time had been published his first play, *Tamburlaine the Great*, full of rant, bombast, and genius. It was openly attacked by Green and Nash, and afterwards ridiculed in the mouth of Shakespeare's Pistol. The common people accepted it with delight, and were indulged with a *Second Part of Tamburlaine*, first acted in 1586–87. *The Tragical History of the Life and Death of Dr. Faustus* was produced 1587–88, *The Rich Jew of Malta*, 1588–89, and *The Troublesome Reign and Lamentable Death of Edward Second*, 1590. His last and worst play was *The Massacre of Paris*, 1592–93. Besides translating in part the *Hero and Leander* of Musæus, completed by Chapman, *The First Book of Lucan*, and, in a very licentious style, Ovid's *Elegies*, M. left an unfinished play, *Dido*, which was completed by Nash, and he is thought by some critics to have had a hand in the *Taming of a Shrew*, and in the 2 and 3 *Henry VI.* He died in a drunken squabble at Deptford, June 16, 1593. M.'s genius raised the Elizabethan drama to a height which only Shakespeare's could overtop. He died a youth, yet the hand that depicted the death scene in *Edward II.*, or that of *Faust*, had given a higher token of passion and power than Shakespeare's in his two or three comedies. M.'s bent was towards the sublime and the terrible. Never so whole-minded as Shakespeare, never so genial, many-sided, and true, he might have proved as great a tragic poet; he could not have written *As You Like It*, yet he might have almost reached the greatness of *Macbeth*. The best editions of M. are those of Dyce (1865) and Wagner (1871).

Mar'malade (Portuguese, *marmel*, 'a quince') was originally a conserve of quinces in sugar, but now almost exclusively denotes preparations of oranges and lemons. Orange M., which is most commonly used, is made from the Seville or bitter orange by boiling the peel in syrup till it is soft, thereafter pulping it, and again boiling with the juice of the fruit in the original syrup and with additional sugar to a proper consistence for jellying. M. is manufactured on a large scale in Dundee and Glasgow.

Mar'mande, a river-port in France, department of Lot-et-Garonne, on the right bank of the Garonne, 35 miles N.W. of Agen by rail. It has a church of the 13th c., with a fine altar-piece. Ropes, hats, casks, brandy, oil, leather, linens, and sail-cloth are manufactured, and there is a trade in cereals, wines, prunes, hemp, and spirits. Pop. (1872) 5417.

Mar'mont, Auguste Frédéric Louis Viesse de, Duc de Raguse, born at Châtillon-sur-Seine, 20th July 1774, entered the army when eighteen, was present in 1793 as artillery lieutenant at the siege of Toulon, where Napoleon first noticed him, was made captain in 1794, and accompanied his chief to Italy. In the campaign of 1796 he acted as Bonaparte's aide-de-camp, distinguished himself in Egypt and at the taking of Malta, superintended the crossing of the St. Bernard in 1800, and contributed largely to the victory of Marengo. Having completed 200 miles of road in Dalmatia he was created Duc de Raguse; and after the battle of Wagram he became marshal. In 1814 he defended Paris from the Allies, but by capitulation incurred the hatred of Napoleon and many of his countrymen. Louis XVIII. named him a peer of France, and Charles X. sent him as ambassador to Russia, to congratulate Nicholas on his coronation. Becoming still more unpopular, he left France and visited many countries, publishing an account of his travels in

1837. He likewise published *Ésprit des Institutions Militaires* (1845). He died at Venice, 22d July 1852. His *Mémoires* were published in 1856. Sainte-Beuve, after careful investigation, declares him sincere, intelligent, full of generosity and candour, a loyal Frenchman, but too fond of glory. He survived the rest of Napoleon's generals.

Mar'montel, Jean François, born at Bort, Limousin, July 11, 1723, was educated in the Jesuit College of Mauriac, whence he removed to Clermont. On the invitation of Voltaire he went to Paris, where he sold a translation of Pope's *Rape of the Lock* for a hundred crowns (1746). He plunged at once into literary work and vicious pleasures. Pompadour gave him a sinecure as clerk of public buildings in 1753; and he entered the Academy in 1763,—not without opposition, and after imprisonment for writing too much satire. He succeeded D'Alembert as secretary to the Academy in 1783, and died at Abloville (Eure), on the last day of the 18th c. M. was a thorough disciple of Voltaire, writing gracefully, gaily, mockingly, but with wit of blunter point. He wrote all manner of books, of which the best are *Denys le Tyran* (1748), *Aristomène* (1749), *Cléopâtre* (1750), *Egyptus* (1753), tragedies; *Contes Moraux*, written for the *Mercure*, and very popular, collected in 1761 (second series, feebler, 1801); *Bélisaire* (1768)—condemned by the Sorbonne for its views on toleration; and *Les Incas*, romances; *Eléments de Littérature* (1787); *Mémoires d'un Père* (posthumous, 1804), containing much information about himself, and amusing pictures of his time. His *Œuvres Complètes*, edited by himself, appeared at Paris in 17 vols.; a second edition in 18 vols. (Par. 1818); a third in 7 vols. (Par. 1819–20). His *Œuvres Choisies* in 12 vols. were published by Saint-Surin (Par. 1824–27).

Mar'mora (anc. *Propontis*), the sea that separates European from Asiatic Turkey, and communicates with the Black Sea by the Bosphorus, and with the Ægean by the Dardanelles (anc. *Hellespont*). It is 135 miles long from S.W. to N.E., and 45 miles broad, and is indented on the Asiatic side by the deep Gulf of Isnikmid. It has three large and many smaller islands. M., the largest, is famed for its marble and alabaster.

Mar'moset, the name applied to various monkeys belonging to the Platyrhine ('broad-nosed') or New World section of the *Quadrumana* (q. v.), and forming the family *Hapalidæ*. They have thirty-two teeth, consisting of eight incisors, four canines, twelve premolars, and eight molars. The tail is long, but non-prehensile. The marmosets bear a general resemblance to squirrels. They are small, have a soft, silky fur, and are of very gentle disposition. The *Jacchus vulgaris* is typically known as the 'M.,' and allied species are the *J. Œdipus* and *J. Rosalia*. The *Hapale pencillata* is another common genus and species.

Mar'mot (*Arctomys*), a genus of *Rodentia* (q. v.) somewhat related to the Squirrels (q. v.), inhabiting N. Europe and America, and distinguished by the possession of twenty-two teeth. The incisors are smooth and rounded. No cheek-pouches exist. The front feet have four toes and a rudimentary thumb; the hinder feet are five-toed. The tail is short, and covered with hair. In the allied genus, *Spermophilus*, cheek-pouches exist. The common M. (*Arctomys Marmotta*) attains the size of an ordinary rabbit. It is common in N. Europe, inhabiting mountainous situations. It lives in burrows, and is of gregarious habits. The colour is a greyish-yellow above, the grey tint predominating below, and the tip of the tail being black. The M. hibernates during winter, retiring to its burrows in September and reappearing in the succeeding April. The young number three or four. The Polish M., or Bobac, is the *A. Bobac* of the naturalist, and is a native of N. Europe and N. Asia. It attains a length of 20 inches, and is of a greyish-brown colour, tinted with yellow. Hood's M. belongs to a different genus, and is the *Spermophilus Hoodii* of the zoologist. It is also named the 'Leopard or Pardine M.' from its colour, which is yellowish-brown striped with dark brown, in a horizontal manner, and marked with pale spots on the dark-brown bands. The average length is 11 inches. The 'Leopard M.' is an American species, and is very common in Upper Missouri.

Marne, a department of France, part of Old Champagne, is bounded N. by Ardennes, S. by Aube and Haute-Marne, and W. by Aisne and Seine-et-Marne, and E. by Meuse. Area 3154 sq. miles; pop. (1872) 386,157. It is traversed in a N.-westerly direction by the M., and tributaries of the Aisne, and touched by the Seine on the S. In the N. is the arid chalky *Champagne-Pouilleuse*, yielding the best qualities of the famous wine. M. produces annually from seven to fifteen million bottles of champagne. Except in the N. it is well cultivated, the cereals amounting in value to 73 million francs. There are several iron mines, and many important peat-pits, and quarries of limestone, building-stone, chalk, and grinding-stones. The iron and textile industries are valuable. The chief town is Châlons-sur-Marne. —The *River M.* (anc. *Matrŏna*), the chief affluent of the Seine, rises in the plateau of Langres, flows first N.W., then W., and joins the Seine, four miles above Paris, and after a winding course of over 200 miles.

Marne, Haute, a department in the N.E. of France, is bounded N. by the Meuse and Marne, S. by Côte-d'Or and Haute-Saône, E. by Vosges, and W. by Aube. Area, 2401 sq. miles; pop. (1872), 251,196. It consists of a series of high plateaux, flanked with vineries, of which the principal is that of Langres, wending in a N.E. direction from the mountains of Côte-d'Or to the Vosges. M. is one of the most densely wooded parts of France; forests cover 205,000 hectares; crops of all kinds, 342,000; vines, 16,000. The annual produce of wine, which is of middling quality, is 600,000 hectolitres. M. has some 300 iron mines, 100 large furnaces, 30 forges, &c., employing 40,000 men, and producing 900,000 quintals of metal. There are large manufactures of cutlery and gloves (100,000 pairs yearly sent to America). The chief town is Chaumont.

Marochett'i, Baron Carlo, was born at Turin in 1805, studied at the Lycée Napoléon, and in Bosio's studio, gained the gold medal of the King of Sardinia (1827) for his *Young Girl Playing with a Dog*, and in 1831 exhibited at Paris his statue of *A Fallen Angel*. About the same time he completed an equestrian statue of the Duke of Savoy for one of the public places of Turin, which is considered by many to be the finest piece of sculpture he has done. In Paris Napoleon's tomb, the Madeleine altar, the bas-relief of the battle of Jemappes on the Arc de Triomphe de l'Étoile, and Bellini's tomb testify to his genius. The statue of Richard Cœur de Lion in Palace Yard, London, the cenotaph in St. Paul's Cathedral to the officers of the Coldstream Guards, the equestrian statue of Queen Victoria at Glasgow, are examples of his manner at its best. M. died at Paris, 28th December 1867.

Mar'onites are a Christian sect living among the Libanus Mountains, founded by a party who, in spite of the decree of the Emperor Anastasius II. (died 719), retained the Monothelite (q. v.) doctrines, and collecting about the monastery of St. Maro, chose for themselves a patriarch called of Antioch. In 1182 the M. were induced or compelled by the Crusaders to renounce their Monothelite errors and unite themselves with the Church of Rome, to which they have ever since remained faithful, while they have been left in a condition of unusual independence. On the Quirinal Hill there is a Maronite monastery where the Mass is performed from their own Syriac liturgy, and to which many young M. are sent from Syria to be educated. The M., who are said to number about 200,000, are a temperate, industrious race, among whom crimes are rare, but ignorant and priest-ridden to an extraordinary degree. The clergy, to whom a fourth part of the territory belongs, have been described by travellers as fanatical, intolerant, and unscrupulous. In modern times the M. have suffered much persecution from the Druses (q. v.). See Neale's *Eastern Church;* Palgrave's *Essays on Eastern Questions* (Lond. 1872).

Maroons' (Fr. *Négres marrons*, from Span. *cimarron*, 'wild'), a name first given in Jamaica to the slaves left behind by their Spanish masters on the English conquest of the island in 1655. The M. kept up a guerilla warfare with the English till 1795, when they were overpowered, and sent, some to Africa, some to Nova Scotia. The M. of Dutch Guiana have been recognised as independent in several treaties. In 1869 they numbered 7500.

Maros-Vásárhely (Ger. *Neumarkt*, or *Marktstadt*), a town of Austria, in Transylvania, on the Maros, 70 miles E.N.E. of Karlsburg by rail. It has a strong castle, a fine Gothic Reformed church, a public library of 60,000 vols., and a trade in wheat, fruit, wine, and tobacco. Pop. (1869) 12,678.

Marot, Jean, a French poet, was born at Mathieu, near Caen, in 1463, and died at Cahors in 1523 as valet-de-chambre to François I. His works were first collected by Coustelier (Par. 1723). —His son, **Clément M.**, born at Cahors in 1495, served as page to the Seigneur de Villeroi, and having by his verses won the patronage of Marguerite de Valois, succeeded his father as valet to her brother, François I., with whom he was taken prisoner at Pavia (1525). A charge of heresy cast him, on his return, into prison, whence in his *Enfer* he launched a bitter satire against his persecutors, and in 1535 he was forced to seek a refuge at the court of Navarre. But even there his translations of the Psalms brought him once more into difficulties with the clergy. He withdrew to Geneva (1543), and thence—the sour Calvinism of the place ill assorting with his gay Bohemian spirit—to Turin, where he died, September 1544, leaving a son, Michel, who was also a poet. The best edition of Clément's works is Guiffrey's (Lyon, 1869). See Colletet, *Notices Biographiques sur les Trois Marots* (Par. 1871); and H. Morley, *Clement M., and other Sketches* (Lond. 1871).

Marque and Reprisal, Letters of. See LETTERS.

Marque'sas Islands, a group of thirteen islands in the S. Pacific, included between 7° 30′–10° 30′ S. lat. and 138°–140° 25′ W. long. The southern part of the group was discovered in 1595 by the Spanish navigator Mendaña, who named it after the Marquesas de Mendoza, Viceroy of Peru. The northern islands were not known till 1791, the discoverer being an American, named Ingraham. In 1842 France established a protectorate over the group, the seat of government being in the island of Nuka-hiva. The M. I. are of volcanic formation and very mountainous, some of the peaks being nearly 4000 feet high. The total area of the group is about 700 sq. miles, but the population is not more than 8000, and is decreasing. The natives are a particularly handsome race, but are very warlike and superstitious, and till lately were cannibals. Christianity has not made much progress among them. The islands are fertile, and by means of Chinese labour their natural productiveness is being developed.

Mar'quess, or **Marquis,** in the British peerage, a nobleman ranking next below an earl, *Marchioness* being the corresponding female title. There are now (1877) 19 English, 3 Scotch, and 11 Irish marquesses. Under the later Roman emperors the defence of the frontiers was committed to military commanders called *comitesl imitanei.* The office outlived the Teutonic conquest of Gaul, and its holders—now styled *markisii* or *marchisiones* (see MARK)—became under the Karolings hereditary suzerains of extensive *marquisates.* With the extinction of feudalism, however, these marquisates were gradually merged in the kingdom, the title alone being retained as a purely honorary dignity; and of marquesses, in this the modern sense of the word, the earliest creation was, in France, of Louis de Villeneuve, M. de Trans (1505); and in England of Robert de Vere, M. of Dublin (1385). In Germany the analogous dignity of *markgraf*—hereditary since the 11th and 12th centuries—was raised to the rank of 'prince of the empire' (*reichsfürst*) in the 13th c.; and in Italy the *marchese* immediately precedes the *conte.*

Mar'quetry (Fr. *marqueterie,* 'chequered work'), a mode of decorating furniture by inlaying pieces of wood of different colours, natural or produced by dyes, likewise ivory, mother-of-pearl, and tortoise-shell. M. was practised in Italy in the 15th c., a knowledge of the art having been brought from the East, and two centuries later it became the prevailing fashion in Europe. In the time of Louis XIV. a new and costly kind of M. of tortoise-shell and brass, called buhl or boule work, was invented for the decoration of the furniture of Versailles Palace.

Mar'riage (Fr. *mariage;* It. *maritagio,* from low Lat. *maritaticum,* formed from classical Lat. *maritare,* lit. 'to provide with a male') is the name given to the legal union of a man and woman constituting the relation of husband and wife. According to Scripture, it is an ordinance of God, and coeval with the creation of man. Those who reject the authority and teaching of the Bible on this point, do not quite agree among themselves as to the origin of the practice, some considering it an 'invention' of legislators, others an outcome of social necessities. Of the two, the latter is decidedly the more probable. M. exists under very different conditions in different countries. Nature may be said to favour monogamy, or M. between *one* man and *one* woman, because the sexes are pretty nearly equal in numbers; but men have not always followed the teaching of nature. Hence the custom of polygamy, with its revolting variety of polyandria, under which a woman has several husbands. The prevalent view of the origin of M. held by those who discard the scriptural record, is that men at first *stole* their wives, and that legal unions are a product of civilisation. This theory is maintained with great learning and ability by Mr. M'Lennan in his *Primitive M.* (1865), and by Sir John Lubbock in his *Origin of Civilisation and Primitive Condition of Man* (1870). The Church of Rome holds M. to be a 'sacrament,' and all orthodox Protestants regard M. as at least an ordinance of God, which ought, therefore, to be accompanied with religious rites, but the law looks upon it purely as a civil contract.

The terms and conditions of this legal union vary in different countries. According to the law of England the wife becomes legally incorporated with her husband and subordinate to him. For the validity of M. are requisite—1. Consent of the parties; 2. The absence of legal disability on either side, or relatively; 3. The M. rite must be solemnised as directed by the Marriage Act. Fraud may be a ground for annulling a marriage; but it does not necessarily prove fatal to this contract as it does to others. Deceit on either side, however great, as to fortune or social position, will not invalidate a marriage; but to obtain a license under a false name, *with intent to defraud,* may do so. M. is necessarily dissolved by death, and it may be dissolved by Divorce (q. v.). With regard to the powers of a husband over his wife's property, see HUSBAND AND WIFE.

The Marriage Act, 6 and 7 W. IV. c. 85, amended by subsequent statutes, has multiplied the modes by which M. may be contracted in England. It may be by licence from the Archbishop or Surrogate, according to the rights of the Church of England; by Banns (q. v.), according to the rites of the Church of England; by certificate without banns, according to the rites of the Church of England; or by registration under 19 and 20 V. c. 119. Persons desirous of being married according to the rites and ceremonies of the Church of England may be so married after publication of banns, or by licence, or by special licence, or under certificate from the superintendent registrar of the district. Persons desirous of being married otherwise than according to the rights and ceremonies of the Church of England, may be married according to other rites and ceremonies on production of a certificate from the superintendent registrar. This certificate is obtained by giving not less than seven days' notice, in form of a schedule, which the registrar will give on application, filled up with particulars specified as to names, ages, occupation, &c. M. may be solemnised at the office of the superintendent registrar, with open doors, between 8 A.M. and noon, in the presence of the superintendent registrar, and another registrar of the district, and of two witnesses. 21 and 22 V. c. 93, enables persons to establish their legitimacy, the marriage of their parents, and also their right to be deemed natural born subjects, by petition to the Divorce Court. Marriages within the prohibited degrees are absolutely null, if solemnised after the passing of the Act 5 W. IV. c. 54–31, Aug. 1835. The same Act legalised former marriages within the degrees of Affinity (q. v.) prohibited since its date. First cousins and second cousins may intermarry. Marriages of British subjects abroad are valid if contracted according to the law of the country, unless the M. be such as to be illegal in England. A Mr. Brook married at Altona his deceased wife's sister, and the question was raised in December 1857 whether that M., legal in Denmark, was legal in England. Mr. Justice Creswell decided that, as the parties were British subjects, it was not legal. Foreign nations adopt the same rule of law. Thus, in January 1866, a couple, unable to marry in Paris, were privately married in London. On their return the M. was declared null by the Civil Tribunal of the Seine, as not having had the consent of the father of the bride. By the law of Scotland M. is a contract completed by the consent of parties, if there be no legal obstacle to it. Consent may be legally proved by circumstance. Thus, proof of promise to marry, *copula subsequente* is held to prove consent. So, the fact of a couple living together as if married, may constitute M. from the legal effect of Habit and Repute (q. v.). A mere promise to marry does not constitute M., but the party withdrawing may be found liable in damage for breach of promise. A promise to marry, *subsequente copula,* does not constitute M.

in Scotland; but if the facts be proved, it may be constituted by Declarator (q. v.) of Marriage. A marriage in Scotland may be either regular or clandestine. A regular M. is performed by a clergyman, in presence of at least two witnesses, and is preceded by the proclamation of Banns (q. v.). Clandestine marriages are valid, but the parties, celebrator, and witnesses are liable to fine and imprisonment. By 19 and 20 V. c. 96, after 1st December 1856, no irregular M. entered into in Scotland is valid, unless one of the parties had at the date of it been resident in Scotland for the previous twenty-one days. See DIVORCE, JUDICIAL SEPARATION, ADULTERY, CONTRACT, MARRIED WOMEN, PROPERTY OF.

Married Women, Property of. Property settled upon a wife by ante-nuptial contract is, under all circumstances, protected from the creditors of the husband; but if so settled by post-nuptial contract, it only is so under deduction of all debt due by him at the date of execution. See DESERTION OF SPOUSE, and JUDICIAL SEPARATION. In Scot. law, SEPARATION OF MARRIED PERSONS.

Marr'ow, the name applied to the fatty substance found in the interior of the bones of Mammals. The use of M. is undoubtedly that of affording a certain degree of nutrition to the innermost portions of the bones. M., when microscopically examined, is seen to consist of fat cells, large nucleated cells, and blood-corpuscles. It is of low specific gravity, and generally exhibits a reddish tint.

Marrow Controversy derived its name from a book on the subjects of justification and sanctification, entitled the *Marrow of Modern Divinity*, which was published in 1646 by Edward Fisher, of Brazenose College, Oxford. A copy having been found in his parish by Thomas Boston (q. v.) about 1700, it was reprinted at Edinburgh in 1718, with a preface by Thomas Hogg, minister of Carnock, Fifeshire. Owing to its highly evangelical sentiments the book came to be greatly esteemed throughout Scotland, being reckoned by many next to their Bible and Catechism. But a controversy having arisen over certain points of its teaching, a committee was appointed by the General Assembly to examine it, and an unfavourable report having been received, the Assembly condemned the propositions in question, and prohibited all ministers from using or recommending the book, May 1720. Thereupon twelve ministers—J. Hogg, T. Boston, J. Bonnar, J. Kid, G. Wilson, E. and R. Erskine, J. Wardlaw, J. Bathgate, H. Davidson, W. Hunter, and J. Williamson—drew up a Representation vindicating the Marrow from the interpretation put upon it: hence called *Representers* and *Marrow Men*. A somewhat modified Act was passed in 1722, against which the Representers also protested; and although the M. C. seemed to die away, it eventually led to the Secession of 1734. See M'Crie in the *Edinburgh Christian Instructor* for 1834, *State of the Controversy Concerning the M.* (Glasg. 1773.)

Marr'yat, Frederick, a famous English novelist, was born at London, 10th July 1792, entered the navy as midshipman in 1806, became lieutenant in 1812, after much service was made commander in 1815, and C.B. in 1825. *Frank Mildmay* (1829) was his first novel. Of his others, most of them sea tales full of rollicking jack-tar humour, *King's Own* (1830), *Peter Simple* (1834), *Jacob Faithful* (1834), *Midshipman Easy* (1836), may be mentioned as favourable specimens. He likewise published a *Code of Signals for the Use of Vessels Employed in the Merchant Service* (1837), adopted by Government, and his *Diary in America* (1839). He died at Langham, Norfolk, 2d August 1848. See his *Life and Letters*, by his daughter Florence (Mrs. Ross Church) (1872), who has also written several novels.

Mars (contracted from *Mavers* or *Mavors*, the Sabine and Oscan *Mamers*), the Roman god of war, was early identified with the Greek Ares. He was the second of the tutelary deities of Rome, ranking after Jupiter, and before Quirinus ('Spear-Bearer' or 'Warrior'), with whom, however, he was often identified as the god protecting the Romans in their civil capacity as *Quirites*. As the protector of the country, he was *M. Silvanus*, and, as the god of advancing to battle, *M. Gradivus*. The wife of 'Father Mars' (*Marspiter* or *Maspiter*) was Neriene or Nera (feminine form of *Nero*, Sabine 'strong'), but he was also associated with the goddess of war, Bellona. His priests were called the Salii from their warlike dances, and were the keepers of the twelve holy shields (*Ancilia*), one of which had fallen from heaven. Of the many temples of M. in Rome, the chief were that without the Porta Capena, on the Appian Way (q. v.), and that built in the forum by Augustus, and named after M. the Avenger (*Ultor*).

Ares—from the same root as *Aryan* (q. v.)—the Greek god of war, was the son of Zeus and Hera, and ranked among the great deities of Olympus. He is the embodiment of strength and courage, and finds his chief delight in the excitement, and even in the horrors of war, for their own sake. Following the inclination of the moment, he attacks now one side, now the other, and is apparently resistless; yet, as the Greek mind loved to think of blind force as the slave of intellect, so Ares is overcome when he meets powers of a higher order than his own. Diomedes, aided by Athena, wounds him; he is conquered by Herakles; and again, overpowered by the giant sons of Aloeus, he is held in chains for a year and a month. Ares was loved by Aphrodite, his amours with whom were discovered by her husband Hephæstus (q. v.). The worship of Ares seems to have been derived from Thrace. Its chief seats were in that country and Scythia, where horses, cattle, and even men were offered to him as victims.

Mars, the fourth planet in order from the sun, being the nearest superior planet to the earth. When visible it is readily distinguished by its ruddy light; and telescopic observation discloses that its surface is probably diversified, like ours, by continent and sea, and that its meteorological conditions much resemble ours. Around either pole is seen a patch of white light, which diminishes in size during its summer and increases in size during its winter, and is most likely a mass of ice and snow. The greatest distance of Mars from the sun is 152,304,000 miles, and the least distance 126,318,000, giving a mean distance of 139,311,000 miles, and an eccentricity of ·093,262. The equatorial diameter of the planet is about 4360 miles, the polar 4290. The sidereal year of M. is 686·9797 days; and his diurnal revolution has a period of 24 h. 37 m. 22·735 s., according to Proctor. The inclination of the orbit to the ecliptic is 1° 51′ 5″; and the inclination of the equator to the orbit about 28°. On account of its proximity to the earth when in opposition, Mars offers peculiar facilities for studying its surface, and at the same time affords an independent method of determining the solar parallax, and thence the distance of the earth from the sun. The succession of the seasons is very similar to that of the earth; the changes are, however, more rapid and more marked, and consequently the surface of M. is probably subject to hurricanes of great severity. In August 1877 M. was peculiarly well situated for observation; and the discovery was made by Professor Asaph Hall, astronomer at Washington, of two satellites. They are exceedingly faint, and are scarcely observable beside the much more intense light of the planet.

Marsa'la (Arab. *Marsa Alla*, 'the port of Alla'), a fortified seaport on the W. coast of Sicily, province of Trapani, on a bay protected by Cape Boeo (or Lilibeo), 19 miles S.S.W. of Trapani by rail. It is a modern place, and has a good cathedral and a harbour that has been much improved of late years. The exports are the famous M. wine, grain, oil, salt, soda, &c. M. wine, which distantly resembles sherry, is produced here (chiefly by English firms) to the extent yearly of 30,000 pipes. Built on the site of *Lilybæum*, the principal Silician fortress of the Carthaginians, M. is rich in remains, including the grotto of the sibyl, with its prophetic well, parts of the old town wall, curiously painted sepulchres cut in the solid rock, old mosaics, &c. Here Garibaldi landed with his heroic 'thousand' (11th May 1860), eluding the Neapolitan fleet, and beginning the campaign that shortly ended in the overthrow of the Bourbon kingdom of the two Sicilies. Pop. (1874) 34,202.

Marseillaise. See LISLE, ROUGET DE.

Marseille', the greatest seaport of France, and chief town of the department of Bouches-du-Rhone, on a bay in the Gulf of Lyon, 29 miles E.S.E. of the mouth of the Rhone, and 410 S.S.E. of Paris by rail. It clusters picturesquely around the deep, spacious, natural inlet forming the harbour, and is sheltered on the N. by the Chaîne-de-l'Étoille, while to the S. rises the hill of l'Endoume, dotted with beautiful villas, and surmounted by Notre-Dame-de-la-Garde, a Romano-Byzantine church, with

a tower conspicuous from the sea. The new and old parts of the town are separated by the splendid street of la Cannebière, and by an avenue leading from the Port de Rome on the Prado, the principal promenade, to the Porte d'Aix, a triumphal arch in the extreme N. Among the notable buildings are the churches of Notre-Dame du Mont-Carmel, restored in 1621, and the Hôtel-Dieu, dating from the 12th c.; the modern cathedral, a basilica of Byzantine style; the beautiful episcopal palace, the hôtel-de-ville, exchange, palais-de-justice, museum, theatre, and observatory. M. has also many educational and benevolent institutions, several scientific societies, a hydrographic institute and medical school, a botanical garden, an academy of Oriental languages, a library of 75,000 volumes, &c. There are some fifty public squares, and many delightful gardens. In the bay are several islands, on one of which is the Château d'If, built by François I. The Vieux-Port of M. is 1000 yards long by 330 broad, and 24 feet deep, covering an area of 70 acres, accommodating 1200 merchant vessels, and defended by forts St. Jean and St. Nicholas. La Jolliette, a new harbour, formed by a breakwater 1300 yards long, was opened in 1855. There are various other basins, including the Dieu-Donné, between the fortified islands of Pomèques and Ratonneau, which is capable of admitting the largest ships of war. The port had in March 1877 a total wharfage of 12,616 longitudinal metres. M. is the packet station for the Mediterranean and the East, and the various shipping companies (including the Messageries Maritimes) had, in March 1877, 154 steamers of 128,130 tons, and 157 sailing vessels of 58,887 tons. The trade is chiefly in wheat, maize, barley, sugar, cotton (104,400 bales), coffee, oil-seeds, silk (22,000 bales), cocoons, wool, sheepskins, hides, olive oil, petroleum, wine and spirits, rice, coal, and metals. In 1876 there entered the port 8689 vessels, of 2,605,890 tons, and of these 762 of 387,467 tons arrived from long sea voyages. The chief manufacture of M. is soap, of which 50,000 tons were produced in 1872. Other industrial products are chemicals, machinery, glass, porcelain, leather, and liqueurs. The shipbuilding yards can turn out annually 20,000 tons of iron ships, and engines to the extent of 6000 horse-power. M. is supplied with water from the Durance by a canal 54 miles long, which has contributed much to the fertility of the adjoining country. The climate is exceedingly hot for France, and the mistral often blows with destructive force. Pop. (1872) 218,763. M., the ancient *Massalia*, was founded about 600 B.C. by the Phocæans of Asia Minor, and soon became a prosperous trading place. The Massalians defended themselves successfully against the Carthaginians in a sea-fight, and subsequently were the fast allies of the Romans. Massalia, called by the Romans *Massilia*, continued to be one of the chief commercial cities of the world for many centuries. During the Roman civil war, it took the side of Pompey, but was subdued, after a protracted siege, by Cæsar. Under the early emperors it ranked as one of the great seats of learning, the sons of many illustrious Romans being sent thither to complete their studies. Cicero called M. the Athens of Gaul. Sacked by the Arabs in the 8th c., its commercial importance was eclipsed during the middle ages by the rise of Venice, Genoa, and the other maritime republics of Italy; but it began to regain its ancient prosperity after it passed with the rest of Provençe to the French crown in 1481. During the Revolution it was the scene of Fréron's atrocities. The French conquest of Algeria, and the opening of the Suez Canal have given a powerful impulse to its commerce.

Marsh, George Perkins, LL.D., an American philologist, born at Woodstock, Vermont, March 17, 1801, graduated at Dartmouth College (1820), and after practising at the bar, was elected a member of the Supreme Executive Council of the State (1835), and of Congress (1842), having published privately a translation of Rask's *Icelandic Grammar* (1838). He was U.S. Minister at Constantinople (1849–53), travelled in Europe, and returning to America (1854), served as Railroad Commissioner in Vermont (1857–59). He delivered his lectures *On the English Language* in 1859, and *On the Origin and History of the English Language* in the winter of 1860–61, and on June 15 of the latter year was appointed Minister to Italy, a post which he still (1877) holds. Amongst M.'s other works may be mentioned his edition of Wedgwood, *Etymology* (1861), and *The Earth as Modified by Human Action* (1874).

Mar'shal (Fr. *maréchal*, Ger. *marschall*, Low Lat. *marescalcus*, from Old Ger. *march*, 'horse,' and *schalc*, 'servant'), originally 'a groom,' a meaning preserved in the Fr. *maréchal*, 'farrier,' came under the Merwing dynasty to denote an officer of higher rank—the *Comes Stabuli* or Constable (q. v.). Of marshals of France the first was Albéric Clément I. (1185), and under Louis XIV. there were twenty such (1703). The office was suppressed from January 21, 1793, till May 19, 1804, when Napoleon nominated eighteen marshals of the empire, and Louis XVIII. revived the title M. of France (1815). There are now (1877) four marshals in the French army. In Germany the M. was in the 10th c. one of the highest officials of the imperial court, and the office of *Reichserzmarschall* remained since the 13th c. vested in the Duke of Saxony. In England this title has been generally used only in composition with other words, as Earl-Marshal (q. v.), Field-Marshal (q. v.), and Knight-Marshal, a subordinate of the Lord Steward.

Mar'shalling of Arms, in Heraldry, is the grouping of two or more coats of arms into one complete achievement, either by keeping them *accollé* (*i.e.*, side by side), or by joining them in one. In course of time, as the use of armorial bearings became more and more prevalent, the art of so quartering the shield as to display at a glance the hereditary dignity of the family in the arrangement of each part became of great importance, and this mode of M., which began to be adopted about 1350, soon became the most common. The most important of the arms thus marshalled are placed in the first quarter of the shield. Thus in the royal escutcheon, England occupies the first and fourth quarters, Scotland the second, and Ireland the third. On the official seals of Scotland, however, this arrangement is reversed.

Marsh Gas, or Light Carburetted Hydrogen, is a gaseous exhalation from the earth, occurring in mines and in marshy places. It is the fire-damp of miners, has no smell, taste, or colour, and burns with a pale white flame. Its composition is represented by the formula CH_4. See HYDROCARBONS.

Marsh-Harrier (*Circus rufus*), a genus of Raptorial bird, closely allied to the sparrow-hawk. The American species (*Circus Hudsonius*) is a large and rapacious bird, found all over the Continent. See HARRIER.

Marsh-Mallow (*Althæa*). This genus of *Malvaceæ* (q. v.) includes about twelve species, inhabitants of temperate and warm regions. Of these the Common M.-M. (*A. officinalis*) is found in marshes near the sea in the southern half of England and Ireland. It possesses the mucilaginous properties ascribed to the order, and to its allied genus Mallow (q. v.), and in France the root is largely used to make lozenges and demulcent drinks, under the name of *Guimauve*. *A. hirsuta* is perhaps also a British native. Several species of the genus are in garden cultivation.

Marsh'man, Joshua, an English missionary, born at Westbury Leigh, Wiltshire, 20th April 1768, was sent in 1799 by the Baptist Missionary Society to Serampore, India, where he laboured for many years along with Carey, Ward, and others of the 'Serampore Brethren.' He mastered several Oriental languages, and translated a great portion of the Scriptures into Chinese. He published the *Works of Confucius* (the original text with a translation) in 1811, a Chinese grammar in 1814, and jointly with Carey a Sanskrit grammar in 1815, and a Bengali-English dictionary in 1825 (abridged 1827). He printed a discussion with Rammohum Roy on *The Deity and Atonement of Christ* in 1822. Rightly or wrongly, M. was held mainly responsible for the separation of the brethren from the parent Baptist Missionary Society in 1827. He died at Serampore, December 5, 1837. See Cox's *History of the Baptist Missionary Society*.—**John Clark M., C.S.I.**, a leading man of letters in India, the eldest son of the preceding, was born at Serampore in 1794. He founded the first Bengali newspaper, the *Sumachar Darpan*, and also the first English weekly newspaper, the influential *Friend of India*, which has recently passed out of existence. In conjunction with his father's friend, Dr. Carey, he brought out the first complete *Bengali Dictionary*; and his popular *History of India from the Earliest Times to the End of the Eighteenth Century* is perhaps the most widely read of all books on the country which was his adopted home. He also wrote Lives of Carey, Marshman, and Ward, and memoirs of Sir Henry Havelock, who was his own brother-in-law. While in England he had been called to the

bar, and in the department of Indian law he wrote many useful works. For ten years he filled the appropriate office of Translator to the Government of Bengal, and finally returned home in 1852. M. died 8th July 1877.

Marsh-Marigold is the name of *Caltha palustris*, a very common British marsh plant with bright golden-yellow flowers, from 1 to 2 inches in diameter, and closely related to the buttercups; so that it has no affinity with the proper Marigolds (q. v.), all of which belong to *Compositæ*. Dr. Prior explains that it is through a slip the name came to be given to the plant.

Mar'ston, Westland, poet and dramatist, was born at Boston, Lincolnshire, 30th January 1820, and studied law in London, but has devoted himself to literature. His earliest tragedy, *The Patrician's Daughter*, was produced at Drury Lane (1842) by a company that included Miss Helen Faucit, Phelps, and Macready. It was followed by many other plays, of which the best known are *Strathmore* (1849), *Anne Blake* (1852), and *Life for Life* (1868). Written expressly for the stage, these are singularly eloquent and concentrated works, full of genuine character and feeling. M. is also the author of several fine lyrics and tales. His *Dramatic and Poetical Works* were published in 2 vols. (Lond. 1876).

Marston Moor, in the W. Riding of Yorkshire, 5 miles N. E. of Tadcaster, the scene of the second great defeat of the Royalists by the Parliamentarians (July 1, 1644). The former were commanded by Prince Rupert, the Marquis of Newcastle, and Sir Charles Lucas; the latter, by Fairfax, the Earl of Manchester, Cromwell, and Sir David Leslie; the forces on each side amounting to some 25,000. On one flank the king's horse broke through the Scotch, but on the other Cromwell's 'Ironsides' turned the fortune of the day. The Royalists lost 3000 killed and wounded, and 1500 prisoners, and the remnant of their forces, who threw themselves into York, were forced to capitulate after a few days' siege.

Marsupia'lia (*L. marsupium*, 'a pouch'), one of the two lowest orders of *Mammalia*, represented by the Kangaroos (q. v.), Wombats (q. v.), Opossums (q. v.), &c. The M. forms the only group included in De Blainville's section *Didelphia*, and necessarily falls under the term *Implacentalia*, since in the M. no *Placenta* (q. v.) is developed. The characters of this interesting order are derived, firstly, from the pouch or bag, named the *marsupium*, which is supported on two long bones (*marsupial bones*) rising from part of the pelvis, and representing the ossified inner tendons of the *external oblique muscles* of the abdomen. Many M. have no pouch, but the marsupial bones exist in all. The milk glands are contained within this pouch, and the young are carried in it after birth, and fly for refuge to it during their early years. The nipples of the mammary glands are long, and the young of the M. attach themselves thereto, the milk being forced down the throat by the action of a special muscle which compresses the mammary glands. The two oviducts or Fallopian tubes do not coalesce to form a single uterus or womb, but remain separate, and open into a *urogenital canal*, which in its turn opens externally in a distinct and separate manner from the *rectum*, although one sphincter muscle embraces the rectum and urogenital canal. The young of M. are born in a very immature condition. Another character of the M. is found in the fact that the angle of the lower jaw is inflected inwards to form a prominent horizontal process. The fur is always hairy, and the outer ears are well developed. True teeth always exist; canines being absent in a few cases. Five toes are usually found on the fore limbs, but the hinder-limbs may have four toes only (as in the kangaroos), whilst the great toe in the opossums can be opposed to the other fingers, thus converting the foot into a hand-like organ. The brain-surface is smooth in the opossums, &c., but convoluted in the kangaroos; and the stomach, usually simple in M., is of complex structure in the latter animals. All existing M., with the exception of the opossums (*Didelphidæ*), are confined to Australia. M. first appear as fossils in the Trias; and represent the oldest mammalian remains. Gigantic extinct M. occur in recent deposits in Australia.

Martaban', Gulf of, an arm of the Bay of Bengal which breaks the coast of British Burmah, nearly dividing Pegu from Tenasserim, and receiving from the N. the great rivers Irrawaddy and Saluen.

Mar'ten (*Martes*) a genus of carnivorous Mammalia, belonging to the weasel family *Mustelidæ*, represented by the British species the Pure M. (*M. abietum*), and the Beech M. (*M. foina*). The former animal attains a length of 28 inches inclusive of the tail. Its colour is a dark brown, and the fur is valued very highly, since when well dressed it bears a very close resemblance to the well known 'sable.' The Pine M. occurs in N. Europe and in N. America also. It is a lively, agile animal, committing great havoc on birds and the smaller mammals. The Beech or Stone M. is much more common than the preceding species. It has a white patch on the throat and breast. Its fur is not so valuable as that of the Pine M. The Beech M. is common in some parts of Britain. It commits sad havoc in hen-houses and in the poultry-yard generally. The characters distinguishing the genus *Martes* are the absence of anal glands, the secretion of which imparts such a strong and disagreeable odour to the polecats and their neighbours, and the development of a false molar tooth on each side of each jaw.

Martia'lis, Marcus Valerius, was born at Bilbilis in Spain, A.D. 43. He went to Rome in 66, where he resided for thirty-five years, leading an easy life of pleasure, rising in fame as a poet, and enjoying the special favour of the emperors Titus and Domitian. He returned to Bilbilis in 100, married a lady of fortune named Marcella, and died about 104. The extant works of M. consist of upwards of 1500 *Epigrammata*, arranged in 14 books, to which is commonly added the *Liber de Spectaculis*, containing 33 epigrams relating to the imperial shows. The first 11 books were published before his return to Bilbilis, the 12th was sent from Bilbilis to Rome; while the 13th and 14th, named the *Xenia* and *Apophoreta*, and are descriptive of Roman festive gifts, were written chiefly under Domitian. The Gr. word *epigramma* meant originally an inscription, and came to be applied to any brief poem; since M. it has been restricted to a poem of a few lines, pithily expressing contrasted thoughts or incidents, and closing with brilliant emphasis. The *Epigrammata* display literary qualities of the highest order, and also form a treasury of illustrations of the social life of the earlier empire. The works, however, which establish the poetic fame of M. destroy his personal character, being marred by mean flattery of his tyrant patron, and by disgusting impurity of thought and expression. The best modern editions of M. are those of Lemaire (3 vols. Par. 1825), and Schneidewin (2 vols. 1842). M. has been frequently, but never successfully, translated into English.

Mar'tial Law is the law by which the discipline of an army is maintained; the law as administered by military force during insurrection or rebellion; and the law of hostile armies and nations relative to each other. As regards the first, there is no settled code for the United Kingdom; the discipline of the army being regulated by Articles of War (q. v.), promulgated by the crown under the Mutiny Act (q. v.). During insurrection or rebellion, when the ordinary law has not sufficient power to protect life and property, the legislature causes the disturbed district to be occupied by a military force; offenders against the peace are then tried by Court Martial (q. v.), and the law administered according to the practice of military courts. It is usual under such circumstances for Parliament to suspend the Habeas Corpus Act (q. v.). In local tumults, the responsibility of employing soldiers rests on the magistrate who does so. Before resorting to military force, it is necessary to read the Riot Act (q. v.). Regarding the third phase of M. L., the tendency of civilisation is towards leniency to an enemy. It is customary to respect personal liberty and private property, so far as military necessity renders it possible to do so. The lives of the conquered are spared, and prisoners of war reasonably well treated.

Martigues', a town of France, department of Bouches du Rhône, situated partly on some islets in the 'Étang de Berre,' partly on the banks of the channel by which it communicates with the sea, has been called the 'Petite Venise de la Provence.' It consists of three portions, joined by wood and stone bridges, and manufactures caviare, soda, bricks, and chemicals. Iron-founding is also carried on. M. was founded by fishermen in the 16th c. Pop. (1872) 5792.

Martigny (the Roman *Octodurum*) a Swiss town in the canton of Valais on the Drance, a branch of the Rhone, 25

miles S. by E. of Villeneuve, on Lake Geneva, by rail. It is the starting-point of the routes over the Simplon to Lago Maggiore, over the Great St. Bernard to Aosta, and over the Tête-Noire and Col de Balme to Chamouny. Pop. (1870) 1403.

Mar'tin. See SWALLOW.

Mar'tin, the name of five popes. **M. I.** (649–53), for his opposition to the Monothelites was seized by the Emperor Heraclius, imprisoned, maltreated, and banished to Kherson, where he died in 655. He was afterwards canonised.—**M. II.** or **Marinus I.** (882–84), and **M. III.**, or **Marinus II.**(942–46), are often not counted among the popes.—**M. IV.** (1281–85) supported the cause of Charles of Anjou, and used the censures of the Church so rashly on his behalf that even Catholic writers consider him to have permanently weakened the temporal authority of the Holy See.—**M. V.** (1417–31), of the Colonna family, was chosen Pope by the Council of Constance, after the abdication of Gregory XII. and the deposition of Benedict XIII. By shrewd policy he destroyed the fruits of the latter's ecclesiastical reforms. With Germany, France, and England, he made separate concordats. He died in 1431.

Martin, John, an English painter, born at Haydon Bridge, near Hexham, 19th July 1789, went to London in 1806 to study art, and exhibited his first picture—'Sadok in Search of the Waters of Oblivion'—in 1812. He quarrelled with the Academy because of a fancied slight, and refused to be a candidate for any diploma. 'Belshazzar's Feast' (1821) was perhaps his most effective work; 'The Fall of Babylon' (1819); 'The Creation' (1824); 'Pandemonium' (1841); 'The Last Man' (1850) also drew special attention. His popularity was at one time extraordinary; Bulwer in an evil moment declared him more original than Raffaele or Michael-Angelo. In all his pictures he repeated the same effects, aiming at the sublime, and reaching only the sensational. He died at Douglas, Isle of Man, February 9, 1854. See M.'s autobiographical notes in *Athenæum* for 1854.

Martin, St., one of the Lesser Antilles, 6 miles S. of Anguilla, belonging partly to the Netherlands, partly to France. Area, 30 sq. miles; total pop. 6270. Its products are sugar, salt (300,000 vats yearly), cotton, tobacco, maize, bananas, &c. The slaves in the Dutch part were liberated in 1863.

Martin, St., was born at Staïn, in Pannonia (Hungary), in 316, and educated at Pavia. A soldier at Amiens when eighteen, he was converted to Christianity, ordained deacon by Hilary of Poitiers, and became in 374 bishop of Tours. He founded the monasteries of Liquqé and Marmontiers, at the latter of which he lived the life of an anchorite. He died at Candes, Touraine, in 396. M. was the first saint-confessor to whom the Roman Catholic Church offered prayers. His festival is the 11th of November. His life, written in Latin by his disciple, Severus, is a legend rather than a history.

Martin, Theodore, C.B., LL.D., was born in Edinburgh in 1816, and educated there at the High School and University. He settled in London as a solicitor in 1846. M. was joint-author with Professor Aytoun of the famous *Bon Gaultier Ballads* (1854). He has translated *The Poems and Ballads of Goethe* (1858), several Danish dramas by H. Hartz and Oehlenschläger (1854–57), *The Odes of Horace* (1860), *Poems of Catullus* (1861), Dante's *Vita Nuova* (1862), Goethe's *Faust* (1865), &c. In 1851 he married Miss Helen Faucit, and in his adaptation of Hartz's drama, *King René's Daughter*, the great actress achieved one of her grandest triumphs. M. wrote the *Life of Professor Aytoun* (1867), and the *Life of the Prince Consort* (vol. i. 1874, vol. ii. 1876, bringing the Life down to 1854) from materials supplied by Her Majesty. He was created C.B. in 1875, and in the same year received the degree of LL.D. from the University of Edinburgh.

Marti'na Fran'ca, a well-built town of S. Italy, province of Lecce, on a hill 17 miles N. by E. of Taranto, with fine public buildings, and the ducal palace of the Caraccioli, resembling the Pamfili of the Piazza Navona at Rome. Pop. (1874) 18,102.

Mar'tineau, Harriet, was born in Norwich, 12th June 1802, of a Huguenot family settled there in 1688. Her father was a manufacturer. She was a weakly, nervous child, extremely deaf, but family distress forced her to earn her bread. She wrote first, as Talfourd did, some devotional pieces in the *Monthly Repository*, then the theological organ of the English Unitarians. Her *Traditions of Palestine* first brought her into notice, and this was followed up by the *Illustrations of Political Economy*, patronised by Lord Brougham, which exhibited the 'great natural laws of society by a series of selected pictures of social action.' The book reached a circulation of 10,000, and made her the lioness of two London seasons; but its stilted phrases and forced characters are now almost forgotten. She had no dramatic or poetic power. Her novels of *Deerbrook* and the *Hour and the Man* (based on the life of Toussaint L'Ouverture) appeared in 1839. These, with the *Playfellow*, a storybook written in illness for children, *The Forest Game-Law Tales*, and a few tales in *Household Words*, are her contributions to fiction. *The Feats of the Fiord* is unmistakably her best; in others there may be wholesome, caustic, and moral observation, but there is no literary construction. *Society in America* and *Retrospect of Western Travel* gave the results of two years of travel, and formed an influential statement of the Abolition question in all its political issues. A serious illness, from which she was restored by mesmerism, caused her in 1845 to withdraw to a house near Ambleside, which she occupied till her death, 27th June 1876. For the last twenty years she was bedridden through deterioration and enlargement of the heart. Her largest and probably most useful book is *History of the Thirty Years' Peace* (1815–45). A journey to the East with an eminent Unitarian, Mr. Yates, of Liverpool, produced *Eastern Life—Past and Present*, which describes four great religions, and shows her belief in none. *The Laws of Man's Nature and Development* was written more by Atkinson than by M., but embodies the views of both on the question of immortality and other important subjects. The book is materialistic, but not atheistic. M. also translated and condensed Comte's *Positive Philosophy*. She would herself have been a Positivist if she had possessed any philosophical faculty. But, as she said herself, her only power was earnestness and intellectual clearness within a certain range. She contributed largely to the *Daily News*, in particular biographical notices of public men. Her autobiography, written with extraordinary candour, was published in Boston and London in 1877, with additional passages by her friend Mrs. Chapman.—**James M.**, brother of Harriet, was born in Norwich in 1807, and was educated for the Unitarian ministry. He was successively pastor of congregations at Dublin, Liverpool, and London, was also for many years Professor of Philosophy, and is still Principal of Manchester New College, the theological training school for the Unitarian Church. M. is the most eloquent of Unitarian preachers. He was the editor of the brilliant but unfortunate *National Review*. M.'s writings fall into three classes: (1) the devotional, such as the *Endeavours after the Christian Life*, and the *Hymns for the Christian Church and Home*, with its valuable prefaces; (2) theologico-critical, as the *Rationale of Religious Inquiry*, *Studies in Christianity*, &c.; (3) philsophical, such as the Essays recently reprinted from the *National Review*. M. is a devout man, with strong imagination and sympathies in the highest walks of the human spirit; he is also a learned and subtle critic of the evidences of Christianity, from which he rejects the miraculous element; he is, finally, the most forcible and authoritative living exponent in Britain of the Intuitional Philosophy, especially in its relation to the problems of spiritual religion. M.'s acquaintance with mathematical and physical science enables him to meet on equal ground the ambitious negations of many professors of physical knowledge. His literary genius is probably unique; combining the ethical glow of his Huguenot ancestors with a delicate fancy, worthy sometimes of Tennyson, and a power of analysis which has found out every weak point in the Association Psychology, and has not spared the efforts made to defend revelation on the principles of agnosticism. M. is greatly beloved in Unitarian circles, and has largely affected religious thought beyond them. M.'s son, **Russel M.**, is a rising Orientalist.

Martinique', one of the Lesser Antilles, is, next to Guadaloupe, the most important French possession in the W. Indies. Area, 375 sq. miles; pop. (1873) 153,334. The coast-line is deeply indented, and inland the surface slopes gradually upwards, culminating in six extinct volcanoes, the loftiest of which, Montagne Pelée, attains an elevation of 4428 feet. Watered by some seventy-five streams, the soil is of great fertility, one-third of the area being under cultivation (sugar-cane, coffee, cocoa,

cotton, &c.); one-half savannah and forest. The climate, though tropical, is tempered by regular sea-breezes, but earthquakes and hurricanes are frequent. In 1874 the value of imports was £860,000; of exports, £524,000. Between the capital Fort de France (pop. 13,000) and St. Pierre (q. v.) a railroad was (1876) in course of construction. M., discovered by the Spaniards (1493), was colonised by the French (1635), fell several times into the hands of the English, and was finally ceded to France (1814).

Martinmas, 11th November, a Scotch money term. See LAMMAS.

Mar'tius, Karl Friedrich Philipp von, a celebrated German botanist and traveller, was born at Erlangen, April 17, 1794. In 1817 he proceeded to Brazil as a member of the scientific expedition sent out by Austria and Bavaria. He returned in 1820, and subsequently became professor of botany at Munich. He died December 13, 1868. M.'s principal works are *Reise nach Brasilien* (3 vols. 1823–31), *Genera et Species Plantarum* (3 vols. 1824–36), *Nova Genera et Species Plantarum* (3 vols. 1824–32), *Historia Naturalis Palmarum* (3 vols. 1823–45), *Flora Brasiliensis* (1840–71), *Beiträge zur Ethnographie und Sprachenkunde* (2 vols. 1863–66). A biography of M. was published by Schramm (2 vols. 1869).

Mart'let, in Heraldry, is a long-winged bird resembling a swallow, with a very short beak and no legs. It is given as a mark of cadency to the fourth son.

Mar'tos, a town of Spain, province of Jaen, 12½ miles W.S.W. of the city of Jaen, is celebrated for its cold springs. Pop. about 11,000.

Mar'tyn, Henry, the martyr missionary of the East, was the son of a miner, and was born near Truro in Cornwall, in 1781. Educated in classical studies at the Truro Grammar School, he went up to St. John's College, Cambridge, in 1797. There he read mathematics, and graduated as Senior Wrangler in 1801. There also he came under the influence of the Rev. Charles Simeon, whose curate he presently became. In 1805 he went out to India as a military chaplain; in 1811 he betook himself to Persia, and died 16th October 1812, at Tokat in Asia Minor, while travelling alone back to Europe. His career is rendered yet more interesting from the feeble health with which he had always to contend, and by the melancholy story of his persistent and unrequited love. He lived long enough to translate the New Testament into Hindostani and Persian, and to leave behind a heroic example of self-sacrifice. See memoirs of H. M. by Sargent, Wilberforce, and Sir J. Kaye.

Mar'tyr (Gr. 'witness') is the name given to those who suffered death in the early ages in the cause of Christianity, and thereby witnessed for their religion according to the saying that the blood of the martyrs was the seed of the Church. Great honour was paid to them in the Church upon earth, and it was believed that the highest rewards were bestowed upon them in heaven, being exempted from the probation of Purgatory (q. v.), and admitted immediately to heaven. Churches or shrines were built at the scene of their sufferings, in which were deposited their relics, which were believed to work many miracles. When heathen persecution ceased, and Christians, divided into rival sects, persecuted and put to death each other, the name M. assumed a new or slightly different meaning. For orthodox writers denied that a heretic or schismatic could be a M., since 'the cause for which he suffered, and not the mere penalty of death, constituted the only claim to the title.' But those have always been considered martyrs by their own sect who have suffered death for their religious opinions.

Martyrol'ogy was a book containing the acts and sufferings of martyrs, which were read during divine service on the anniversary days of their martyrdom, each diocese at first having a M. of its own. The earliest general M. in the Western Church is attributed to Eusebius, which is only extant, however, as rewritten by Jerome. A number were compiled during the middle ages, by various ecclesiastics, but the great one, which has remained the standard Roman M., was compiled (875) at the command of Charles the Bald by Usuard, a French monk, from the previous works of Florus (830), Bede (730), and Jerome. In the Eastern Church the foundation of all the later works was the Menologian ('month-calendar'), compiled by order of the Emperor Basil (886). An English M., called the Golden Legend, was much in use before the Reformation.

Mar'vell, Andrew, politician and poet, was born, 15th November 1620, at the rectory of Winestead in Holderness, went to Cambridge (1636) with an exhibition from Hull, graduated (1638), and was admitted a scholar of Trinity College, lost his father (1641), travelled for four years in Holland, France, Spain, and Italy. On his return, he became tutor in Lord Fairfax's family till 1653, then to Cromwell's nephew, after which he was appointed (1657) assistant Latin secretary with Milton. In 1658 he sat in Richard Cromwell's Parliament, was returned (1660) to the Short Parliament, and in the following year to the Pensionary Parliament, which outlasted his life. He died 12th August 1678. Five editions of his poems have appeared since his own time, and they take rank among the most witty and melodious of the second-rate productions of his period. His political satires are coarse but effective, and many of his lesser poems are permeated with what Charles Lamb has called 'a witty delicacy.' Occasionally he rises from banter and gaiety to a tone of earnestness and feeling. An edition of M.'s writings, with a memoir by Thompson, was issued at London in 1776.

Marvel of Peru. See JALAP.

Marx, Karl, born 1818 at Köln, studied law and philosophy at Berlin. From 1841 till its suppression he edited the *Rheinische Zeitung* at Köln, but went to Paris in 1844, where he joined the republican and socialist leaders; with Ruge, H. Heine, and Börnstein publishing *Deutsch-französische Jahrbücher*, and a newspaper, *Vorwärts*, but was forced to flee to Brussels, where he put himself at the head of the 'central committee' of the Socialists in 1848. The same year he returned to Köln, where he started the *Neue Rheinische Zeitung*, but removed to London in 1849, where in 1864 he established the 'International' (q. v.), of which he has since been the most prominent leader. In 1872 a disruption of the Society took place, and M., who headed the extreme section, withdrew to New York, where he still (1878) presides and plots. His chief work is *Das Capital, Kritik der politischen Oekonomie* (1867).

Mary, The Virgin, as the mother of Jesus Christ, has always been held in the greatest veneration by Christians, and there have been various controversies regarding her, arising from and turning upon points connected with the nature of Christ. The personal history of M., as given in the New Testament, begins with the announcement of her betrothal to Joseph (Luke i.). According to traditions preserved in the apocryphal writings of the Gospels of St. James and St. Matthew, the Infancy of Mary and Jesus, and the Nativity of Mary, she was the only child of Joachim and Anna, of the family of David, which indeed seems to be implied in Luke i. 32. Born at Nazareth after her parents had been twenty years without children, M. was brought up in the temple from her third year till she was of the marriageable age of fourteen, when the high priest chose Joseph to be her husband by a sign supernaturally given. While Joseph went to Bethlehem to set his house in order for the marriage, M. returned to her parents at Nazareth, and there, as recorded in the New Testament, she was visited by the angel Gabriel, who announced to her that she would conceive a son by the power of the Holy Ghost. There is little of importance either recorded in the New Testament or preserved by tradition as having taken place in the life of M. after the birth of her divine son. During his public ministry she is mentioned three times; once in connection with the miracle at Cana (John ii.), when she desired on one occasion to speak with him (Matt. xii. 47), and as being at the last consigned by her son to the care of John (John xix. 25–27). Scripture has nothing more to tell of her except that she remained at Jerusalem till the Pentecost (Acts i. 14). According to one tradition she lived and died at Jerusalem under the care of John; according to another she died at Ephesus, whither she and John had been driven by the siege of Jerusalem. A tradition of the 7th c. asserts that all the apostles were miraculously brought together to Jerusalem to witness her death—all except Thomas; that on his arrival, three days after, her grave was opened that he might see the corpse, but that nothing was found in the grave but her grave-clothes. See ASSUMPTION OF THE VIRGIN MARY.

Mary I., Queen of England, daughter of Henry VIII. by his first wife, Catherine of Aragon, was born at Greenwich, 18th February 1516, received the title Princess of Wales (1518), was promised in marriage to the eldest son of François I. the same year, to the Emperor Karl V. (1522), and then to the King of France himself. After Henry's divorce from Catherine was pronounced, M. was sent away from court, but upon the death of Anne Boleyn she made an effort, through Cromwell, to be restored to the favour of the King, and (in 1538–39) he was so far gracious as to attempt to get her married to the Prince of Portugal or the son of the Duke of Kleve. By an Act in 1544 she was declared to have the right of succession in the event of Edward having no issue. With the death of her father M. again returned to the practice of Catholicism, which she had temporarily seemed to abandon, and as King Edward's health was waning, it was determined by working upon his religious prejudices to turn aside the succession into a Protestant channel. This was accordingly arranged by the Duke of Northumberland in favour of Jane Grey, who was directly descended from a sister of Henry VIII. But the people would not endure the usurpation, and on the 1st October 1553 M. was crowned queen. At once the Protestantism of the previous reign was abolished. Married priests were expelled from their charges. The Prayer-book was burned, the mass was revived. Latimer and Cranmer were imprisoned. Even Elizabeth was sent to the Tower. A revolt of Sir Thomas Wyatt was promptly suppressed, and M., having obtained the reluctant consent of Parliament, married Philip of Spain, 25th July 1554. A submission was made to Rome, and both Houses of Parliament by formal vote returned to the obedience of the Papal see. The martyrdom of Taylor, Rogers, Latimer, Ridley, and Cranmer completed the work of reaction. Within three years 300 Protestants perished at the stake. When M.'s husband found there was no chance of issue he left her, and troubles accumulated about her until, overcome by disease and mental bitterness, she died 17th November 1558, amidst universal rejoicing. M. was both courageous and virtuous, but bigoted and relentless to the last degree. See Froude's *History of England* (vols. iv. and v.); Green's *Short History of the English People* (Lond. 1875).

Ma'ryborough, the name of two towns in Australia. 1. A town in Queensland, in 24° 40′ S. lat., 152° 54′ E. long., 180 miles N. of Brisbane. It is situated on the navigable river Mary, 60 miles from its mouth, and is the port of a large and important district. The exports consist of wool, gold, copper, timber, and sugar. Pop. (1875) 5000.— 2. A town in Victoria, in 37° 5′ S. lat., 143° 45′ E. long., 112 miles N.W. of Melbourne, with which it is connected by railway. It is the centre of a rich gold field, which yielded 104,664 oz. of gold in 1876. Pop. (1875) of the municipality, 3200; of the district, 12,684.

Mary Hall, St., Oxford, originally the parsonage of St. Mary's Church, was converted by Oriel College into a place of education (1333), and subsequently became an independent hall. It possesses four Dyke scholarships of £75 per annum, tenable for four years, and one Nowell exhibition; and in 1876 had 51 members of Convocation, 46 undergraduates, and 107 members on the books.

Ma'ryland, a state of the American Union, is bounded N. by Pennsylvania, E. by Delaware and the Atlantic, S.W. by Virginia, and W. by West Virginia. Area, 11,124 sq. miles; pop. (1870) 780,894. It is of extremely irregular shape, being 198 miles long by from 3 to 120 wide, and is divided by Chesapeake Bay (q. v.) into two parts, the eastern of which is mostly level, while the western contains several offshoots of the Alleghanies, nowhere, however, exceeding 2500 feet in height. The only important river is the Potomac (q. v.). According to the State (1871) Agricultural Report, 4,512,579 acres were in farms, of which 1,598,572 were waste. In the E. the soil is a light sandy loam, but in the central and northern valleys it is of great fertility, yielding vast crops of tobacco, wheat, and Indian corn; while the mountain slopes are covered with forests of oak, maple, pine, cypress, &c. In 1873 the total value of the crops was $22,382,300; the amount of wheat was 5,262,000 bushels; of rye, 309,000; of Indian corn, 10,451,000; of oats, 2,798,000; of barley, 10,600; of buckwheat, 60,000; of Irish potatoes, 1,336,000; of hay, 169,400 tons; and of tobacco, 19,300,000 tons. In the same year M. had 104,500 horses, 10,700 mules and asses, 222,500 cattle, 133,200 sheep, and 256,200 swine. The value of imports (1874) was $29,302,311; of domestic exports $27,514,721; and in January 1875 there were 1825 miles of railway in the state. Annapolis is the capital, but Baltimore is the commercial metropolis of M., and other towns are Frederick, Cumberland, and Hagerstown. M. was first settled by a Virginian adventurer, William Clayborne (1631), and was chartered (1632) through Queen Henrietta Maria, after whom the colony received its name, to Cecilius Calvert, Lord Baltimore, when it became an asylum for the English Catholics, though granting full religious toleration. It played an important part in the Revolution, its new constitution (revised in 1851) dating from 14th August 1776, and in the Civil War, as a slaveholding state, espoused the cause of the Confederates.

Ma'ryport, a seaport of England, in the county of Cumberland, 29 miles S.W. of Carlisle by rail, stands at the entrance of the Ellen into the Solway Firth. Dating only from 1750, it has grown to be the chief coal port of the county, and carries on a busy import trade with the Baltic in flax and hemp. In 1875 there entered 494 vessels, of 53,200 tons, and cleared 1538, of 164,568 tons. M. has a floating dock of 4 acres, a pier 300 feet long, an observatory (1838) 140 feet high, an athenæum (1857), and iron-foundries, tanneries, steam saw-mills, &c. Its herring fisheries are highly productive, and in the neighbourhood are rich coal-mines and quarries of limestone and red freestone. Pop. (1871) 6938.

Mary Stewart (Fr. **Stuart**), Queen of Scots, daughter of James V. and Marie de Lorraine, was born at Linlithgow, 5th December 1542, became Queen of Scotland when a week old, was demanded by Henry VIII. as wife to his son Edward, and, after being removed from Stirling Castle to Inchmahome, was sent to France, 13th August 1548. According to the account of Brantôme, she was taught music, dancing, Italian, Latin, and the art of versifying, at a convent where the children of the aristocracy were educated. Her proficiency in Latin is shown in the fact that in her thirteenth year she is said to have declaimed in that language before the French court upon the desirability of women studying letters and the liberal arts. On the 24th of April 1558, M. married the Dauphin of France, who received the title of King of Scots, while she was created *Reine-Dauphine*. It happened, too, at the same time that 'the title of Queen of England was taken by the court of France for Queen Mary in a quiet, offhand way.' On the 10th July 1559 M. became Queen of France through the elevation of the Dauphin to the throne; on the 5th of December 1560 she was a widow. Owing to the predominance of Catherine de Medicis, the French court became very uncomfortable for her, and, being refused a safe-conduct by Queen Elizabeth through her dominions, M. set sail for Scotland, 15th August 1561, not without profound regret at leaving 'fair France.' Arrived at Edinburgh, she found herself called to a kingdom where the established religion was Protestant, and where the character of her subjects was unknown to her. In vain she tried to talk over Knox (q. v.), and to turn the course of the Reformation. All the compromise she could get was the non-molestation of her French followers in the private exercise of their religion. Yet through her illustrious origin, her personal charms, and her regal pageants, paid out of her dowry as Queen-Dowager of France, M. steadily advanced in popularity. It became necessary for her to marry again, and about a dozen foreign potentates or Scotch earls were proposed for her acceptance. Having lost her heart to Henry Stewart, Lord Darnley (q. v.), a descendant of Henry VII. of England through the marriage of Earl Lennox with a granddaughter, M. wedded him at Holyrood, July 29, 1565. It was preceded by a Papal dispensation, on account of affinity in blood, and the ceremony was performed according to the office of the Romish Church. This marriage was the cardinal mistake of M.'s life. Darnley's demands for kingly honours became exorbitant, and in 1566 he made overtures to the heads of the Protestant party, according to which it was arranged that they should murder Rizzio, the Queen's Italian secretary, on the condition that they should not be incriminated, and that the crown should be fixed upon him and his house. In March of the same year Rizzio was stabbed to death in M.'s ante-room at Holyrood. Indignant at first to the extent of repudiating Darnley as a husband, M. afterwards resolved on having him back, along with such of the other enemies surrounding her as she could win over. Darnley forsook the confederate lords and escaped with her to

Dunbar, and on his return to Edinburgh declared his innocence of the crime before the Privy Council. At the same time M.'s antipathy towards him increased in intensity, though it was suspended for a short time when a son was born to her, 19th June 1566, but only to break out by the end of the year in greater force. Darnley grew alarmed after she welcomed back those lords who in the affray by which Rizzio was killed had not taken an active part. 'He resolved to go to France in a sort of desperation, as the French ambassador called it—in short, to escape.' But he was struck down with smallpox at Glasgow in January 1567, visited by M., advised to retire to Craigmillar, actually removed to a place close to the city wall of Edinburgh, called the Kirk of Field, where, after the Queen had been at his bedside (February 9th) before attending a ball at Holyrood, he was strangled in making his escape from an explosion which reduced the house to ruins. The Earl of Bothwell, to whom on the best grounds the murder was imputed, immediately took upon him the functions of Governor of Scotland. On the 12th of April he was summoned to a trial, but as there was no evidence to supplement the indictment put before the jurors, they had no alternative but to acquit him. Between the 24th of April and 15th of May he intercepted M. on her return from Stirling, fled with her, she gladly consenting, to Dunbar, received a public pardon for the transaction, and, after having divorced his own wife, married her. 'The beginning of this wedded life,' says Mr. Burton, 'resembled that of any innocent young couple affluent in the sources of magnificence and luxury.' 'It may,' he continues, 'be accounted one of the most remarkable phenomena of the whole situation that one of the subtlest and acutest women ever born should, in her fool's paradise, have been totally unconscious of the volcano she was treading on.' On the 15th June, at Carberry, M. was compelled to part with Bothwell, and to return to Edinburgh with the confederate lords, and from thence she was despatched to Loch Leven, where (July 23d) she signed a renunciation of her crown in favour of her son. On the 2d May 1568 she escaped, and the Hamiltons rose in her support, but were defeated at Langsyde. She then fled to England and took refuge at Carlisle, after which she was conveyed from prison to prison during the remainder of her days. 'Let me go,' she wrote to Elizabeth from Fotheringay in 1586, 'let me retire from this island to some solitude where I may prepare my soul to die. Grant this and I will sign away every right which either I or mine can claim.' But the only release came to her through the block, February 8, 1587. 'Do not weep,' she begged her attendants, 'I have given my word for you. Tell my friends,' she charged Melville, 'that I die a good Catholic.' 'Her beauty,' writes Mr. Green, 'her exquisite grace of manner, her generosity of temper and warmth of affection, her frankness of speech, her sensibility, her gaiety, her womanly tears, her manlike courage, the play and freedom of her nature, the flashes of poetry that broke from her at every intense moment of her life, flung a spell over friend or foe which has only deepened with the lapse of years.' An immense body of controversial literature has grown round the life of M. See Mignet's *Histoire de Marie Stuart* (1854; 3d ed. 1865); Miss Strickland's *Lives of the Queens of Scotland* (1850–57); Teulet's *Lettres de Marie Stuart* (Par. 1859); J. H. Burton's *History of Scotland* (vols. iii. iv. v.); Robertson's *Catalogues of the Jewels, Dresses, Furniture, Books, and Paintings of M., Queen of Scots* (Edinb. 1863); Hosack's *M. Queen of Scots and Her Accusers* (1869); Green's *Short History of the English People* (1875); Froude's *History of England* (1856–70).

Ma'rysville, a town of California, U.S., at the junction of the Yuba and Feather rivers, 52 miles N. of Sacramento by rail, has eight churches, four banks, two newspapers, and flour-mills, foundries, and machine-works. Pop. (1870) 4738.

Masaniell'o, properly **Tommaso Aniello**, born at Amalfi in 1622, went at the age of twenty-four as a fisherman to Naples, which was then groaning under the dominion of Spain, and governed by a viceroy. Murmurs at the outrageous taxation became general; and M., roused by the imprisonment of his wife for smuggling meal, stirred the people to revolt. Fruit was taxed with particular severity; he therefore gained the fruit merchants, and out of these and the lazzaroni formed a rough militia. The insurrection began on the 7th of July 1647; the tax-collector's offices were burnt, the houses of the nobles reduced to heaps, the prisons thrown open, and M. demanded of the viceroy the charter of Karl V. The nobles hired 200 brigands to assassinate him, but these were all killed. Styling himself 'Capo del Popolo,' and discarding fisher's garb for gaudy robes, M. marched in procession to the church of the Madonna del Carmine, and there arranged terms of peace on the basis of the Karl V. charter. Instead of then relinquishing his position, however, he clung to power, became arrogant, and probably insane; at last incurring the hatred of his own party, by some of whom he was assassinated on the 16th July, after a dictatorship of a week. See *History of M.*, by Midon (Lond. 1729); *Historia de la Sublevacion de Napoles*, by Rivas (Mad. 1848).

Masay'a, a town of Central America, in Nicaragua, near a lake and volcano of the same name, 245 miles S.E. of the town of San Salvador. Palm-hats and wooden wares are manufactured. The surrounding district is fertile and well-tilled. Pop. 15,000 (mostly Indians).

Mas'cara, an old town of Algeria, on the N. slope of the Atlas Mountains, 50 miles S.E. of Oran. It has considerable trade, and some industry in making burnus. Formerly a residence of Turkish beys, it was nearly destroyed by Marshal Clauzel, 6th December 1835. Pop. (1872) 9240.

Mas'carene Islands, the collective name given to the islands of Reunion, Mauritius, and Rodriguez, in the Indian Ocean, the two first having been discovered by the Portuguese navigator Mascarenhas, in the 16th c.

Mas'cle (Old Fr. *mascle*, from Lat. *macula*, 'mesh of a net'), in heraldry, a Lozenge (q. v.) so perforated as to leave only a narrow border. It is thought that in early times the M. was identical with the lozenge.

Mask, a term in fortification of various meanings. An army or fortress is *masked* when held in check by the enemy, or when the line of fire is barred by friendly troops. A *masked* battery is one concealed by grassy glacis or otherwise from the enemy.

Mask'elyne, Nevil, D.D., F.R.S., a celebrated astronomer and physicist, was born in London, October 6, 1732. He graduated M.A. at Cambridge in 1757, and in 1761 was appointed by the Royal Society to go to St. Helena to observe the Transit of Venus. In 1763 he took a voyage to Barbadoes to test Harrison's newly-invented chronometer; and on his return in 1765 was appointed Astronomer Royal. In 1767 he began the publication of the *Nautical Almanac*, a now indispensable companion of the navigator. In 1772 he undertook his famous experiments on Schiehallion to ascertain the density of the earth; and in 1774 published the first volume of his *Astronomical Observations*, which have been of such immense service to subsequent astronomers. He died February 9, 1811.

Masks (Fr. *masques*, from the Ital. *maschera;* Med. Lat. *mascæ;* the origin of the word is uncertain) are of extreme antiquity. Made of papyrus, to represent the heads of hawks, lions, and other animals, they were worn on certain solemn occasions by the kings and priests of the Egyptians. Another of their early uses, to cover the faces of the dead, is exemplified in the M. of finely-hammered gold discovered by Dr. Schliemann at Mycenæ (1876). Dramatic M. (Gr. *prosōpa;* Lat. *larvæ* or *personæ*), originating probably in the practice at the Dionysia of smearing the face with wine-lees, were made at first of bark, later of leather, wood, or ivory, and covered the whole head, like the M. in a modern pantomime. Roscius Gallus first introduced the use of M. upon the Roman stage (*circa* 100 B.C.), but they had been used long before in the *Fabulæ Atellanæ*, as they were long afterwards in their descendant, the *commedia dell' arte*, of medieval Italy. The modern mask, worn simply to disguise the face, originated at Venice, and was introduced into France during the reign of Charles VI. See Ficorini, *Le Maschere Sceniche . . . degli antichi Romani* (Rome, 1736).

Masks, in architecture, are pieces of grotesque sculpture used to fill up vacant spaces in prominent positions, as keystones, door-panels, friezes, &c.

Ma'son, William, an English poet, born at Hull in 1725, entered St. John's College, Cambridge (1742), graduated B.A. (1745), was elected a fellow of Pembroke (1747), and published *Iris*, a satire on Oxford Jacobitism (1748), which was followed

by four bombastic *Odes* (1756), and by two tragedies, *Elfrida* (1753) and *Caractacus* (1759), both acted and condemned at Drury Lane. Having taken orders, M. received a royal chaplaincy, with the living of Aston in Yorkshire (1754), and a canonry and precentorship in the cathedral of York (1762), where he died, April 7, 1797. Besides other poems—among them *The English Garden* (1772–82)—M. published works on painting and church music, but he is best remembered as the compiler of the *Memoir and Letters* of his friend the poet Gray (1775), the basis, it may be said, of all succeeding biographies.

Mason and Dixon's Line, the S. boundary of Pennsylvania, separating it from Delaware, Maryland, and Virginia, was surveyed by Charles Mason and Jeremiah Dixon, two English mathematicians, 1763–67, in consequence of the disputes of the great proprietors, the Penns and the Lords Baltimore. The line, 280 miles long, marked by a series of milestones, was revised in 1849. During the anti-slavery agitation the line was widely regarded as the boundary between the free and slave territory, instead of the parallel of 36° 30′ fixed by the 'Missouri Compromise' in 1820.

Mason Bee, Mason Wasp, names applied to certain *Hymenopterous* insects from their habit of forming dwelling-places in wood and in other materials. *Osmia paretina* is a common species of M. B., which builds cells of earth, or excavates its nests in the stems of plants. *Osmia leucomelana* builds its cells of mud, and forms each cell separately. The M. W. (*Odynerus murarius*) is a solitary species of wasp, which bores holes in sand or plaster, and thus forms a nest.

Ma'soned, as a heraldic epithet, is applied to representations of buildings when the cross-lines of the brick or stone work are displayed.

Maso'rah, or Masso'rah (Heb. 'tradition,' according to the usual derivation, from *masar*, to hand down; but also 'bond' or 'bridle,' from *asar*, to bind), is a collection of grammatical, critical, and explanatory notes on the Hebrew Bible, written in Chaldee, chiefly on the margin of Hebrew MSS. As to the time when they were written, certain Jewish writers maintain that some of them are as old as the time of Moses, others think they were begun in the time of Ezra, and others again that they were produced in the school of Tiberias, between the 3d c. and 6th c. after Christ. Most probably they were not the production of any one age, but were written at long intervals, and some of them in comparatively modern times. The notes are occasionally trivial enough, as, *e.g.*, the number of letters and verses in each book, which is the middle letter, how many verses begin or end with a particular word, how many verses contain exactly a certain number of letters, &c., but always imply the expenditure of labour and pains; and the vowel-points, which fixed the meaning to be attached to the consonants, the accents, and most of the corrections of the text, are also the fruit of the labours of the Masorites. On this account, as well as because a regard to the M. has greatly contributed to bring about uniformity in the text, the modern standard text of the Hebrew Bible is called the *Masoretic*. The M. was first published in a collected form in Bomberg's Rabbinical Bible, at Venice, 1518–36.

Masque is a species of drama, originating in the mummings or costume dances, which date in this country from Edward III.'s time, but differing from these because of the masks performers wore. At first mere pageants, the masques in Elizabeth's time—particularly those of Ben Jonson—took the form of irregular dramas, with dialogue, music, decorations, and interspersed with lyrics. They attained their most perfect form in the reign of James I., and declined during that of Charles I. Milton's *Comus* is the most famous M. in English literature, and that introduced in the *Tempest* may serve as a short specimen. See Ward's *English Dramatic Literature*, vol. i. p. 82.

Masquerades', or **Masked Balls**, originated in Italy towards the close of the 15th c., their invention being ascribed to one Granacci, spread thence into France, and were introduced into England by Henry VIII. 'on the daie of the epiphaine' (1513). They were suppressed by 9 Geo. I., but revived, and in 1776 we find Ranelagh maskerade tickets selling at twenty-five guineas apiece, whilst Covent Garden Theatre was destroyed by fire at the close of a *bal masqué*, March 5, 1856. They were not common in Germany or Denmark till the latter half of the 17th c., and, except at the Carnival (q. v.), have now been generally superseded by fancy balls.

Mass, in physics, is the quantity of matter of a body. Its measurement depends upon Newton's second law of motion, which states that the acceleration produced by a given force acting upon a given body is proportional to the M. of the body. The *weight* of a body is the force with which the earth attracts it, and diminishes as the distance from the earth increases. The ratio of the weight to the acceleration is the measure of the M. The numerical value of the M. will of course vary according to the units chosen; but with the same units the M. of a body is absolutely constant. In this country the practical unit of M. is the pound; for scientific purposes, however, the unit of M. universally adopted by civilised nations is the gramme.

Mass, the modern English name of the Roman Catholic sacrament and sacrifice of the Eucharist. The Old Eng. form of the word is *mæsse* (Fr. *messe*, Ger. *messe*), and is a corruption of the Latin *missa*. The Latin word again has been derived by some from the Hebrew *missah*, 'an oblation,' but more generally from the *Ite, missa est* of the Western liturgies, which was the form used in the Latin Church at the dismission of the Catechumens (q. v.) and others who were not permitted to be present at the celebration of the Eucharist, but only at the ante-communion service of psalms, lessons, prayers, sermon, and then of the whole assembly at the conclusion of the Communion-service proper. Hence the services themselves came to get the names *missa catechumenorum* and *missa fidelium* respectively, and the name *missa* was also applied to services at which no Communion was celebrated at all, as morning and evening prayer: indeed it was sometimes used simply for lessons. The idea of a sacrifice began to be associated with the Eucharist at a very early period. First the free gifts of bread and wine brought by members of the community, from which the elements for the Lord's Supper were taken, then the thanksgiving prayer of the officiating minister, and lastly the entire celebration, was called an 'offering' or 'sacrifice.' But this was merely a symbolic thank-offering made by the Christians themselves. Cyprian (about 200–258) was the first to maintain that 'the sacrifice did not consist in the thank-offering of the congregation, but in the sacrifice made by the priest in the stead of Christ.' But this was yet only an imitation, not a repetition of the sacrifice of Christ. By and by the reference to the death of Christ became more prominent, although the rite continued for a time to be regarded as a commemorative representation of the sacrifice he had once offered. But along with the notion of the existence in the Christian Church of a priesthood, there grew up also the notion of a sacrificial worship corresponding to that in the Jewish Church. The tendency in the popular mind was more and more to regard the ordinance in the light of a magical charm, and the idea of a commemorative celebration of the sacrifice of Christ passed insensibly into the idea of a sacrificial act of the priest, with a magical efficacy both for the living and the dead. As expressed by Gregory the Great (6th c.) 'whenever the priest presented this offering, heaven opened at his voice; the choirs of angels appeared; the high and the low, the earthly and the heavenly united, the visible and the invisible became one.' The idea of a sacrifice is distinctly set forth by most of the fathers of this period. Gregory speaks of a 'daily sacrifice of immolation,' although even he apprehended the idea in connection with the whole tendency of the inward life. The sacrificial idea was complete when the doctrine of Transubstantiation (q. v.) was fully developed, for then the real body of Christ was actually present on the altar. And from that time to this the M. has been more than ever the centre of the Roman Catholic ritual. See Neander's *Geschichte d. Christl. Rel. u. Kirche* (Eng. trans. 1858); Gieseler's *Lehrbuch der Kirchengesch.* (Eng. trans. 1855), Hagenbach's *Lehrbuch. der Dogmengesch.* (Eng. trans. 1846).

Mass'a, a town of N. Italy, province of Massa-Carrara, delightfully situated on the Frigido, amid orange, citron, and olive groves, 3 miles from the sea, and 5 S.E. of Carrara by rail. It was formerly the capital of the Duchy of Massa-Carrara, which was united to Modena in 1829. The noble palace was built by the Cybos, who became the feudal lords of

M. in the 15th c. The marble quarries here rival those of Carrara. Pop. (1874) 18,031.

Massachus'etts (Ind. 'the blue hills'), one of the States of New England, and of the original Confederacy of 1776–88, is bounded N. by New Hampshire and Vermont, S. by Rhode Island State and Connecticut, W. by New York, and E. by the Atlantic. Area, 7800 sq. miles; pop. (1870) 1,457,351, of whom 13,947 were coloured. The coast-line is indented with numerous bays, of which the chief are M. Bay, enclosing Boston Harbour, and Cape Cod Bay, three-fourths landlocked by a peninsula, 75 miles long, that terminates in Cape Cod. Along the coast are the islands of Martha's Vineyard and Nantucket, and hundreds of smaller size. M. is for the most part hilly, the greatest heights being Saddle Mountain, or Graylock (3505 feet), and Mount Everett (2624), in the W. range of Taghkanic. The main rivers are the Connecticut, Housatonic, Hoosack (an affluent of the Hudson), and Merrimack, the first and last of which alone are navigable within the State. The prevailing rocks are metamorphic, but the valleys of the Connecticut and Housatonic display red sandstone, and in the S.E. there are beds of coal and anthracite, some having been wrought for many years. Among the minerals worked are gold (recently), iron, slate, limestone, soapstone, asbestos, plumbago, ochres, and fine white marble. The S.E. is covered with sandy flats, but the other parts of the State, originally under dense forests of pine, oak, chestnut, maple, &c., are cleared and cultivated to the extent (1874) of 4,467,066 acres. In 1874 the produce of Indian corn was 1,446,000 bushels, of wheat, 31,000, of rye, 246,000, of oats, 246,000, of barley, 110,000, of buckwheat, 50,000, of potatoes, 2,425,000, of tobacco, 8,200,000 lbs., and of hay, 400,200 tons. The live-stock comprised (1874) 102,800 horses, 122,600 oxen, 136,300 milch cows, 76,300 sheep, 78,000 swine—total value, $24,282,079. M. imports a large quantity of cereals, for the growth of which its climate and soil are not favourable, but exports tobacco, hay, Indian corn, and potatoes. In the actual amount of its manufactures M. is only surpassed among the States by New York and Pennsylvania. In 1870 the capital invested was $231,677,862, and the sales of annual produce $553,912,568. The chief manufactures are cottons, woollens, leather, boots and shoes, paper and machinery. In 1874 there were 1782 miles of railway. Boston is the capital, and other towns are Worcester, Lowell, and Cambridge. The Cabots sailed along the M. coasts in 1497, and the *Mayflower* entered Provincetown Harbour, Cape Cod (November 11, 1620), with the band of Puritans, 102 in number, who subsequently formed Plymouth colony. The colonists suffered greatly at first from the severity of winter and want of provisions, and still more from the attacks of the Indians, especially in 1675–76. The first blood of the Revolutionary War was shed in M., at Lexington and Concord, April 19, and at Bunker's Hill, June 17, 1775.

Massaf'ra, a town of S. Italy, province of Lecce, on the slope of a ravine 11½ miles N.W. of Taranto by rail. The district produces 6½ million lbs. of oil annually, and is favourable to the cultivation of cotton. Pop. (1874) 9719.

Massa'getæ, a savage and warlike Turcoman tribe of Central Asia, dwelling in Margiana, N. of the Jaxartes, and between the Sea of the Aral and the Caspian, though some think they extended further towards the S.E. It was in an expedition against the M. that Cyrus the Great met his death. Their country is now occupied by the Kirghiz Tartars.

Masséna, André, Duc de Rivoli, Prince d'Essling, was born at Nice, 6th May 1758, became cabin-boy in a ship commanded by his uncle, entered the Sardinian army, and rose to the rank of sub-lieutenant, but retired (1789) because his humble birth gave him no chance of rising higher. Joining the French Army of the S., M. rose to be general of brigade (1793), had a share in the victory of Saorgio (1794), and (1795) obtained two victories over the Austrians at San Giacomo and Borghetto. M. shared with Napoleon the glories of the Italian campaign (1796–97), and was dubbed by him *l'enfant chéri de la victoire*. In February 1799 he was appointed to the command of the Army of Switzerland, and after being for months upon the defensive, overpowered the Russians (September) at Zürich, and saved France from invasion. Thereupon Napoleon appointed him commander-in-chief of the Italian army. In 1803 he became member of the Corps Legislatif, in 1804 Marshal of the Empire, and in 1807 he fought in Poland, where he was made Duc de Rivoli. On the 6th July 1809, though he had been deprived of an eye while hunting, he commanded the left wing at the battle of Wagram, and had his services rewarded by the title Prince d'Essling. In 1810 he made an unsuccessful effort to force Wellington from his position at Torres Vedras, and in 1811 his failure in Spain was completed by the battle of Fuentès de Oñoro, and he was superseded; nor was he ever partially restored to favour until 1813, when he was appointed commandant of the eighth military division at Marseille. He took the oath of fidelity to the Bourbons (1814), and at the restoration commanded the national guard of Paris. He died at Paris, 4th April 1817. See Thiers' *Histoire du Consulat et de l'Empire*, Koch's *Mémoires of M.* (7 vols. 1849–50), and the *Biography* by Tosselli (1869).

Mass'icot. See LEAD.

Mass'illon, Jean Baptiste, an illustrious French preacher, born at Hières, in Provence, 24th June 1663. Educated for the Church, he was appointed head of the Saint Magloire Seminary in Paris at the age of thirty-three. He rapidly gained fame as a preacher at the Oratoire, and was appointed to preach in Advent of 1699 before Louis XIV. He appeared before court again in 1704, and a third time in 1719, in presence of Louis XV., then aged nine. On this occasion he preached the sermons known as the *Petit-Carême*, fearless exhortations to the young king, written with such eloquence that Voltaire kept them always beside him. In 1717 the Regent appointed him Bishop of Clermont; and he entered the Academy two years later. M. early resolved to avoid display as a preacher; he indulged in little gesture, selected the homeliest texts, and aimed rather at reaching hearts than winning applause. With none of the bombast too often mistaken by French orators for eloquence, he wrote earnestly and in a pure style, at once simply and brilliantly, occasionally with a magic of colour and vehemence of passion overhanging his calmer passages like bursting clouds. He was devoid of vanity, lived unostentatiously, and, having devoted his means to charity, died, like Fenelon, 'without money or debts,' 28th September 1742. The first edition of M.'s works was edited by his nephew, the Abbé M. (15 vols. Par. 1745–48). Of the numerous later editions, the most noteworthy are those of Renouard (13 vols. Par. 1810–11), Beaucé (4 vols. Par. 1817), Mequignon (15 vols. Par. 1818), and Guillon (16 vols. Par. 1828). See D'Alembert's *Eloge*, and Sainte-Beuve's *Causeries du Lundi*, vol. i.

Mass'inger, Philip, was born at Salisbury, 1584. He entered as a commoner at St. Alban's Hall, Oxford, but appeared in London without a degree, and became one of the brilliant set of dramatists of whom Shakespeare was chief. The first record of his work is a notice of the performance of *Woman's Plot*, 1621. Before this he must have written several plays, probably eight, the MS. of which a Mr. Warburton's cook made use of to cover pies. To the same period belong four extant plays, *The Old Law* (comedy), *The Virgin Martyr*, *The Unnatural Combat*, *The Duke of Milan* (tragedies). M. also joined Fletcher, Dekker, and others, in writing for the stage. His other extant works are *The Bondman* (1623); *The Renegade* and *The Parliament of Love* (1624); *The Roman Actor* (1626); *The Great Duke of Florence* (1627); *The Maid of Honour*, *The Picture* (1629); *The Emperor of the East* (1631); *The Fatal Dowry* (1632); *A New Way to Pay Old Debts* (1632); *The City Madam* (1632); *The Guardian* (1633); *A Very Woman* (1634); *The Bashful Lover* (1636); *Believe As You List* (long lost, discovered by the Percy Society). Except from hints dropped in his dedications, little is known of M.'s life. He was poor, but was befriended once and again when in straits, died about the middle of March 1638, and was buried at St. Saviour's Church, Southwark, the books of which bear this record:—'1638, March 18th, Philip Massinger, stranger.' His comedies, *The Great Duke of Florence* excepted, are feeble, but his tragedies vigorously conceived. In spite of blemishes, they exhibit a far loftier moral tone than those of his contemporaries; the characters are firmly drawn, the incidents original, if laboured, but the parts do not hang well together; the action is either forced or tedious, and the plays derive their chief beauty from the sustained dignity and sweetness of the style, and isolated passages full of rich and solemn harmonies. Gifford's

edition of M. (1805, reprinted 1815), is the standard, but his text, with Cunningham's introduction and the recovered play, *Believe As You List*, was published in cheap form by Chatto & Windus (1874).

Mass'on, David, an English scholar and critic, born at Aberdeen, December 2, 1822, educated at Marischal College and Edinburgh University, edited a Scotch provincial newspaper for a short time, and thereafter busied himself with literary work in Edinburgh and London. He was appointed Professor of English Literature in University College, London, in 1852, and in 1865 received the chair of Rhetoric and English Literature in Edinburgh University, an appointment which he still (1878) holds. M. edited *Macmillan's Magazine* for many years, and has contributed to many periodicals. His chief works—all carefully, judiciously, and learnedly written—are *Essays, Biographical and Critical* (1856), reprinted (1874-76) in 3 vols. entitled *Wordsworth, Shelley, and Keats; The Three Devils—Luther's, Milton's, and Goethe's;* and *Chatterton, a Story of the Year* 1770; *Life of Milton, and History of His Time* (3 vols. 1858–71–73, vols. iv. and v. in the press, 1877); *British Novelists* (1859); *Recent British Philosophy* (1865, 3d ed. 1877); *Drummond of Hawthornden* (1873); the Cambridge edition of *Milton*, with notes (3 vols. 1874), and the Globe edition (1 vol. 1877).

Mass'owah, a town belonging to Egypt, on a small coral island of the same name on the Red Sea, 1¼ miles from the mainland, opposite the boundary between Nubia and Abyssinia. It is a dirty, wretchedly built place, but has a good harbour, and a large transit trade in grain, salt, tobacco, sugar, ivory, wax, ostrich-feathers, drugs, spices, pearls, cottons, silks, arms, gunpowder, glass, and iron wares, &c. Pop. 8000, mostly Arabs.

Mast, a long rounded upright spar erected on the keelson of a ship for the attachment of the yards, sails, and rigging. The masts of a ship, barque, or other three-masted vessel are called the *fore*, which is nearest the stem, the *mizzen*, which is the smallest, and placed nearest the stern, and the *main*, between these two. Two-masted vessels have no mizzen M. The spars rising through the deck are called *lower* masts, and above these in order rise the *top masts, top-gallant masts, royal masts*, and sometimes *sky-sail masts*, main, fore, and mizzen respectively. A temporary M. rigged out in an emergency receives the name of *jury* M. Within thirty years iron has been largely substituted for wood in the construction of masts, yards, and rigging, and in steamships of great length the number of masts has been increased to four, while the *Great Eastern* boasts of six.

Master (Lat. *magister*, from *magis*, 'more;' Old Fr. *maistre*), as a general title of courtesy, has become corrupted into Mr. (*mister*), as **Mistress** (Old Fr. *maistresse*) into Mrs. (*missis*); *master* itself being restricted to boys, a singular instance of linguistic conservation of energy. In art, the term 'Old Masters' often designates the names of the best-known medieval, and the works of the least-known modern, painters; while by the 'Little Masters' are understood seven artists and engravers of Nürnberg, all pupils of Dürer in the beginning of the 16th c., whose names were Aldegraver, Altdorfer, Barthel and Hans Sebald Beham, Binck, Brosamer, and Pencz. In music, the Ital. *maestro* is applied to any eminent composer.

Master, in the British navy, was formerly a commissioned officer, whose duties corresponded to those of the present *navigating lieutenant*, a lieutenant, that is, who has passed a special examination in navigation. In the United States navy, a M. belongs to the grade above an ensign and below a lieutenant, and ranks equal to a first lieutenant in the army or marines. In the merchant service the captain of a vessel is termed the M. Under the Mercantile Marine Act the masters of large vessels must hold certificates from the Board of Trade (q. v.), which may be withdrawn in cases of negligence or unskilfulness.

Master and Servant. There are four kinds of servants recognised by the law of England:—1st, operatives or skilled labourers; 2d, domestic servants; 3d, agricultural labourers; 4th, apprentices, whose service is regulated by deed of indenture. If in hiring an agricultural servant no period be specified for the duration of the contract, the law holds it to be for a year; and in that case a quarter's warning must be given on either side prior to the expiration of the term. If a female servant marry, she must nevertheless serve out her term, and her husband cannot take her out of her master's service. A servant may be discharged without notice for immorality; and if taken into custody, the master may discharge him by paying the proportion of wages due to the date. If a servant fall ill during the period of service, his master cannot put him away, nor abate his wages. Liveries remain the property of the master. A master may support his servant in an action at law, and he may maintain an action against any one who entices away his servant. Regarding *character*, see article CHARACTER TO SERVANT. Masters are liable for the acts of their servants done in course of business, by their order, expressed or implied. If a servant commit a legal offence by order of his master, both are guilty. If an innkeeper's servant rob a guest, the master must make restitution. A banker is liable for money paid to his clerk; but if you pay money due to a physician or a clergyman to his servant, and the servant embezzle it, you must pay it again, because it is not the business of the servant of either of these to receive money. A wife or friend in the habit of transacting business for a man are so far his servants that he is answerable for their doings regarding his business. But if you are in the habit of dealing with a tradesman yourself, and of paying him ready money, and your servant buys on credit, you are not responsible; but if you sometimes send your servant to buy on credit, and at other times for ready money, you are answerable for all he buys; for in this case the tradesman cannot be expected to know when the servant has your authority and when he has not. A master is answerable for the fault or negligence of his servant and of his household. Servants are bound to discharge their duty with care, diligence, and fidelity; but they are not answerable for an accident; so that if a servant lose or break an article, the value cannot be deducted from his wage, unless it was stipulated at the hiring that the servant was to be so liable. If, however, habitual carelessness, or gross special carelessness, were proved, the reverse might be the case. Under the Master and Servant (1867) Act, if master or servant refuse to fulfil any contract of service, on the aggrieved party laying a complaint before a justice in England, or before a justice or sheriff in Scotland, the recusant will be summoned to appear and answer to the charge in court, on pain of having a warrant issued for his apprehension. The laws of England and of Scotland as to M. and S. do not materially differ. In both countries, local custom has due weight given to it.

Master-at-Arms, in nautical affairs, an inferior officer at the head of the police of a ship of war, who are called its 'corporals.'

Master of Arts. See DEGREE, UNIVERSITY.

Master of Court is, in England, the title given to a chief officer under a judge. His chief duties are to write minutes of procedure, and to tax bills of costs.

Master of the Buckhounds, one of the ministers of the crown, to whose care is intrusted the management of the royal hunts. His emoluments amount to £1700.

Master of the Ceremonies, an office instituted at all European courts for the direction of matters of state etiquette. It was established in England in 1603. The name is now extended to the director of the arrangements of a public ball.

Master of the Horse (Lat. *Magister Equitum*), among the Romans, was from the earliest times the officer next in authority to a dictator. In England the M. of the H. is a minister of the crown, the third great officer of the royal household, intrusted with the direction of the royal stables, and privileged to ride next to the sovereign on state occasions. His salary is £2500 a year.

Master of the Household, an officer of the royal household, charged with the choice, direction, and payment of the household servants. He holds office at the Queen's pleasure, and receives £1158 a year.

Master of the Rolls. This is the title of the president of the Chancery division of the High Court of Justice. He formerly had the custody of the Rolls or records. This he still has nominally. The M. of the R. ranks next to the Lord Chief Justice of England. See COURT OF JUDICATURE, SUPREME, ACTS.

Mas'terwort is the translation of *Imperatoria*, and is the name given to *I. Ostruthium* of Linnæus, an umbelliferous plant of Mid. Europe, formerly cultivated as a pot-herb and for medicinal purposes. It is found in several northern counties of England and in Scotland, but is a relic of former cultivation rather than a factor of the indigenous flora. It has now passed out of use; in Britain, at any rate, such is the case. The genus *Imperatoria* has been reduced to a section of *Peucedanum*. The name M. is sometimes also applied to *Astrantia*, another genus of *Umbelliferæ*.

Mas'tic, from *masticare*, 'to chew,' has become the name of a tree known botanically as *Pistacea Lentiscus*, from its supplying the gum-resin called M. or mastich, which is chewed largely by the Turks for sweetening the breath and strengthening the gums. It is used by dentists in this country, and is also the basis of a picture-varnish. See PISTACEA.

Mastica'tion, the process of dividing the food by the teeth or jaws preparatory to deglutition or swallowing. In addition to the work of dividing the food into small portions, on which the gastric juice of the stomach may readily act, the function of M. provides that the food shall become duly mixed with the *Saliva* (q. v.) or fluid of the mouth, an action which is absolutely essential for its due digestion. The chief muscles concerned in M. are the *masseters*, and other muscles of the mouth, tongue, and cheeks.

Mas'tiff, a species of Dog (q. v.) of large size, distinguished by its massive head and square muzzle. The lips are heavy and hang loosely over the lower jaw, which protrudes slightly in the well-bred dog. The hair is smooth, the usual colour being a reddish fawn, variegated with black and white. The height varies from 25 to 28 or 30 inches. The M. is a mild-tempered dog, possessing a dogged endurance and determination, and evincing a strong attachment to his master. Occasionally the M. breed is mingled with the bull-dog, the courage and ferocity of the latter being thus tempered by the gentler nature of the M. A variety of M. named the *Cuban M.* has been thus produced. This dog was used by the Spaniards in their conquest of America in hunting the natives. The *Thibet M.* or *Thibet Dog* is apparently related, though distantly, to the true or English M. It is of deep black colour, and very large and strong.

Mas'todon, a genus of fossil elephants, which had lower tusks in addition to the upper tusks seen in existing elephants. These lower tusks, however, did not attain any great development, and seem to have disappeared in adult life. The molar teeth of the M. were more numerous than in other elephants, and had blunt protuberances arranged in pairs on their crowns. The name M. ('nipple-toothed') is derived from this circumstance. The oldest M. remains occur in the Miocene formations of Europe and India, and these animals existed also during the Pliocene epoch. In N. America the remains of one species (*M. Ohioticus*) occur in deposits of the Pleistocene age.

Mas'ulah Boats, a peculiar kind of craft used for the conveyance of passengers through the perpetually raging surf of the Coromandel or E. coast of the Indian peninsula, especially at Madras city. The materials are taken from any grove of mango and cocoanut. Mango planks are saturated with oil, bent into shape over a fire, and seamed and sown together with coir and straw. Such is their elasticity and toughness, that it has been proved by experiment that English-built lifeboats are less capable of resisting the tremendous strain caused by beating over the surf and the sandy beach. They have no keel, but a smooth and rounded bottom. There are 160 M. B. registered at the port of Madras.

Masûlipatâm, the chief town of the district of Kistna, Madras Presidency, British India, on the N. mouth of a small branch of the Kistna river, 215 miles N. of Madras; pop. (1871) 36,188. There is a fort with large barracks and military cantonments, but no soldiers are now stationed here. It was the first English settlement on the Coromandel coast, and was long celebrated for its cotton fabrics, of which the manufacture is not yet extinct. There is no good harbour, but there is a large coasting trade. In 1874-75 the exports were valued at £171,414; the imports at £119,636. The town lies very low, and is liable to be flooded from the sea by cyclones. M. has a flourishing Christian school for girls.

Mataban'gha, one of the three offshoots from the Ganges which make up the Hooghly River. It traverses the district of Nuddea, and brings down the produce of N.E. and E. Bengal. The down traffic is about 80,000 tons, chiefly rice, jute, gunny bags, and pulses; the up traffic is about 35,000 tons, of which more than half is salt.

Matador'. See BULL-FIGHT.

Matagor'da, a large bay in Texas, U.S., receiving the rivers Colorado and Lavaca, and partly separated from the sea by a sand-spit, which is open for navigation at Pass Cavallo, which is marked by a lighthouse. On the low-lying coast are the towns M., Port Lavaca, and Indianola. M., an old Spanish town, was submerged during the severe storm of 15-20th September 1875.

Matamo'ras, a frontier town of Mexico, state of Tamaulipas, on the Rio Grande, 40 miles from its entrance into the Gulf of Mexico. It exports horses, hides, wool, metals, &c., and imports all kinds of manufactured goods. Pop. 12,000.

Matan'zas, a fortified port of Cuba, on a beautiful bay, 52 miles E. of Havanna by rail. It has an excellent harbour, and in 1867 exported 1,725,699 cwts. of sugar, and 1,212,587 cwts. of molasses. For the first half of 1871, the total export of sugar had risen to 1,490,080 cwts. The Empressa Academy at M. is one of the best schools in the W. Indies. Pop. 36,102.

Mataro' (*Iluro*), a town and seaport on the N.E. coast of Spain, province of Barcelona, 17½ miles N.E. of the town of that name by rail. It is a place of great industry. There are ten manufactories of cotton yarn, twenty-one of sailcloth, twenty of vermicelli, 1180 looms, nine tanneries, and nine tileworks. Iron-founding, dyeing, and the manufacture of soap, tallow, glass, and glue are also carried on. M. existed in pre-Roman times. Pop. 13,000.

Match'es, Lu'cifer. These now indispensable conveniences of civilised life are of quite modern introduction, having only come into use in 1832, when the first real friction M. were invented by Congreve. The original M. were consequently known as Congreves, and consisted of sulphuretted splints tipped with a mixture of one part of chlorate of potash with two of sulphide of antimony, and sufficient glue or gum to render the compound adhesive. In 1833 M. in which phosphorus took the place of the antimony compound were made by Preshel of Vienna, and ever since that period Vienna has continued to be the most important centre of the match industry. According to Faraday, John Walker of Durham was the first English manufacturer of L. M. Owing to the loud report given by M. in which chlorate of potash is used, and the readiness of such M. to ignite by percussion, the use of that compound was early modified by the introduction of other substances, or altogether abandoned, and red lead with the black oxide of manganese substituted for it. Other ingredients were subsequently introduced, and now most manufacturers possess recipes of their own for their igniting compositions. These they keep strictly secret, but the igniting compositions always contain phosphorus in variable proportions with one or other of the substances above alluded to, mixed with fine sand or ground glass, coloured with some colouring agent, and the whole made into a paste with water and glue or gum.

In the preparation of the splints, in dipping and drying them, in the manufacture of the matchboxes, and in the packing and labelling of the finished M., much ingenious machinery and great dexterity are exhibited. Planks of wood—generally white pine—are cut into blocks of a length suitable for two M., and steamed in a close steaming-chest. A variety of machines have been devised for cutting the splints; one of the most efficient of which is the 'Rowley' machine, patented by Mr. John Jex Long, which, formed like a revolving turnip slicer, will cut from ten to sixteen millions of M. per day. In Vienna and other Continental factories circular splints are made by means of planes. The cut splints are arranged in a frame so that each splint is separated a little from its neighbours, and being tightly fastened up they are thoroughly dried in a stove. They are next charred at the ends on a sand bath, and both ends are dipped into melted paraffin (formerly, and still sometimes into sulphur). They are now ready for being tipped with the igniting composition, which is done by dipping them into a shallow tray over which the composition is evenly spread. As

both ends of the splints form uniform plane surfaces, all the splints dip to the same depth with the composition. The splints are then allowed to 'drip,' after which they are dried in a stove, and taken out of the frames. Each splint being dipped at both ends forms two M., and they are cut into two by means of a lever knife. When 'bundle dipped' M. are made, the splints are not arranged in frames, but dipped in round bundles tied up by string. The ends thus are only tipped with the igniting composition, and as the M. take up less of the costly chemical mixture, and as the labour of arranging them in dipping frames is saved, they are cheaper than the frame-dipped kind. The preparation of the wooden skillets for boxes and cases employs ingenious machinery, and the papering of the boxes, filling in the M., and other operations, are performed with great dexterity by women and children.

The phosphoric fumes in a match-factory give rise to a very painful and serious disease of the jawbones—necrosis—which occasionally affects the operatives more directly exposed to them. Partly on that account, but more as a security from fire, safety M., in which amorphous or red phosphorus is employed, have been introduced, and are now extensively used. The phosphorus mixed with ground glass is spread on paper, and the M. are tipped with chlorate or nitrate of potash or peroxide of manganese and red lead. The M., therefore, only ignite when rubbed gently on the prepared phosphorus papers attached to the match-box. As neither the M. nor the prepared paper ignite readily apart from each other the device forms an undoubted security against fire, and as the employment of red phosphorus is unattended with the danger of necrosis, the use of safety M. deserves to be encouraged.

Match'lock, a portable firearm, which is discharged by means of a lighted match held by a serpentine or crooked lever attached to the lock of the weapon. Matchlocks, without trigger or tumbler, were invented about 1424, and these were succeeded by the Arquebus (q. v.). Matchlocks are still used in the East, notably among the Mahrattas of India and the Chinese.

Ma'té, or Paraguay Tea, in S. America occupies the same position that Chinese tea does in Europe. It is obtained from the leaves and fine twigs of *Ilex Paraguayensis*, a small tree with plain or toothed leaves, native of S. Brazil, in the district drained by the Parana and Paraguay. Branches cut from the tree are roasted on hurdles over a wood fire until thoroughly dry, the leaves are then beaten off and pounded. The infusion is prepared by placing a small quantity of the powder into a cup or gourd with a little sugar, and adding boiling water. When sufficiently cool it is imbibed through a tube, and is very refreshing after fatigue. Its chemical principles are caffein, quina acid, and a peculiar tannic acid that can be converted into viridin acid. It is understood by botanists that along with the above-named *Ilex* several other allied species are indiscriminately used in M. manufacture. The name M. originally meant the small gourd which forms the drinking cup.

Mate (Icel. *máti*, 'equal;' Dutch, *maat*, 'a comrade'), in the merchant service the officer ranking next to the captain. If the vessel carries several under-officers, these are termed respectively the first, second, and third M., and so on. In the British navy the term formerly corresponded to the present Sub-lieutenant (q. v.), but is now restricted to certain petty officers, as boatswain's M., gunner's M., &c.

Mate'ra, a town in S. Italy, province of Potenza, 37 miles N.W. of Taranto. It has several churches and a curious chapel, San Pietro Barisano, cut out of the rock. M. is a bishop's see, and has manufactures of firearms and leather. Pop. (1874) 14,312.

Mate'ria Med'ica is the term used to designate that department of medicine which is devoted to the consideration of pharmacological remedies, or substances employed as medicines in the treatment of disease. M. M. comprises a consideration of *pharmacognosy*, which treats of the origin, properties, varieties, quality, and purity of *unprepared medicines* or *simples*; *pharmacy*, which treats of the collection, preparation, and preservation of medicines; and *pharmacodynamics*, or *therapeutics*, which treats of the effects, uses, and administration of medicines in the cure of disease. Dr. Pereira, in his work on M. M., arranges Medicines in three groups as follows:—'(1) Medicines derived from the mineral kingdom, and definite chemical compounds, organic as well as inorganic, which are obtained as products of decomposition, and not as educts, from the vegetable and animal kingdoms; (2) medicines derived from the vegetable kingdom, including bodies of definite chemical composition, obtained as educts from vegetable substances; (3) medicines obtained from the animal kingdom, including bodies of definite chemical composition, obtained as educts from animal substances.' Professor Christison and others adopt a simple alphabetical arrangement; and others, an arrangement of medicines in groups corresponding to their physiological effects. In accordance with this system of classification, Neligan groups medicines as antacids, anthelmintics, antispasmodics, astringents, cathartics, caustics, diaphoretics, diuretics, emetics, emmenagogues, emollients, epispastics, expectorants, narcotics, refrigerants, sedatives, or contra-stimulants, sialogogues, general stimulants, special stimulants, tonics, and supplementary agents. Dr. Stillé, of America, adopts the same basis of classification, but his subdivisions are different. Dr. T. Lauder Brunton proposes a grouping of medicines according to their physiological action, which he ascertains by considering the effect of the drug, firstly in small, secondly in large, and thirdly in long-continued doses—(1) when applied to the cutaneous surface, and to the mucous membranes; (2) when taken into the digestive canal, and while passing along it; (3) when absorbed from the intestinal canal into the circulation, and acting on the blood, the blood-vessels, and vaso-motor nerves, the heart, and the cardiac nerves, and muscles; (4) when passing out of the body and brought into contact with the eliminating glands. The diseases in which the drug is used, or for which it may be adapted are next considered, and finally the various officinal preparations of the medicines. See *Elements of M. M. and Therapeutics*, by Dr. Pereira, edited by Bentley and Redwood (Lond. 1872); *Therapeutics and M. M.*, by Dr. A. Stillé (Phila. 1876); *Tables of M. M.*, by Dr. T. L. Brunton (Lond. 1877); *Guide to Therapeutics*, by Dr. Farquharson (Lond. 1877).

Mate'rialism is that theory in philosophy which reduces all existence to matter and its modifications. Philosophy in its beginning was materialistic; the Atomists, Stoics, and Epicureans were the staunchest supporters of the theory among the Greeks. In modern times it received new vigour from Locke's speculations, and was long maintained in France by Condillac and others, resolving itself into mere physiology, and culminating during the French illumination in the doctrines of the Encyclopædists, expressed sometimes thus: 'Idealogy is a branch of zoology,' 'To think is to feel.' The vigour with which mental physiology is studied influences philosophy strongly at present in the direction of M., which is favoured by many of the ablest thinkers of the day. See Lange's *History of M.* (vol. i. Eng. trans. 1877).

Mathemat'ics is ordinarily defined as the science which treats of the properties of space and number. The simplest conception of number lies perhaps in the continuous succession of intervals of time; and this idea seems to have been present to the mind of Sir W. R. Hamilton, of Dublin, when he defined the two great branches of pure M., Algebra (q. v.) and Geometry (q. v.), as being respectively the sciences of pure time and pure space. Algebra, of which arithmetic forms a part, consists of a series of strict logical processes, which may be applied without any regard to the meaning of the symbols employed. With geometry it is otherwise. In it the thing sought is ever present to the mind of the investigator; and the fundamental properties of space can never for an instant be lost sight of. The truth of Gauss's favourite saying that M. is the queen of the sciences is at once apparent when the practical applications of M. are for a moment considered. All the other sciences depend more or less upon the extent of our mathematical knowledge; and the rapid progress in all science can be directly traced to a previous advance in M. The term *mathematical sciences*, however, is more strictly applied to those sciences which make direct use of mathematical symbols and principles—for example, the various departments of physics, such as electricity, heat, hydrodynamics, light, &c., &c.

Ma'ther, Increase, D.D., an American divine, born at Dorchester, Massachusetts, June 21, 1639, was educated at Harvard and Dublin. He was for many years pastor of North Street Church, Boston, and was President of Harvard Univer-

sity, 1685-1701. He was also an active politician, and obtained a new charter for his native state by a personal journey to England, 1688-92. He wrote ninety-two separate works, including *Cases of Conscience Concerning Witchcraft* (1693), *Agathangelus* (1723), and *Remarkable Providences* (1684, reprinted in Russell Smith's *Old Authors*, 1856). He died at Boston, August 23, 1723. His life was written by his son (1724).—**Cotton M., D.D.**, son of the preceding Mather, was born at Boston, February 12, 1663, graduated at Harvard in 1678, and was ordained colleague to his father in North Street Church in 1684. He was a learned and pious man, but his credulity and superstition at least equalled his piety and probably surpassed his learning. His *Memorable Providences relating to Witchcraft* (1685) precipitated the Salem tragedy of 1688, when nineteen people were killed and many others imprisoned on suspicion of witchcraft. M. was made LL.D. of Glasgow in 1710, and Fellow of the Royal Society of London in 1714. He introduced inoculation into America in 1721. He died at Boston, February 13, 1728. M. wrote no fewer than 382 separate works, most of which have long ago passed 'into the portion of weeds and outworn faces.' A few, however, still possess an interest for us. Among these are *Magnalia Christi Americana*, an ecclesiastical history of New England, the *Life of Increase, Mather*, *Psalterium Americanum*, a translation of the Psalms into blank verse, *Essays to do Good*, and *Directions to a Candidate for the Ministry*. See Life by his son, Samuel M., published in 1729 (abridged by Jennings, Lond. 1744).

Math'ew, Theobald (Father), the Irish 'Apostle of Temperance,' was born at Thomastown, Tipperary, October 10, 1790. He was educated at a Catholic school and at Maynooth, was ordained in 1814, and laboured successively in the wilds of Connaught and the city of Cork. Here he founded an institution on the plan of the Society of St. Vincent de Paul. He commenced an earnest crusade against drunkenness in 1838, and in five months induced 150,000 persons to sign the pledge. Henceforward M. devoted his life to the temperance cause, travelled through the whole of Ireland, and extended his labours thence to England, Scotland, America, and even to the Pacific Islands. He produced probably the greatest and most sudden change in the habits of a nation which modern history records, and Ireland still bears the impression of his life-work. His circumstances were latterly much embarrassed, and the benefit of a pension of £300, granted him by the crown, was unfortunately reaped only by his creditors. He died at Cork, December 8, 1856. Statues have been erected to his memory in Cork and New York. See J. F. Maguire's *Life of Father M.*

Math'ews, Charles, an English comedian, the son of a bookseller, was born in London on June 28, 1776, and educated at Merchant Taylor's School. He adopted the stage as a profession in 1794, and after a struggling career at Dublin, Swansea, and York, obtained an engagement at the Haymarket Theatre in 1802. At this house, and subsequently at Drury Lane and the Lyceum, he took first rank as a comedian. His most masterly impersonation was perhaps his Mawworm in *The Hypocrite*. His fame rests mainly, however, on his marvellous *At Homes*, which he commenced at the English Opera House in 1818, and continued till his death. Unique and original in construction, they were brilliant models of single-handed entertainments. His matchless mimicry, capital singing, and exquisite knack of rendering to the life personal and national peculiarities charmed the most fashionable and critical of audiences. Especially successful were *The Mailcoach* and *A Trip to America*, the latter founded on a professional visit to America in 1822, which he repeated in 1834. He died at Plymouth, June 28, 1835. M.'s Life and Correspondence was published by his wife in 1844 (an abridged edition by Edmund Yates in 1860).—**Charles James M.**, the gifted and only son of the preceding, was born in December 1803. He was articled to an architect, but took to the stage before his father's death, of which for forty years he has been one of the brightest ornaments. M. has played successfully not only wherever the English language is spoken—in America, India, and the Antipodes—but also in Paris, where his airy gaiety of style and almost faultless French made him a prime favourite. His handsome figure, gentlemanly manner, buoyant spirits, and brisk effervescent humour have not ceased to charm with his increasing years, and he still (1877) hops and skips on the stage, a perennial youth, an unapproachable *jeune premier*. He has written several farces and comediettas, *Little Toddlekins*, *The Dowager*, *The Liar* (altered and adapted from Foote), *Un Anglais Timide* (his French version of *Cool as a Cucumber*), &c. Among his happiest rôles are Sir Affable Hawk in the *Game of Speculation*, and Adonis Evergreen in *My Awful Dad*, a comedy of his own, first played in 1876. Mr. M. has twice married. His first wife, Madame Vestris, died in 1857, and his second, formerly Mrs. Davenport, in 1873. See G. H. Lewes's *Actors and Acting* (1875).

Mathil'da, Countess of Tuscany, daughter of Count Bonifacius of Este, born in 1046, held besides Tuscany, Mantua, Parma, Piacenza, Modena, Reggio, and the greater part of what afterwards became the 'States of the Church.' Part of her possessions was allodial, part fief. She married Duke Gottfried, the Hunchback, of Lower Lothringen, but lived separate from him in Italy, and became a widow (1076) in her thirtieth year. M. was a woman of great prudence and culture rare in that age, and she ruled her lands firmly. She was the main support of Gregory VII. in his struggles with the Emperor Heinrich IV. In 1090 she married Duke Welf V. of Bavaria (uncle of Heinrich the Proud), from whom also she lived separate. In 1115 she died childless. As early as 1077 she bequeathed her lands to the Pope. This bequest was the cause of a violent and long-continued struggle between the Emperor and Pope, at length settled chiefly in favour of the latter.

Mathi'as Corvi'nus, second son of John Huniades, was born at Klausenburg, 27th March 1443, brought up under the guardianship of Georg Podiebrad, King of Bohemia, elected king of Hungary 1458. In 1459 Friedrich III. attempted to snatch the crown from him, but through the Papal intervention, after two battles, a peace was declared which lasted until 1464. In 1465 M. entered Bosnia against the Turks, became master of Jaiez, and routed the Sultan; in 1467, the Pope having preached a crusade against Podiebrad, M. took arms against him, and kept up the warfare after his death, even though the Turks were making incursions into his territory. At the end of a seven years' warfare, Silesia, Moravia, and Lusatia were added to the Hungarian dominions. M. married Beatrice, daughter of Ferdinand, king of Naples, in 1477, and two years afterwards defeated the Turks at Kenyérmezö. On the 4th of April 1490 he died of apoplexy at Vienna, at the moment when he had humbled Friedrich, and driven him from his throne. M. was not only an indefatigable soldier, but also a man of artistic and literary sympathies. Under his rule commerce flourished, and law and justice were administered without reference to class. See Mailath, *Geschichte der Magyaren* (5 vols. Vien. 1828-31).

Mat'ico, a Peruvian name for *Artanthe elongata*, the leaves of which have a prominent felt of hairs on their under surface, and are used for staunching blood; the effect is probably mechanical, as with lint. The plant belongs to the natural order *Piperaceæ*, and possesses aromatic stimulant qualities.

Mat'ins. See CANONICAL HOURS.

Mat'lock, an inland watering-place of England, in Derbyshire, beautifully situated on the slope of a height overlooking the Derwent, 17 miles N. by W. of Derby by rail. The hot springs have a temperature of 68° F., and contain much free carbonic acid. There are here several caves with 'petrifying springs,' and a slight trade is carried on in vases, tazze, and other articles made from the fluor-spar and Derbyshire marbles. M. High Tor is a precipitous limestone rock rising from the river to a height of 306 feet. Pop. of parish (1871) 5220.

Matrica'ria. See CHAMOMILE.

Ma'trons, Jury of. If a woman under sentence of death allege pregnancy, a J. of M. may be appointed to ascertain the fact. See REPRIEVE.

Mat'sumai, a seaport of Japan, on the S. coast of the island of Yesso, 60 miles S.W. of Hakodai. It is a great centre of trade, and has a spacious harbour, but is not open to foreign commerce. Estimated pop. 60,000.

Mat'sys, Met'sys, or **Mess'is, Quentin**, a Flemish painter, born at Louvain in 1466, is said to have been a blacksmith until his twentieth year—whence his nickname, the 'Farrier of Antwerp'—and to have exchanged the sledge-hammer for the brush from love of a maiden who would wed none but a painter. Genuine works by him are rare, the best-known being the

'Descent from the Cross' in the Antwerp Museum, 'Mary Magdalen' in Lord Methuen's gallery at Corsham House, and a 'Madonna' at Berlin, while other specimens occur in the collections at Vienna, Munich, Frankfurt, and Dresden. The 'Two Misers' at Windsor has been of late years ascribed to his son Johann. M. died at Antwerp in 1531. See Van Even's *Recherches sur Quentin Messis* (Louvain, 1864).

Matt'er, in philosophy, is a term used to denote the unknown substratum underlying all phenomena revealed to us by consciousness. Our knowledge of it is only relative; we perceive by the senses only extension, figure, colour, &c., but in order to account for their existence assume these to be qualities of a hypothetical substance.

M., in physics, may be defined as that which fills space. It is the vehicle by which the energy of the universe is made evident and utilised. Its objective existence we assume not merely because it is an experience common to all, but because, subject it to any operation whatever, it cannot be increased or diminished in quantity. It is this principle of the noncreatability and indestructibility of M. upon which the whole science of chemistry is based; just as natural philosophy is based upon the same conservation principle applied to energy. M., as known to us, exists in three modifications—solid, liquid, and gaseous; and, according to the present theory of the ultimate nature of matter, these depend upon the arrangement of the molecules. A molecule is a group of atoms, held together by what are known as molecular forces; and atoms are the ultimate indivisible particles which compose matter. The nature of these atoms, whether they are the hard, rigid, incompressible spheres of the ancient atomists, or the pliable, vibrating, but yet unapproachable vortex rings of Sir W. Thomson, we cannot at present hope to determine, but experiment furnishes us with means to measure approximately the size of the molecules. The recent development by Clausius and Clerk Maxwell of the kinetic theory of gases has further given much insight into the probable nature of these ultimate particles. The various properties of matter are indicated under such articles as FLUIDS, GASES, SOLIDS, ELECTRICITY, ENERGY, HEAT, LIGHT, SOUND, SPACE, &c.

Matt'erhorn, The ('the mount of the meadow'), or **Monte Cervi'no**, a famous needle-shaped peak to the W. of Monte Rosa on the border line between Italy and Switzerland. It is 14,780 feet high, and is difficult and dangerous of ascent.

Matth'ew, St., the son of Alphæus, was called by Christ from his occupation of publican, or farmer of the Roman taxes, at Capernaum, to be a disciple (Matt. ix. 9), and became afterwards one of the twelve apostles, and, as is supposed, the author of a Gospel or life of Christ. Before his call he seems to have borne the name of Levi (*cf.* Mark ii. 13, 14; Luke v. 27, 28). Nothing is recorded of him in the New Testament after the Ascension of Christ. According to various traditions preserved by Church historians, he preached in Judæa, in Ethiopia, in Macedonia, and among the Persians, the Medes, and the Parthians. A late tradition says he suffered martyrdom. The Gospel of St. M. was probably written in Palestine, for Jewish Christians, between A.D. 60 and A.D. 70. Whether it was originally written in Greek, like the other Gospels, or in Aramaic, the vernacular of Palestine at the time (see JEWS, *Language and Literature*), is a point which is much debated among critics.

Matthew of Westminster, an English chronicler who flourished some time in the 14th c. All that is known of him is that he was a Benedictine monk of Westminster. His work, which bears the same title as Roger of Wendower's, viz., *Flores Historiarum*, goes over the same ground in the earlier part, but comes down to the death of Edward I., and for the last seventy years may be considered an original and important record. M. is a vivid narrator, and his work is particularly minute for the period after the Norman Conquest. The first printed edition appeared at London in 1567; the second at Frankfurt in 1601. There is an English translation in Bohn's Antiquarian Library.

Matthew Paris, one of the most valuable chroniclers of the middle ages, was born about 1195, entered the Benedictine monastery of St. Alban's, of which he was chosen annalist in 1235, and died in 1259. The name Paris is thought by some to be derived from the city where he may have studied. M.'s chief work, entitled by himself *Historia Major*, is a history of the world from its creation to the year of the author's death. Up to 1235 A.D. it is simply a transcript of Roger of Wendower's *Flores Historiarum*, with a few variations and additions, but the remainder is a copious and careful record of the events that happened in M.'s own lifetime, and is the work of a man of veracity, frankness, insight, and courage. It was first printed by Archbishop Parker in 1571. The latest edition is that of 1684. There is an English translation in Bohn's Antiquarian Library. Other works of M.'s are *Duorum Offarum Merciorum Regum Vitæ*, and *Vigina Abbatum S. Albani Vitæ*.

Matt'o-Gross'o ('great wood'), the largest and westmost province of Brazil, bounded N. by Amazonas and Pará, E. by Goyaz, São, and Paulo, and S.W. by Paraguay and Bolivia. Area, 865,800 sq. miles; estimated pop. 46,000 (nine-tenths Indians and negroes). Forests cover a great part of the surface, which is crossed from E. to W. by a mountain range, from which valleys slope to the plains of the Amazon and Rio de la Plata. Cattle-rearing is the chief pursuit of the people. Gold, diamonds, and iron are found. Cuyaba (q. v.) is the chief town.—**M.-G.**, on the Guapore, 425 miles N.E. of Chuquisaca, founded in 1734, was in 1818 the chief town, with 18,000 inhabitants, but proved unhealthy, and has not now 1500.

Mauch'line, a picturesque town of Scotland, in Ayrshire, on the river Ayr, 11 miles N.E. of Ayr by the Glasgow and South-Western Railway. The parish church, rebuilt in 1829, is a red sandstone structure with a turreted tower. There is a monument on the Green to the memory of five covenanters who suffered death in 1685. M. Hill, part of the long ridge of Kyle, a little to the N.E. of the town, commands a fine prospect of the surrounding country. M. is noted for the manufacture of snuff-boxes, cigar-cases, and various fancy articles. Pop. (1871) 1574. The genius of Robert Burns has dowered the town and neighbourhood with immortal interest. Mossgiel, a small farm about a mile from M., was for some years the residence of the poet. M. Kirk was the scene of the 'Holy Fair,' and the change-house of 'Poosie Nancie' the 'howf' of the 'Jolly Beggars.'

Mau'i, the third largest of the Sandwich Islands, lies to the N.E. of Hawaii, is nearly separated into two parts, and has an area of 750 sq. miles. It is very mountainous, reaching a height of 10,200 feet in Manna Haleakala. The only port is Lahaina, on the E. coast.

Maunbhum', a district of Bengal, British India, occupying the hilly border land between Chota Nagpore and the Gangetic delta. Area, 4914 sq. miles; pop. (1872) 995,570. The staple crop is rice. Iron is wrought in the hills, and a coalfield is known to exist. The most valuable product is soapstone, which is carved into cups, plates, and idols, and largely exported. The chief town is Puruliah. This tract, owing to its remoteness, suffered severely during the famine of 1866.

Maund (*man*), the standard weight throughout India, used for measuring heavy commodities. It is universally composed of 40 *seers*, but unfortunately the *seer* is itself a variable weight. The standard M. is equivalent to about 82 lbs.; but for ordinary purposes of conversion it may be taken as = 80 lbs., or 28 to the ton. In various parts of India, however, the local M. varies from 90 to 28 lbs.

Maun'dy Thursday is the Thursday before Easter. Two customs have been associated with the day from very early times. First, it was customary for pious persons, especially the wealthy and the great, even kings and queens, to wash the feet of a number of poor people, in obedience to the injunction of Christ after washing the disciples' feet: a custom which is kept up by the Pope to this day. In this connection the name is supposed to be a corruption of Latin *mandatum*, 'command,' in John xiii. 34. Another custom was to give certain poor people —those whose feet were washed, or without the foot-washing— doles of bread, clothes, or money; a custom which is yet kept up by the sovereign of Great Britain. Hence the name has been derived also from Old Eng. *maund*, 'a large basket,' and from Fr. *maundier*, 'to beg.' See Brand's *Popular Antiquities*.

Mauper'tuis, Pierre Louis Moreau de, was born at St. Malo, July 17, 1698, educated at the Collége de la Marche, Paris, served for some years in the army, forsook it to pursue a

scientific career, and read a *mémoire* before the Academy of Science (1724) entitled *La Forme des Instruments de Musique.* In 1728 M. visited England, was received into the Royal Society, and on his return to Paris became the chief disseminator of the Newtonian theory of physics. *Figure de la Terre déterminée par les Observations*, published in 1738, was a book containing the experiences of M. in Lapland, to which he was sent to get the measurement of a degree of longitude, in order to settle the question as to the perfect rotundity of the earth. In 1740, Friedrich II., who wished to create an Academy of Science, invited M. to Berlin, where, after having been captured at the battle of Mollwitz and sent back to France, he was ultimately successful in organising an institution over which he was placed as President. But 'this big, glaring, geometrical bully in red wig,' as Mr. Carlyle calls him, who, as 'flattener of the earth, is, with his own flattish red countenance and impregnable stony eyes, a man formidable to look upon,' was too overbearing for his post. In 1750 he quarrelled with König, a Dutch professor, because the latter combated his *Cosmologie.* Shortly afterwards he quarrelled with Voltaire, who has handed him down to the laughter of posterity in his *Micromégas* and *Diatribe du Docteur Akakia.* M. died at Basel, July 27, 1759. His *Œuvres* were published at Paris in 4 vols., 1752. See Damieon's *Mémoires sur M.* (Par. 1858), and Carlyle's *Frederick the Great*, vols. iii., iv., v., vi., and viii.

Mau'rice. See MORITZ.

Mau'rice, Rev. Frederick Denison, D.D., son of a Unitarian minister, was born 29th August 1806, educated at Cambridge, where he made the friendship at the 'Union' of Trench, Buller, Sterling, Milnes, and others, forsook the University (1826), and began to write for the *Athenæum*, recently founded. 'It was,' says Mr. Carlyle, 'about the end of 1828 that readers of periodical literature, and *quidnuncs* in those departments, began to report the appearance, in a paper called the *Athenæum*, of writings showing a superior brilliancy and height of aim.' For two years M. worked away at literature, and published *Eustace Conyers*, a novel; but under the influence of Coleridge his views began to change. Believing at last that the English Church, by being spiritualised and made intellectually reasonable, 'became once more a living ship of the desert, and invariably bore you over stock and stone,' M. went to Oxford, graduated M.A. (1831), and was ordained an Episcopal clergyman. Throughout his career he gained distinction by leading several different movements. His revolt from the Augustinian theology, and his insistance upon more spiritual conceptions of God and destiny, though it obtained for him a large following of the 'Broad Church' party, brought about his ears the fierce reprobation of the orthodox. Ultimately M. was compelled to resign the Professorship of Divinity in King's College, London. Among his best theological productions are *The Doctrine of Sacrifice*, *Theological Essays*, and *The Kingdom of Christ.* M. devoted himself also to strictly philosophical work, which took shape in his *Mental and Moral Philosophy*, and in articles contributed to the *Encyclopædia Britannica.* In 1866 he was appointed Professor of Moral Philosophy at Cambridge. He died 1st April 1872. M. had most definite social aims before him, attempting in the Christian socialist movement to abolish competitive labour, and to establish a kind of enlightened and peaceful communism among the working-classes. His success as founder and president of the Working Men's College was great and widely recognised. As a writer, M. is delicate, subtle, and refined. No more pellucid English than his has been written in the 19th c. His opponents complained of his nebulous thinking, but it may be doubted if their difficulty in apprehending him was not the sign of a radical weakness in themselves. Seldom, indeed, has purer, tenderer, or truer religious thought found expression than in the writings of this saintly heretic.

Mauri'cius, Fla'vius Tibe'rius, was born of an ancient Roman family at Arabissus, in Cappadocia (*circa* 539 A.D.), and spent his youth at the court of Justin II. Appointed *magister equitum*, he served with distinction against Khosru I. (q. v.), winning the honours of a triumph, and on August 13, 582, succeeded Tiberius on the Byzantine throne. The chief events of his reign were a great victory over the Persians at Solacon (586), and the restoration by M. of Khosru II. to the throne of Persia (591); a war with the Avars (587), and their capture of 12,000 Roman veterans (600); the revolt of Phocas (q. v.), and the flight and assassination of M. and his six sons (November 27, 602). Though greater as a general than as a ruler, M. was one of the best Eastern emperors—bold, firm, and liberal to his subjects. He wrote twelve books on military tactics, *Stratēgika*, published, with a Latin version, by John Scheffer (Upsala, 1664).

Maurita'nia, or **Mauretania**, was in ancient times the N.W. part of Africa, so called from the Mauri or Marusii. After the last of the dynasty of Bocchus died in 32 B.C., Augustus gave the country to Juba as compensation for Numidia, which had become a Roman province. In 43 A.D. Claudius made M. also a Roman province, dividing it at the river Molochath into M. Tingitana, with the capital Tingis (now Tangier), and M. Cæsariensis, with the capital Cæsaræa (Shershel). In the 7th c. M. was seized by the Arabs.

Mauri'tia. The most universally distributed palm throughout the basins of the Amazon and Orinoco is *M. flexuosa*, and there are few palms about which more has been written. It abounds mostly on the shores of low flat islands and about swampy lakes, and to the native is

> 'At once his dome, his robe, his fruit, his arms.'
> —*Seasons*, l. 837.

The genus M. is peculiar to S. America, and the various species rise to the height of 100 to 150 feet, bearing a crown of enormous fan-shaped leaves, amongst which the pendulous flower spikes are produced.

Mauri'tius, or Isle of France, an island in the Indian Ocean belonging to Great Britain, and lying between 19° 58'-20° 33' S. lat., and 57° 17'-57° 46' E. long. It is nearly elliptical in shape, and has an area of 676 sq. miles. M. was discovered in 1505 by the Portuguese, but they made no practical use of their discovery. In 1598 the Dutch established a settlement on the island, to which they gave the name of Maurice, in honour of their Prince. They abandoned it, however, in 1710, and in 1721 it was taken possession of by the French, who kept it till 1810, when it was captured by Britain, to whom the seizure was confirmed at the peace of 1814. M. is of volcanic formation, and though volcanic action in it has long since ceased, eruptions and earthquakes occurring in Reunion (q. v.), 120 miles off, are felt in M. The latter is mountainous, and some of the isolated peaks are curiously shaped. The most remarkable, Pieter Botte, consists of a spire 2840 feet high, crowned by a dome of rock larger than the point on which it rests. The centre of the island is occupied by a plateau 1200 feet above the sea level. The rivers are torrents in winter, but mere brooks in summer. The coasts are fringed by dangerous coral reefs, and there are only two harbours adapted to shipping, viz., that of Port Louis (q. v.), the capital, on the N.W., and that of Malhébourg, or Grand Port, on the S.E. On the coast the climate is hot and unhealthy, but on the hills and central plateau it is much more bearable. Smallpox and cholera have at different times committed great ravages in the island. The mean annual rainfall at Port Louis is 39¼ inches, most of which falls from October to April, though there are four seasons. Terrible hurricanes at times sweep the island from December to March, doing fearful havoc. One of these storms, in March 1874, lasted for five days. The fury of the hurricanes, however, is said to have decreased of late years, a result attributed to the lessening of the humidity of the climate by the clearing away of the forests which formerly covered the whole island. The soil of M. is fertile, though stony in some districts. Traces of iron are abundant, and at one time the metal was extensively worked. By far the most important crop cultivated is sugar, of which very large quantities are exported. The plantations are wrought by Coolies (q. v.) imported from India. M. possesses two lines of railway, connecting Port Louis with the northern and eastern districts, and of an aggregate length of 65 miles. The total value of the imports of M. during 1876 was £2,284,213, and of the exports, £3,273,822. The island is divided into ten districts, and is ruled by a governor appointed by the crown, an executive council of five members, and a legislative council consisting of seven official and eleven non-official members. The revenue in 1875 was £692,894, and the expenditure £775,836. The islands of Rodriguez (q. v.), the Seychelles (q. v.), and one or two of less importance, are dependencies of M. The population of M. is of the most heterogeneous character, being made up of French and English colonists, Creoles (the descendants of Europeans

and former slaves imported from Africa and Madagascar), coolies from different parts of India, and Chinese. The total population of the island at the close of 1875 was 344,602, giving the very high average of 509 to the square mile. The Indian population numbered 236,535, of whom fully two-thirds were males.

Maurokorda'tos, Alexander, born February 15, 1791, at Constantinople, played a leading part throughout the Greek War of Independence (1821–29) as head of the 'citizen primates,' in opposition to the Palikari chieftains under Kolokotronis, and rendered good service at Peta, Missolonghi, Navarino, and Sphacteria. During the reign of Otho I. he stood at the head of five ministries, in 1833, 1840, 1844, 1850, and 1854, and served as ambassador to the courts of Munich, Berlin, London, Constantinople, and Paris. He died at Ægina, August 18, 1865. A brilliant scholar, fluently speaking seven languages, and an enlightened patriot, M. was ever the upholder of an English in contradistinction to a Russian policy.

Mau'ry, Matthew Fontaine, LL.D., a celebrated writer on navigation and kindred subjects, was born in Virginia, U.S., January 14, 1806. He entered the navy and became lieutenant in 1836, but was forced to retire from active service in 1839, when he met with an accident which lamed him. He was then appointed to the Hydrographical Office at Washington, and was made Superintendent of the National Observatory in 1844. In the civil war he sided with the Confederates. In 1868 he became Professor of Physics in the Virginia Military Institute, and died at Lexington, February 1, 1873. His greatest work is *The Physical Geography of the Sea* (1855), in which are discussed for the first time with any fulness or attempt at explanation the phenomena connected with ocean currents. His *Treatise on Navigation* (1835) is still a text-book in the United States Navy; while the *Wind and Current Charts* issued by the National Observatory are based upon his valuable researches.

Mausole'um, a stately sepulchral monument, was originally the name of the tomb erected by the Carian queen Artemisia at Halicarnassus, to commemorate her husband Mausolus, which was so splendid as to be counted one of the seven wonders of the world. It was described by Pliny, after whom it was extant for several centuries, though it was at last destroyed by an earthquake. In 1404 the Knights of St. John built a castle there from its ruins, and from these Lord Stratford de Redcliffe, with permission of the Turkish government, removed some bas-reliefs to the British Museum in 1838. In 1856 Consul Newton brought to light the whole foundation of the M., with numerous sculptures, colossal statues, &c.

Mauve. See ANILINE COLOURS.

Maw-Seed (Ger. *magsamen*, Polish *mak*, 'poppy seed'), the seeds of *Papaver somniferum*, sold as a food for cage-birds, but in Poland and elsewhere used for human food. They have an agreeable nut-like flavour.

Maxill'a, in Anatomy, the name given to the *upper jaw*, which consists of the M. proper, and of a part known as the *præmaxilla*. In the latter are situated the upper incisor teeth; the upper canines being placed in the M. just behind the suture which marks the separation of the premaxilla from the M. The name M. is also applied to indicate the lesser jaws of *Arthropoda*—*e.g.*, insects, crustaceans, &c.

Maxill'ary Ar'teries (*maxilla*, 'the jaw'). The internal maxillary artery, the larger of the two terminal branches of the external carotid, is imbedded in the parotid gland, and begins on a level with the lower lobe of the ear. It sends off fifteen branches, and supplies the deep structures of the face.

Maximil'ian I., Germano-Roman Emperor, son of Friedrich III., was born at Neustadt, near Vienna, 21st March 1459, married Mary of Burgundy (1478), adding thereby to the House of Austria the Low Countries and Burgundy, and became King of the Romans (1486). Before becoming emperor (1493) he had to conduct campaigns against the French, Hungarians, and Turks. In 1494 M. created his son Philip governor of the Low Countries, who afterwards married Joanna, from whom sprung Charles and Ferdinand, both of whom became emperors. He summoned a diet at Worms (1495), at which a permanent 'public peace' was proclaimed, and the right of private feuds discontinued, a court of appeal being established to see the system worked. But he was constantly inveigled in wars, with which Germany ought to have had little to do, through the ambitious eye he had upon Italy. Owing to his poverty he was unable to fight Louis XII. or Ferdinand on equal terms, and at one time he served under Henry VIII. for 100 crowns a day. His Bavarian war was the most successful. In 1508 M. took the title of 'Emperor Elect,' which was sanctioned by Pope Julius II., and to it he afterwards added the title 'King of or in Germany.' Among other important reforms M. divided Germany into 'circles,' each circle having its own states over which 'directors' presided. He died at Wels in Upper Austria, 12th January 1519. M. was an ambitious monarch, strong and restless, and ever scheming for his own aggrandisement. But his love of glory was ennobled by a no less ardent love of letters. He drew to his court numerous scholars and authors, and wrote himself, both in prose and verse. His correspondence with his daughter Margaret was published by M. le Glay (Par. 1839). See Klüpfel, *Kaiser M. I.* (Berl. 1864).

Maximilian II., Joseph, son of Ludwig I., King of Bavaria, was born 28th November 1811, educated at the university of Göttingen, became major-general (1831), entered the State Council (1836), and married Princess Marie Hedwige (1842). He was called to the Bavarian throne in 1848, and started his career by promising an amnesty in favour of the Revolutionists, and by proposing measures in behalf of popular representation. In 1853 he travelled in Italy, and kept free of the Crimean war; in 1859 he was anxious to join the Austrians in their war against Italy, but the Peace of Solferino put an end to his 'federal obligations.' Around him he kept men devoted to science, art, and literature. He is even credited with 'a composition refuting' the philosophical system of Hegel. M. died at Munich, 10th March 1864. See Söltl's *Biography of M.* (1867).

Maximilian, Ferdinand Joseph, Emperor of Mexico, son of the Archduke Franz Karl of Austria, was born July 6, 1832. Entering the Austrian navy, he became commander-in-chief of the Imperial Marine in 1859. At the instigation of the Emperor Napoleon, the throne of Mexico was offered to him in 1864. He accepted it on the 10th of April, and assumed the government on 12th June. His short reign was beset with difficulties. On the withdrawal of the French troops, in February 1867, he was besieged by the Republicans at Querétaro, taken prisoner May 15, 1867, and shot, June 19, 1867. His remains were interred at Vienna, January 18, 1868. M. was more of a litterateur than a statesman. Seven volumes of his writings on travel, politics, and miscellaneous subjects have been published at Leipsic and Vienna (1865–67) under the title of *Aus meinem Leben, Reiseskizzen, Aphorismen*, &c. See *L'Empereur M.*, by Eugene de Keratry (Par. 1867); *M. I.*, by Hellwald (Vien. 1868); and *Mexico under M.*, by Kendall (Lond. 1872). His Empress Charlotte survives him, but since her husband's misfortunes has remained hopelessly insane.

Max'imum and Min'imum. When the rate of variation of a function of one or more independent and continuously varying variables changes sign, *i.e.*, if the function begin to decrease in value after having up till that time increased, or to increase after having up till then decreased—the function is then said to have reached a maximum or minimum value as the case may be. Take, for example, the function, $y = ax - bx^2$. The rate of variation of y with respect to x is $\frac{dy}{dx} = a - 2bx$, a quantity which is evidently positive as long as $2bx$ is less than a, and negative for all values of x which make $2bx$ greater than a. For the value $x = \frac{a}{2b}$ $\frac{dy}{dx} = 0$, hence, for this value, $\frac{dy}{dx}$ changes sign, and therefore y is a maximum or minimum when $x = \frac{a}{2b}$. To determine which it is, it is necessary to take the second differential coefficient and find what its sign is for this value of x. In this case $\frac{d^2y}{dx^2} = -2b$, a *negative* quantity; and hence the value is a maximum.

Max'well, James Clerk, LL.D., F.R.S., &c., a distinguished living physicist, was born at Edinburgh in 1831. After studying at the University there, he went to Cambridge, where he came out senior wrangler in 1854. In 1856 he became Professor of Natural Philosophy at Marischal College, Aberdeen, and in 1860 at King's College, London. Since 1871 he has been

Professor of Experimental Physics at Cambridge. His writings in various departments of science are of great merit and originality. He has done more than any other mathematician, with the exception, perhaps, of Clausius, to establish the kinetic theory of gases; and his mathematical theory of electricity, based entirely upon Faraday's valuable researches, is now generally accepted by the scientific world. His chief works are—*Theory of Heat* (1871); *Electricity and Magnetism* (2 vols. 1873); and *Matter and Motion* (1877).

Maxwell, Sir William Stirling, was born at Kenmure in 1818, educated at Trinity College, Cambridge, and graduated M.A. in 1843. In 1848 appeared his *Annals of the Artists of Spain*, the fruit of a strong artistic enthusiasm properly directed by a study of the different schools in France and Spain. *Cloister Life of Charles V.* appeared in 1852, *Velasquez and his Works* in 1855. Returned in 1852 to the House of Commons, he sat until 1865 in the Conservative interest for the county of Perthshire. In 1866 he succeeded his maternal uncle, Sir John Maxwell, in the baronetcy. He was appointed Lord Rector of St. Andrew's University (1863), of the Edinburgh University (1872), Chancellor of the University of Glasgow (1875), and Chairman of the Scotch Education Board. M. was returned to Parliament a second time for Perthshire (1872). In the spring of 1877 he married the Hon. Mrs. Norton, who died in June of the same year. M. has a graceful and incisive style; his sentiment is slightly iced with irony, but his intellect is acute and strong. He has always taken a profound interest in education.

May (Lat. *Maius; cf.* Sansk. *mah*, 'grow,' Lat. *mag-nus* and *maj-or*), the third month of the early Roman, and fifth of the Julian year. The Romans derived its name from Maius and Maia, two deities of ancient Latium, probably equivalent to Jovis and Tellus. The mysterious rites of the Bona Dea were performed on the first of this month, which has been with the English from time immemorial the popular festival of May-day.

May, Thomas, a poet and historian, was born at Mayfield, Sussex, in 1594, and proceeded from Sidney College, Cambridge, to Gray's Inn; but embracing the profession of letters, he became a favourite of Charles I., and during his residence at court produced five plays, two poems on the reigns of Henry II. (1633) and Edward III. (1635), and translations of Virgil's *Georgics* (1622) and Lucan's *Pharsalia* (1627), the latter with a supplement in seven books, which he afterwards rendered into Latin (1640). On the outbreak of the civil war, M. sided with the Commons, and, appointed secretary and historiographer to the Parliament, wrote a *History of the Parliament of England which began Nov.* 3, 1640 (Lat. vers. 1647; Eng. 1650; Fr. trans. 1823), and a *Breviary of the History of the Parliament* (1650). He died, choked by his nightcap strings, November 13, 1650.

Mayag'uez, a town of Porto Rico, 66 miles S.W. of San Juan, is situated 1 mile inland, being connected with its port by a tramway. There is safe anchorage, and the town, well supplied with gas and water, is the most advanced place in the island. In 1875 the total value of exports was £601,003, of which £361,709 were coffee, and £229,550 sugar and molasses. Estimated pop. (1875) 20,000.

Maybole', a town of Scotland, in Ayrshire, 9 miles S.W. of Ayr by rail. It is hemmed in from sight of the sea by a range of low hills, and its chief object of interest is the old castle, an ancient residence of the Earls of Cassillis. Here John Knox disputed with Quentin Kennedy, head of the neighbouring Abbey of Crossraguel, the remains of which are very striking, and attract great numbers of visitors. The chief industries of M. are the manufacture of shoes and of agricultural implements. There were (September 1877) five large shoe factories, which turned out annually about 400,000 pairs of shoes, representing a value of nearly £90,000. Pop. (1871) 3797.

Mayence', the French name of **Mainz** (q. v.).

Mayenne', a department of France, part of Old Anjou and Maine, is bounded N. by Manchè and Orne, S. by Maine-et-Loire, W. by Ille-et-Villaine, and E. by Sarthe. Area, 1996 sq. miles; pop. (1872) 350,637. It is traversed from N. to S. by the river M. (Lat. *Meduana*), an affluent of the Loire, and bounded in the W. by the Collines-du-Maine, reaching a height of 329 metres. The soil is fertile but poorly cultivated, and the chief crops are barley, oats, and buckwheat, amounting in annual value to 35,000,000 francs. Cider is produced to the extent yearly of 240,000 hectolitres. M. also yields much iron, coal, marble, and slate, and the principal manufactures are linens, cottons, hemp, paper, leather, and iron wares. Laval is the capital. M. is crossed from E. to W. by the Paris à Brest Railway.

Mayenne, a town of France, in the department of the same name, on the right bank of the M., 20 miles N.E. of Laval by rail. It manufactures calicoes, linens, leather, oil, &c., and is an important market for cattle. On a rocky height over the river stands an old castle of the Dukes of Mayenne. Pop. (1872) 8227.

May'fly. See EPHEMERA.

Maynooth' College, an Irish Roman Catholic seminary at Maynooth (Ir. Gael. *Magh-Nuadhat, i.e.*, 'The Plain of Nuat, a king of Leinster') or Laraghbryan, a village in the county of Kildare, 13 miles N.W. of Dublin by rail. It was founded (1795) by an Act of the Irish Parliament to supply the void created by the suppression, at the time of the Revolution, of the Irish colleges in France, and its original endowment, consisting of a yearly grant of £8928, was increased in June 1845 to £26,000 annually, with a special grant of £30,000 for the enlargement of the buildings. By the Irish Church Act (July 26, 1869), the Maynooth Grant ceased after January 1, 1871, being with the *Regium Donum* commuted for £1,100,000. The buildings consist of an old and a new quadrangle, the latter of which, designed by Pugin, contains the refectory, a library of 12,000 volumes, lecture-rooms, &c. The governing body is composed of eleven clerical and seven lay members; and the foundation of a president, vice-president, four deans, a bursar, twelve professors, and a librarian. In 1871 the number of students was 475.

May'o (Ir. Gael. *Magh-Eó*, 'The Plain of the Yews,' to which St. Colman retired, and from which the county took its name), a maritime county of Ireland, in the province of Connaught, is bounded E. by Sligo and Roscommon, S. by Galway, and W. and N. by the Atlantic Ocean. Area, 2137 sq. miles; pop. (1871) 246,030. The coast-line is deeply indented by Clew Bay (q. v.), Blacksod Bay, Broad Haven, and Killala Bay, and is fringed by Clare, Achil (q. v.), and other islands; while the Mallet promontory, 15 miles in length, is only connected with the mainland by a narrow isthmus 5 miles long. The western half of M. contains thirteen summits exceeding 2000 feet of altitude, Mulrea, the highest, rising 2683 feet; the eastern is more level, with numerous bogs and lakes—Lough Conn (q. v.) and portions of Loughs Mask and Corrib (q. v.). In 1876, 181,679 acres were under crop, 522,781 in pasture, 10,119 of plantation, and 603,202 waste, bog, water, &c. There were 17,411 horses, 19,259 asses, 173,596 cattle, 277,225 sheep, and 57,215 pigs. Agriculture, fishing, brewing, and distilling, are the chief industries, the linen manufacture having greatly declined. Marble, slate, potter's clay, and manganese are found in abundance. M. returns two members to Parliament, is traversed by the Great Northern and Western Railway, and the chief towns are Castlebar (the capital), Ballina, and Westport. Among the antiquities of the county are five round towers, and the ruins of six abbeys and ten castles.

Mayo, Richard Southwell Bourke, Sixth Earl of, was born at Dublin in 1822. He was brought up at home, and first entered Parliament in 1847 as member for County Kildare, but afterwards represented Cockermouth. He was three times Chief Secretary of Ireland under a Conservative ministry; in one of these terms of office he had to deal with the Fenian conspiracy, and was the member of the Cabinet most directly concerned in opposing Mr. Gladstone's Resolutions against the Irish Church. In 1868 he received the post of Indian Viceroy. By his capacity for work and strong personal character, he endeared himself both to the European and native world. He adopted a firm, but not meddlesome, foreign policy; reformed the finances, and changed the chronic deficit for a surplus; while he favoured many well-advised schemes of internal improvement. No great historical event marks his government, but all India mourned when he was struck down by the hand of a Mohammedan assassin, 8th February 1872, while he was visiting the penal settlement of Port Blair, in the Andaman Islands. There was no political or religious

animus in the crime. His body was brought home to be buried in Ireland with a public funeral, and a pension was settled upon his widow. In his young days he published a book on his travels in Russia, *St. Petersburg and Moscow* (Lond. 1846). His son, the present Earl of M., an officer in the Grenadier Guards, has written *Sport in Abyssinia* (1876). See *A Life of the Earl of M.*, by W. W. Hunter (2d ed. Lond. 1876).

May'or (Lat. *major*), the title in England and Ireland of the chief magistrate of a Corporation (q. v.). It answers to the Old Eng. *portreeve* and the Scotch *Provost* (q. v.), and was introduced by the Normans in the reign of Henry I. from France, where the mayors of the palace had risen to almost absolute power under the *faineant* Merwings, and where a *maire* is still at the head of each commune. The first M. of London was Henry Fitz-Alwyn (1189), and to his successor in 1354 Edward III. granted the prefix *Lord*, which was also bestowed on the M. of Dublin by Charles II. in 1665. The election of mayors takes place on November 9th; their office is tenable for a year, but they may be re-elected. The Lord Mayor of London receives £8000 per annum, with the use of the Mansion House, carriages, &c.; but the glories of his office have been greatly curtailed since the days of Pickard and Whittington. The French, however, still retain all their old belief in his despotic powers, as was shown on the occasion of the visit of the Right Hon. David Stone to Paris, for the opening of the Grand Opera (January 5, 1875).

Mayor's Court of London, Procedure Act. Under this Act (1857), if either party to any cause in which the value in dispute exceeds £20, is dissatisfied with the decision of the court in point of law, or upon the admission or rejection of evidence, he may appeal to one of the superior courts. Notice of intention to appeal must be given to the opposite party, or to his attorney, within two days of the date of judgment, and security for the costs of the appeal must be given and approved of by the registrar of the court.

Mayott'a, one of the Comoro Islands (q. v.), in the Mozambique Channel. It is 21 miles long and 7 broad, and is encircled by dangerous reefs which extend several miles from the land. M. is mountainous, and traces of volcanic action are everywhere abundant. The soil is fertile, and a considerable quantity of sugar is exported. In 1843 the French took possession of M., and on the small outlying islet of Zaudzi they have erected a fort, which is garrisoned by 100 men. The chief value of M. to France is as a harbour of refuge for her ships. Pop. 12,000, most of whom are Arabs or Sakalavas from Madagascar, who fled thence from the Hovas. See MADAGASCAR.

Maz'amet, a town in the S. of France, department of Tarn, at the foot of the Montagnes Noires, and on the Annette, 33 miles S.S.E. of Albi by rail. It has considerable manufactures of woollens, which, with linens and hydraulic limestone, it produces annually to the value of £720,000. Pop. (1872) 10,500.

Mazanderan', a province in the N. of Persia, is bounded N. by the Caspian, S. by Irak-Ajemi, from which it is parted by the Elbruz Mountains, E. by Astrabad, and W. by Ghilan. It is 200 miles long from E. to W., with an average breadth of 60 miles. Marshy, jungly plains, in some places 30 miles broad, skirt the Caspian, and in the S. the Elbruz sends out bold, densely wooded spurs, traversed in all directions by wild, romantic glens, and behind which tower the peaks and masses of the main range in rocky, naked grandeur, snow-spotted even in September. M. is watered by some fifty small streams, all well stocked with fish. Among the animals are the tiger, panther, bear, wolf, deer, and wild boar, while pheasants, woodcocks, and wild ducks abound all over the province. The climate, though not so damp as Ghilan, is one of capricious extremes. The products are rice, sugar, cotton, mulberry, and a vast variety of excellent fruits. Firdusi calls M. the 'land of roses.' On the coast the fisheries of sturgeon, carp, and salmon furnish the chief supply of caviare to the Russian market. The trade is principally with Russia through the port of Baku. The capital is Sari. The inhabitants, the most warlike of the Persians, furnish to the state about 12,000 foot soldiers. Besides Persian, a Turkish dialect is spoken by the peasantry.

Maz'arin, Jules, or **Giu'lio Mazari'ni**, a great French politician, was born either at Rome or at Piscina, 14th July 1602. His family was probably Sicilian. Educated at Rome and Alcala, he at first had a small command in the army of Pope Urban VIII., and afterwards distinguished himself in the diplomatic negotiations which followed the Mantua Succession War (1628–30). Through the favour of the Barberini family, the recommendations of Richelieu, and the high connections by marriage which his family made at Rome, he was appointed Nuncio Extraordinary at the Court of France, with instructions to demand restitution of the Duke of Lorraine's rights. Suspected of not serving Spanish interests properly, he was recalled. In 1640 he obtained the cardinal's hat, although he was never ordained a priest, and openly entered the diplomatic service of Richelieu, who in his dying letter bequeathed to him the task of securing the glory of France by a general peace (1642). M.'s first acts were merciful: the restoration to favour of D'Orleans, Bassompierre, Vitry, Vendôme, and the liberation of many state prisoners. On the death of Louis XIII. (1643), his graceful and insinuating manners rendered the regency of Anne of Austria purely nominal, and for eighteen years, with a short interval, he reigned supreme in France. The popularity of the victories of D'Enghien and Turenne enabled him easily to suppress the conspiracy of the *Importants*, of whom Beaufort was the chief, and to disregard the enmity of Innocent X. Anxious to add Elsass and the Low Countries to France, he proposed the marriage of Louis XIV. to Maria Theresa, the Infanta of Spain. Elsass was practically gained by the Treaties of Westphalia and Munster (1648), both to a large extent the work of M. In the meantime he had been living in a magnificent style. He had built the Palais M., and had introduced the Italian opera to France. M., however, had not the administrative abilities of Richelieu. The great cost of Government was aggravated by the permitted corruption and oppression of the collectors. The local Parliaments revived the question of 'la paulette,' and the first war of the Fronde (q. v.) began. In the period from 1649–52 more than 4000 satirical writings against M. issued from the French press. For two years he was kept in disgrace and exile by the Parliamentary party, whom he used to call the Cromwells and Fairfaxes. Not his least injury was the sale in fragments of his splendid library. The Pacification of Bordeaux (August 1653) saw him back again at the head of affairs. He pushed on successfully the war against Spain, concluded with Lockhart, Cromwell's nephew, a treaty of commerce and of alliance with England; on the election of Leopold I. arranged the League of the Rhine, so advantageous to France; and finally, by the Peace of the Pyrenees (1659), he secured the Infanta and completed the humiliation of both branches of the House of Austria. From this time until his death at Vincennes, 9th March 1661, M. was supreme in appearance as well as in reality. He abandoned his romantic relations with the Queen-mother, but he pushed his nieces Martinozzi and Mancini into brilliant marriages. M. was not a great statesman or patriot. He neglected the permanent interests of France. But he was strongly attached to the country of his adoption, whose welfare, indeed, he had identified with his own success in the crafty game of foreign politics which occupied his life. In home politics he worked by bribery and the grossest flattery, and he systematically enriched himself at the expense of the nation. More humane and more selfish than Richelieu, he had none of that statesman's profound views of the future. There are three collections of M.'s letters (1693, 1710, and 1836); a life by Aubéry (1751); an endless number of contemporary memoirs, and many studies in the history of the period, such as V. Cousin's *La Jeunesse de M.*, &c. In 1872 M. Chéruel commenced the publication of the whole of M.'s *Correspondence*.

Mazatlan', a port of Mexico, state of Sinaloa, at the entrance of a river of the same name into the Gulf of California. Its harbour is exposed to S.W. winds, its drinking water poor, and its climate hot (during August reaching to 105° in the shade), but not unhealthy. M. is important for its exports of mining produce, especially of silver. In 1873 the value of exports was $2,797,385, of which $2,435,450 was in gold and silver bullion; that of the imports $1,276,000. There entered and cleared the port 53 steamers and 26 sailing vessels of 117,493 tons. Pop. (1870) 12,706.

Mazepp'a, Jan (Russian **Ivan Stepanovitch M.**) Hetman (q. v.) of the Cossacks, was born in 1645 (another account gives 1622) of a good family in Podolia or Little Russia. He was for a time page to Jan Kazimierz, king of Poland, but a Polish noble named Falibowski having caught him in an in-

trigue with his wife, bound him, lying naked on his back, to his own horse, which was then driven wild. The horse bore him to his home. In 1663 he left this for the Ukraine, where his feats of strength and daring pleased the people, and his superior intelligence soon made him the secretary and adjutant of the Hetman Samoilovitch, whom in 1687 he supplanted and succeeded. Peter the Great made him Prince of the Ukraine. M. plotted with Karl XII. of Sweden to bring the Ukraine under Poland, and openly joined him for that end in 1708. After the battle of Pultava (1709) he shared the ill-fortune of Karl, whom he accompanied to Bender, where he died in 1710. M. is the subject of two pictures by Horace Vernet, and the hero of one of Byron's poems, a romance by Bulgarin, and a drama by Gottschall.

Mazur'ka, a Polish dance in triple time, popular now in Germany and England. It has also been worked out into an independent instrumental form, notably by Chopin.

Mazza'ra, a seaport on the W. coast of Sicily, province of Trapani, at the mouth of the Mazarus, 10 miles S.S.E. of Marsala by rail. It is surrounded by quadrangular walls, 36 feet high, and has a ruined castle, of date 1072, and a cathedral of the 11th c., containing three fine old sarcophagi. M. is the residence of a bishop, who has a revenue of 200,000 francs. Some 600 vessels, mostly small, enter the port yearly. Pop. (1874) 12,155. Originally a colony of the Selinuntians, it was destroyed by Hannibal Gisco, B.C. 409. In 807 A.D. the Arabs landed at Ras-el-Belât (*Punta di Granitola*) a little to the S.

Mazzari'no, a town of Sicily, province of Caltanisetta, 10 miles S.W. of Piazza. It has several fine churches, the palace of the Branciforte, a theatre, &c. Near it is the romantically situated castle of Grassuliato. Pop. (1874) 11,951.

Mazzi'ni, Giusepp'e, the apostle and creator of Italian unity, was born 28th June 1805, at Genoa, where his father was a physician. When the Piedmontese insurrection of 1821 broke down, he was already thinking of his country's future. He first tried to form a literary nationalist party, distinct from the conservative classicists and the moderate romantic school. He then perceived the necessity for direct action, and joined the Carbonari, whom, however, he describes as Macchiavellian, materialist, and relying on the French initiative. Having himself suffered imprisonment, he aspired to point out the true way of revolution. In 1831–32, he organised 'La Giovine Italia' ('Young Italy'), from Marseille; in 1834, the Savoy Expedition; in 1835, along with the Polish refugees, the 'Association of Young Europe.' After expulsion successively from Italy, France, and Switzerland, he came in 1837 to England, where he remained constantly 'conspiring' till 1848. In February 1849 he was elected a member of the Tuscan Provisional Government, and, on 29th March 1849, one of the Triumvirs of Rome. Compelled by the French occupation to return to England, he was nevertheless the soul of the risings in Milan and Piedmont of 1853 and 1857, and of the Sicilian Expedition of 1860. He died in lonely and unsuspected privacy at Pisa, 11th March 1871. The Italian Government, to whom his idealistic republicanism was a permanent embarrassment, found it possible when he passed away to express its sense of his noble service to the nation by honouring his remains with a public funeral.

The principles of M.'s life are well stated in the statutes of La Giovine Italia (vol. i. of his collected works, 1864–70, Lond.), and in his writings in the journal of that society; and his political mission is described in his famous letter to Carlo Alberto, the *quondam* Carbonaro, when he ascended the throne of Piedmont in 1831. M. proclaimed the sovereignty of the people, which he based not on the 18th c. conception of liberty or rights, but on that of positive religious duty. He also asserted the unity of the Italian people, and foretold their great destiny, not only in elevating themselves, but in contributing to the civilisation of Europe. Hence, every attempt at resurrection must aim, not at municipal or local, but at national independence. To educate the whole people in the knowledge of their future and in the necessity of their acting for themselves against Austria and the Bourbon Houses, and even against partial monarchy on moderate principles, was the object of M.'s literary existence. He even drew up rules for the conduct of guerilla warfare. Among his leading books may be mentioned the *Apostolato Popolare*, and his *Royalty and Republicanism in Italy*. He also wrote on general subjects for the London press—*e.g.*, his paper on Carlyle in the *Westminster Review*. M. was the object of passionate affection, not only to his Italian fellow-workers, but also to politicians of the advanced school all over Europe. Still more may be said with truth. Every lover of freedom, progress, and purity profoundly honoured one in whose character the tenderest humanity was combined with the most devoted patriotism; who adorned a great political creed with the blended virtues of the martyr and the saint. See a Memoir by E. A. V. (Lond. 1875).

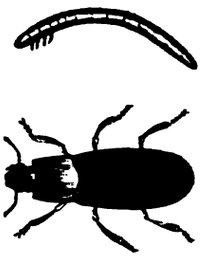
Mead, or **Metheg'lin** (Ir. Gael. *Meadh*, Sansk. *Madhu*, 'honey'), a spirituous liquor prepared by the fermentation of honey. Among Celtic races in early times the liquor occupied a prominent place, and the term honey-moon is said to have originated from the ancient Teutonic custom of using the beverage freely for thirty days after marriage.

Mead'ow Grass, as the book-name of a genus, is restricted to *Poa* (Gr. 'fodder'), two species of which, namely, *P. pratensis* and *P. trivialis*—the smooth-stalked and the rough-stalked M. G.—are valuable constituents of meadow herbage; they may be distinguished by the first having a creeping root stock. Even after the separation from the genus of *Glyceria*, &c. (see MANNA GRASS), it numbers about 100 known species, chiefly spread through cold and temperate regions of the world, from the sea level to very great altitudes. One species named *P. annua* may be said to be cosmopolitan. As far as Britain is concerned, it is the commonest plant of the flora, being found in all waste places where a plant can grow, even in the busy streets of London, and rising to 3200 feet in the Highlands. The Alpine species of the genus are botanically very interesting. *P. Abyssinica*, the teff of Abyssinia, has a grain that is made into bread of an agreeable acidulous taste. Several species are valuable as forming a good pasturage in moist saline soils, such as coast marshes, and *P. maritima*, besides this quality, helps by its creeping roots to bind the loose soil.

Meadow Saffron. See COLCHICUM.

Meal (Ger. *mehl*, Goth. *malan*, 'to grind'), is the coarsely ground or large-grained flour of any of the cereal seeds, or of other farinaceous products employed as food. From the important position the substance holds in human dietary, the term M. has come to indicate the entire fare of civilised man, whose periodical diets are called *meals*.

Meal Worm, the larva or grub of a beetle, the *Tenebrio molitor*, which lives among corn, meal, flour, and like substances. It is also frequently found among ship-biscuits which have been packed in casks. The M. W. is about an inch long. The body is smooth and glossy, and of cylindrical shape. The body of the perfect beetle is long and ovate, the legs are slender, and the tibiæ or shins are spurred. An allied species is *T. obscurus*, which is said to have been imported into England in American flour. Meal Worms are kept by bird-dealers, and sold as food for canaries and other caged birds.



Mealy Bug, the name given to the *Coccus adonidum*, a species of *Coccidæ* or *Hemipterous* insects, and a near ally of the Cochineal insect (q. v.) (*C. cacti*). It is found in hothouses, and feeds on pine apples and other fruits. Its colour is red, and the body is covered with a powder or dust, the presence of which has given origin to the name.

Mean, in Mathematics, is the name given to a number which is intermediate in value to two given numbers, and which is obtained from these numbers according to a certain rule. If three numbers are in arithmetical progression, the centre one is the arithmetic M. of the other two; if they are in geometrical progression, the centre one is the geometric M.; and if they are in harmonical progression, the centre one is the harmonic M. M. when used alone, always signifies the arithmetic M.

Mearns. See KINCARDINESHIRE.

Mea'sles (known also as Rubeola and Morbilli), is an eruptive fever of the exanthematous group of zymotic diseases, most probably depending upon the development, within the body, of a specific *contagium vivum*. The origin of M. is unknown, and the specific contagium has never been known to be spontaneously developed, but has always been communicated directly or indirectly from the diseased to the healthy subject. The most prominent symptoms of M. are lassitude and shivering, followed by heat of skin, rapid pulse, thirst, and general febrile symptoms, resembling those of catarrh, or severe cold in the head. There is usually an affection of the bronchial mucous membrane, manifested by slight sore throat, dry cough, and a sensation of tightness of the chest, and on the fourth day of the febrile symptoms the characteristic rash appears. The rash never appears until a week after infection; it is often deferred until a fortnight; but the usual interval is ten or twelve days. M. has been inoculated, and then the interval between inoculation and the appearance of the rash was seven days. The initial processes of the disease occupy six days, of which the last four constitute the well-known catarrhal stage; so that there are but three days of incubation, even if we include the initial fever which terminates the incubation stage. This period of incubation is prolonged for a day or two when the disease is taken by infection. The longest interval between exposure to infection and the appearance of the rash is eighteen days. On the third or fourth day of the primary fever the first crop of the eruption appears on the face, neck, and upper extremities, consisting of minute red papulæ, which coalesce into crescentic patches. On the following day the second crop covers the trunk; and, on the third day, another crop appears on the lower extremities. On the fourth day, the eruption begins to decline on the face; on the fifth, on the trunk; on the sixth, on the lower extremities, and then terminates by resolution and a furfuraceous desquamation of the cuticle generally. The febrile symptoms attain their maximum intensity about the fifth day; and, after continuing about twenty-four hours, rapidly decline, the normal temperature being reached on the second day from the beginning of the effervesence. In very severe cases the decrease in temperature may be prolonged. Two varieties of M. are described, viz., Morbilli *mitiores*, and Morbilli *graviores*, the main characteristic of the latter form being that the eruption becomes suddenly black, or of a dark purple with a mixture of yellow. M. may be distinguished as follows from Scarlet Fever or Scarlatina (q. v.). In M. the rash appears from ten to twelve days after exposure; in scarlatina, from two to ten. In M. it appears generally on the fourth day of the fever; in scarlatina, on the second. In M. the rash resembles flea-bites, is of a pinkish red or raspberry hue, coalescing in crescentic patches, and extending in successive crops; in scarlatina, the patches are large, universally diffused, and of a bright scarlet colour. In M. coryza is a prominent symptom, and the tonsils are but little affected; while in scarlatina, coryza is seldom present, and the tonsils are almost always greatly enlarged. In M. the fever subsides on the disappearance of the eruption, but in scarlatina it may continue for weeks, or until the sore throat has healed. In M. the tertiary symptoms are inflammation of the lungs or pleura, but in scarlatina they are more usually inflammation of the joints and serous membranes; affections of the kidneys and dropsy.

The average mortality of M. is 1 in 15, and the chief danger arises from bronchial and pulmonary inflammation. No antidote to the poison of M. is known, and the rule is to interfere as little as possible so long as the disease is pursuing its normal course, and to moderate and subdue dangerous symptoms. The patient should be carefully protected from cold for a week or two after desquamation has taken place, and the hot or vapour bath should be frequently used. Anointing the body with glycerine and carbolic acid, or peroxide of hydrogen, will serve the purpose of imprisoning and destroying the specific contagium of the disease; but complete disinfection under skilled supervision will be necessary before the disease germs can be eradicated.

Mea'sure, in Music. See TIME.

Meath (Ir. Gael. *Midhe*), a county of Ireland, province of Leinster, is bounded N. by Monaghan and Cavan, S. by Kildare and King's County, W. by Westmeath, and E. by Dublin, Louth, and the Irish Sea. Area, 579,861 statute acres; pop. (1871) 95,558. It has a coast-line of only 8 miles, and is watered by the Boyne, and its affluent the Blackwater. Part of the E. margin of the great Irish limestone plain, it has a loamy soil of great fertility, yielding good crops of oats, barley, wheat, beans, and pease, potatoes, turnips, mangold-wurzel, &c. In 1876 there were 140,714 acres under crops, 395,439 in grass, 10,568 in plantation, and 31,184 in bog, waste, and water. M. has (1876) 15,205 horses, 170,349 cattle, 217,069 sheep, and 17,085 pigs. The towns are Trim (the county town, pop. 2058), Cavan, Kells, and the S. part of Drogheda. M. returns two members to Parliament. Anciently part of an Irish kingdom of the same name, it was overrun by the Danes in the 9th c., taken by Strongbow about 1171, and granted by Henry II. to Hugh de Lacy. The ancient royal seat was the famous Temor or 'Tara of the kings.' Among the antiquities in which M. is singularly rich, the chief are the great rath at Tara, and the round towers at Kells and Donaghmore. It has also the ruins of some twelve castles and seventeen ecclesiastical buildings.

Meaux, a town of France, department of Seine-et-Marne, on the river Marne and the Ourcq canal, 28 miles E.N.E. of Paris by rail. M. is a well-built town, with fine promenades, and has a Gothic cathedral, dating from the 12th c., and containing the grave of Bossuet (q. v.), who was bishop of M. It is the centre of an extensive trade with Paris in corn, *fromages de Brie* (3–4 million francs yearly), and other provisions. The chief industries are copper-founding, distilling, cotton-spinning, and the manufacture of flour, pickles, beer, and agricultural instruments. M. is the Roman *Jatinum*, chief town of the *Meldi*, and has been a bishop's see from 375. Pop. (1872) 9528.

Mecca, a town of Arabia, capital of the Turkish vilayet of Hedjas, stands in a narrow, sandy valley watered by the Wadi-el-Tarafeyn, 249 miles S. of Medina, and 60 E. of the seaport of Jeddah (q. v.). With unpaved, sandy streets, M. is yet better built, and presents more of a European aspect, than most Eastern cities; its houses being of stone, three-storied, and with numerous windows looking on the streets. The only open space contains the chief mosque—the *Beitullah* ('house of God'), or *El-Haram* ('the inviolate')—inclosing the Kaaba (q. v.), and with nineteen gates and seven lofty minarets. There are no khans, no bazaars, only a few residences of the sherif and other magistrates, and a castle, on the eastern side of the valley, commanding the town, but itself commanded from the surrounding heights. The manufacture of rosaries is the sole industry of the inhabitants, who subsist by the entertainment of pilgrims, all Mohammedans being bound to visit M. at least once in their lives. In the *hajj* ('pilgrimage') of 1875, the number of pilgrims was reckoned at 140,000, of whom 40,000 came by sea, the remainder by caravans across the continent. To the falling off of pilgrims is due the decrease in the pop. of M.—from 100,000 to 45,000, according to Burton. The history of M. (the *Macoraba* of Ptolemy) begins with Mohammed (q. v.), who was born there (571), and whose successors the califs retained it in their power until the fall of Bagdad (1238). Later the sultans of Turkey assumed the title 'Protector of the holy cities M. and Medina,' and nominated the grand sherifs. It fell into the hands of the Wahabis (q. v.) in 1803, was held by the Egyptian pashas (1818–41), and reverted to Turkey, along with Hedjas, in 1867. See Burton, *Pilgrimage to El Medinah and Meccah* (Lond. 1856); and H. von Maltzan, *Meine Wallfahrt nach Mekka* (Leips. 1863).

Mechan'ics is strictly that branch of applied mathematics which treats of the action of machines. In this sense it was understood by Newton, but since his time the term has been very generally applied so as to embrace the whole range of mathematical physics or dynamics. Now, however, there is a tendency to restrict M. to its first signification. The simple machines, such as the lever, wedge, inclined plane, &c., were known in their applications to the ancients; but the first attempt to explain the principles of their action, and so establish the science of M., seems to have been made by Archimedes in his treatise *De Æquiponderantibus*. The publication of Galileo's *Della Scienza Mechanica* (1592), in which the lever, inclined plane, and screw are fully explained, gave the science a powerful impulse; and after this the progress of M. is lost sight of in the progress of the much wider and embracing science of Dynamics

(q. v.). Machinery bears to M. the same position which Kinematics (q. v.) does to dynamics, and is therefore a special part of kinematics just as M. is a special branch of dynamics. (See MACHINES.) Most of the English text-books upon M. really treat of dynamics—the name which formerly meant what M. here means, being *Applied M.* The most complete book on the subject is Rankine's *Applied M.*

Mech'lin (Ger. *Mecheln*, Fr. *Malines*), a city of Belgium, province of Antwerp, on the Dyle, a navigable affluent of the Scheldt, 15 miles S.E. of Antwerp, and 15 N.E. of Brussels by rail. It is the seat of the cardinal-archbishop, primate of Belgium, and has a cathedral of St. Romuald, founded in the 12th c., covering an area of 2 acres, and surmounted by an incomplete tower 345 feet high; the archiepiscopal palace, a grand modern edifice; the churches of St. John and Our Lady, enriched with pictures by Rubens; the town-hall, called the Beyard, built in the 15th c.; and a monument to Margaret of Austria (1849). One of the great industrial centres of Europe in the 14th c., M. has now lost all its commercial importance, retaining only some of the manufacture of 'M. lace' for which it has been long famous. Pop. (1875) 39,377.

Meck'lenburg, the name of two grand-duchies to the N. of Prussia, forming states of the German Empire.—(1) **M.-Schwerin**, by far the larger of the two, is bounded N. by the Baltic, S. by Brandenburg and Hanover, from which it is partly separated by the Elbe, E. by Pomerania and M.-Strelitz, and W. by Lauenburg and Ratzeburg. Area, 5135 sq. miles; pop. (1875) 553,734. Forming part of the N. German plain, and watered by the Warnow and Recknitz, it is to the extent of 70 per cent. arable, 11 forest land, and 9 pasture, the E. half being especially productive of rye, wheat, flax, and tobacco. Along the shores of the Baltic the soil is partly sandy, partly marshy, while inland the country is dotted with numerous lakes, of which the largest are Müritz and Schwerin. There is much rearing of cattle and horses (the latter being of superior value), and extensive industries in fishing and shipbuilding. In 1868 M.-S. joined the Zollverein, and in 1875 had a merchant service of 426 vessels (113,656 tons). Schwerin is the capital, and the ports are Rostock and Wismar. Emigration is diminishing the population (1849–64 by 93,000 men). Some of the noble families trace their descent from the Wendish invaders, who conquered the land about the time of the movement southwards of the Germanic peoples. The Grand-ducal house is the only reigning Slavic family in Europe, and in their full title the grand-dukes style themselves 'Princes of the Wends.' The two duchies hold diets of their 'estates' in common (since 1755), meeting once a year at Malchin and Sternberg alternately. The membership consists of 622 proprietors of Rittergüter ('Knights' estates'), of whom about one-fourth only exercise their privileges, and 40 delegates of towns. The great bulk of the pop., including the entire peasant class, are without any political rights. In 1876–77 the ordinary budget was £102,458, and the public debt, £1,573,345, more than half of which was raised for the construction of railways. The army of the two duchies belongs to the 17th division and the 9th army corps, and comprises two regiments of infantry and two of dragoons, one battalion of jägers, and four batteries of artillery. The bulk of the inhabitants are Lutherans, there being only 1195 Roman Catholics and 3065 Jews. M.-Schwerin has two votes in the Federal Council of the Empire, and six representatives in the diet.—(2) **M.-Strelitz** consists of two separate parts, the duchy proper on the E. side of M.-Schwerin (area 940 sq. miles; pop. 79,330) and the principality of Ratzeburg, lying between M.-Schwerin on the E., and Lauenburg and Lubeck on the W., and touching the Trave, an inlet of the Baltic. Total area 1131 sq. miles; pop. (1875) 95,673. The country and products are the same as those of the larger duchy, with which it has a joint representative chamber. The chief town is New-Strelitz.

History.—The territory was originally inhabited by Germanic tribes, and later by Wendish Slavs of the Obotrite stock, who were subdued and Christianised about 1160 by Heinrich, Duke of Saxony. The country was named Mikilinborg, from the seat (still a village near Wismar) of the Slavic prince Niklot, who was slain by Heinrich, but whose grandson, Heinrich Borwin, having married Heinrich's daughter, eagerly set himself to Germanise the country. M. was made a duchy of the empire in 1348, and divided into the two lines of M.-Schwerin and M.-Güstrow in 1611. Adolf Friedrich I., of the former line, and Johann Albrecht of the latter, were proscribed (1627) on account of their alliance with Christian IV. of Denmark, on behalf of the Protestant cause during the Thirty Years' War. Wallenstein held M. as a fief till 1632, when the banished dukes were restored by the help of Gustavus Adolphus. The many branches into which the ducal line subsequently split were reduced to the two still existing by the Imperial commission of 1701. See the histories of Lützow (3 vols. 1827–35), Boll (2 vols. 1855–56), and Raabe (2d ed. 3 vols. Wism. 1863).

Med'al. See NUMISMATICS.

Medall'ion (Fr. *médaillon*), a bas-relief of a head or figure on a panel of a circular or oval shape. In numismatics the M. is the largest known Roman coin, in gold or silver, struck during the empire, either for circulation or to commemorate persons or events.

Mede'a, the famous sorceress of Greek mythology, was a daughter of the Colchian King Æetes, and either the Oceanid Idyia or Hecate, daughter of Perses. When Jason came from Thessaly with the Argonauts (q. v.) to fetch the golden fleece, M., whose love he had gained, lulled the watching dragon, and enabled him to seize the prize, after which they left Colchis together. At Iolcos, to avenge the wrong done to Jason, she induced the daughters of Pelias to dismember their father's body and boil it in a cauldron, assuring them that thereby they should renew his youth. After this M. and Jason fled to Argos, where the latter fell in love with the king's daughter, Glauke, but M. contrived her death by a poisoned robe. At last she killed her own children by Jason, and went to Athens, whence she was forced to flee for plotting against the life of Theseus, but proceeded to Aria, ever afterwards called *Media*. Her story was the subject of tragedies by Euripides, Seneca, Corneille, &c. For the interpretation of the myth of M. on the solar hypothesis, see Cox's *Mythology of the Aryan Nations*.

Medell'in, capital of Antioquia, Colombia, S. America, in a beautiful and fertile valley of the Cordilleras, 5030 feet above the sea, has a large transit trade in gold, silver, copper, lead, emeralds, &c. In 1875 the amount of gold and silver despatched from M. amounted to 2,403,241 dollars, of which 1,768,368 dollars went to England. A railway is projected from the river Magdalena to M., a distance of 133 miles. Pop. 13,700.

Me'dia (*mada* = 'land' in the cuneiform inscriptions), a territory of ancient Asia, bounded N. and N.E. by the Caspian, E. and S.E. by the desert of Iram, S. by Persia, W. by Assyria, and N.W. by Armenia. It was 550 miles long by 300 broad, had an area of about 150,000 sq. miles, and comprised the modern province of Irak-Ajami, with parts of Kurdistan, Laristan, Azerbijan, and Ghilan. Ecbatana (q. v.) was the capital of this district. Its original inhabitants were Turanians, who were conquered at an early date by an Aryan race (the *Madai* of Gen. x. 2), entering from Bactria and Sogdiana. The dialect of these Medes was a cognate of Zend, their religion a simple form of Zoroastrianism. They seem to have been masters of Babylon (2458–2234 B.C.), and afterwards to have warred with and been partially subdued by the Assyrians, the first mention of them in the cuneiform inscriptions occurring about 880 B.C. In the 7th c., on the fall of Assyria (q. v.), they founded, under Cyaxares, a mighty empire, embracing all Persia, Assyria, Armenia, and Cappadocia, with a total area of 600,000 sq. miles. But this monarchy was as short-lived as it was vast. Cyaxares' successor, Astyages, was defeated and made prisoner by Cyrus (q. v.) in 558, and henceforth M. became absorbed in Persia, in spite of two attempted revolts. See Rawlinson's *History of Herodotus* (vol. i. pp. 401–422), and Grote's *History of Greece* (vol. iii. pp. 301–312).

Media'tor is one who reconciles persons who are at variance. Among the Jews the recognised M. between God and the people was the priest, who made an *at-one*ment for them. This sacrificial language is applied in the New Testament to Christ, who is the high-priest and M. of the New Covenant, and makes an Atonement (q. v.) for the people. In the Roman Catholic Church the functions of a M. also belong to priests, who alone can administer the sacraments, offer sacrifices, and grant absolution, to saints (especially the Virgin Mary), on account of their superabundant merit, and to angels.

Medical Department of the Army. The M. D. of the A. is, next to the commissariat, the most important of the non-combatant sections of the army, the duties of its officers being the maintenance of the health of the troops, their efficient treatment during sickness, and the surgical treatment of the wounded in time of war. In the British army every battalion, when in the temperate zone, has a surgeon and an assistant-surgeon; and when in India or the tropics an assistant-surgeon is added. According to official documents, the army has one surgeon for every 202 men, while the civil population has only one for every 1276 inhabitants. The M. D. of the A. is presided over by the director-general, who is a member of the War Office; a deputy surgeon-general of the sanitary branch, a deputy surgeon-general of the statistical branch, a surgeon-general of the medical branch, four surgeons-major, and a senior clerk. The different grades are surgeon, surgeon-major, deputy surgeon-general, and surgeon-general. Candidates for admission to the service must be not under twenty-one nor above twenty-eight years of age; a board of medical officers must determine as to physical fitness, and they must be registered practitioners, possessed of two diplomas or licences, one to practise medicine and the other surgery in Great Britain or Ireland. After passing a professional examination by the examining board, they are required to attend a course of practical instruction at the Army Medical School at Netley on (1) hygiene, (2) clinical and military medicine, (3) clinical and military surgery, and (4) pathology of diseases and injuries incident to military service. After a satisfactory examination on these subjects the candidate is eligible for a commission as surgeon. By a Royal Warrant, of 28th April 1876, respecting medical officers in the army, a complete revolution has been effected, and a short-service system introduced. It provides, *inter alia*, as follows:—On the completion of ten years' commissioned service, unless the surgeon be specially selected for further employment in the A. M. D.; or if he be unwilling to continue to serve therein, his services shall be dispensed with, and he shall be entitled to receive, in lieu of all pension or retirement, pensions for wounds excepted, the sum of £1000. Every year the commander-in-chief, on the recommendation of the director-general of the A. M. D., may select, with the approval of the secretary of state, a number of surgeons, not exceeding six, who shall be retained in the service, and shall be promoted after twelve years' service on full pay to the rank of surgeon-major. All promotion from the rank of surgeon-major to that of deputy surgeon-general shall be given for ability and merit upon the selection of the commander-in-chief, with the approval of the secretary of state, and the grounds of such selection shall be stated in writing and recorded in the department. The full pay per diem of a surgeon, on appointment, is 13s. 8½d.; and, after ten years' service, 17s. 6d.; of surgeon-major, according to length of service, from £1 to £1, 5s.; of deputy surgeon-general, from £1, 10s. to £1, 17s.; and of surgeon-general, from £2 to £2, 10s. The non-effective pay of the above-named officers, is, respectively 10s.; from 11s. to £1; from £1, 1s. to £1, 5s. 6d.; and from £1, 10s. to £1, 17s. 6d. A medical officer retiring after full-pay service of twenty-five years and upwards may, if recommended for the same by the head of his department, receive a step of honorary rank, but without any consequent increase of pay. Medical officers shall have a right to retire on half-pay after twenty years' service; medical officers of the rank of surgeon-major, or surgeon, shall be placed on the retired list at the age of fifty-five, and all surgeons-general, and deputy surgeons-general, at the age of sixty years. Good-service pensions are awarded to the most meritorious officers, and six of the most meritorious officers of the A. M. D. are selected as honorary physicians, and six as honorary surgeons to the Queen.

Medical Department of the Navy. The M. D. of the N. is presided over by the director-general and the medical officer at the Admiralty. The various grades in the service are surgeon, staff-surgeon, fleet-surgeon, deputy inspector-general of hospitals and fleets, and inspector-general of hospitals and fleets. The regulations for obtaining a commission in the M. D. of the N. are similar to those for the army. After completing three years' full-pay service, surgeons are allowed to be examined for the rank of staff-surgeon, but no surgeon can be promoted to the rank of staff-surgeon until he shall have served five years, two of which must have been in a ship actually employed at sea. Promotion to the rank of fleet-surgeon is open to officers for distinguished or special service, although twenty years on full pay may not have been completed; such fleet-surgeons have 16s. a day half-pay. Fleet-surgeons rank with commanders, according to date of commission, and they are appointed to the flag-ships of commanders-in-chief on foreign service. The full pay per diem of a surgeon is, according to length of service, from 11s. to 17s.; of a staff-surgeon, 18s. to £1, 2s.; of a fleet-surgeon, from £1, 3s. to £1, 10s.; of a deputy inspector-general of hospitals and fleets, £1, 11s. to £1, 18s.; of inspector-general of hospitals and fleets, from £2, 5s. to £2, 10s. The half-pay of the above-named officers respectively is from 6s. to 11s., from 11s. to 14s., from 16s. to 18s. 6d., from £1, 1s. to £1, 7s., from £1, 11s. to £1, 18s. Retirement is provided for, according to age and service, under special regulations.

Medical Practi'tioners. Qualified M. P. are entitled to be registered as such on payment of a fee of £2 in respect of qualifications obtained before January 1, 1859, and of £5 in respect of qualifications obtained since that date. Every person possessing one or more of the following qualifications is entitled to be registered: Fellow, Member, Licentiate, or Extra-Licentiate of the Royal College of Physicians of London, of Edinburgh, and of Ireland; Fellow, or Member, or Licentiate in Midwifery of the Royal College of Surgeons of England; Fellow or Licentiate of the Royal College of Surgeons of Edinburgh, of the Faculty of the Physicians and Surgeons of Glasgow, and of the Royal College of Surgeons in Ireland; Licentiate of the Society of Apothecaries, London, and of the Apothecaries' Hall, Dublin; Doctor, or Bachelor, or Licentiate of Medicine of any university of the United Kingdom; Licentiate in Surgery of any university in Ireland; Doctor of Medicine, by doctorate granted prior to 2d August 1858 by the Archbishop of Canterbury; Doctor of Medicine of any foreign or colonial university or college, practising as a physician in the United Kingdom before 1st October 1858, who has taken such degree after regular examination. Persons who were practising medicine prior to 1815, and those who held appointments as surgeons or assistant-surgeons in the army, navy, militia, or East India Company prior to 1858, and persons practising on foreign or colonial diplomas or degrees prior to 1858, if such have been obtained after regular examination, are entitled to be registered. Registration is not compulsory, but unregistered M. P. cannot recover charges for professional services or medicines in a court of justice; nor can they hold any appointment in the military or naval service, or in the mercantile marine; nor can they hold any public medical appointment, nor a medical appointment in any institution not supported wholly by voluntary subscriptions; nor can they sign any medical certificate required by any Act of Parliament. The names of M. P. may be removed from the registration roll on account of unprofessional conduct, and M. P. are liable to prosecution for negligence and malpraxis. The principal appointments held by registered M. P. are as follows: surgeons in the army, the navy, and the Indian army, and in passenger and merchant ships; medical inspectors of merchant and passenger ships, and of seamen; prison and factory surgeons; medical officer to the Local Government Board; medical visitors of lunatics; medical officers under the Contagious Diseases Acts, and in parishes and unions; public vaccinators; vaccination officers; analysts under the Adulteration of Food Acts; medical officers of health, &c., &c. The principal statutes affecting M. P. are—The Medical Act, 1858, amended 1860, 1873, and 1876; Incorporation of the General Council, 1862; Amendment of Medical Acts so far as relates to London University, 1873; Colonial Practitioners, 1868; The Apothecaries Act, 1815, amended 1874; the Practice of Anatomy, 1832, amended 1871; Vaccination, 1867, amended 1871 and 1874; Medical Witnesses at Coroners' Inquests, 1836, amended 1837; The Sale of Poisons, 1868, amended 1869; The Sale of Arsenic, 1851; The Sale of Poisons in Ireland, 1870; Lunacy Acts 1838, 1840, 1845, 1853, 1855, 1860, 1862; The Contagious Diseases Act, 1866 and 1869; Surgeons in Passengers Ships, 1855; Surgeons in Merchant Ships, 1854 and 1867; Prison Surgeons, 1865; Factory Surgeons, 1844; Births, Deaths, and Marriages, 1836 and 1874; Public Health in England, 1875; Public Health in Scotland, 1867; Public Health in Ireland, 1874; Adulteration of Food, Drugs, &c., Acts, 1860 and 1872; Local Government

Board Act, 1871; Local Government Board (Ireland) Act, 1872; Act to Remove Restrictions on Granting Qualifications for Registration on the Ground of Sex, 1876; The Medical Practitioners Act, 1876; The Vivisection Act, 1876.

Medical School, Netley. The military M. S. at N. is attached to the Royal Victoria Hospital, which is the great invalid depôt for the whole army. The director-general of the army medical department is president of the senate, the other members of the senate being the physician to the council of India, the director-general of the medical department of the navy, the professors of the army medical school, and the principal medical officer at Netley, *ex officio*. There are four professors and assistant professors, who teach military surgery, military medicine, military hygiene, naval hygiene, and pathology, naval hygiene being taught by an additional assistant professor. Successful competitors for appointments in the army, navy, and Indian medical services are required to attend, subsequently, at Netley a course of practical instruction in the duties they will have to perform in the army and navy. The course lasts four months, after which an examination is held to ascertain the progress made by each candidate. The candidates also attend the wards of the hospital to study the diseases of the invalids, the system of recruiting, and the modes of keeping the army medical returns and records. During his service at Netley each candidate receives an allowance of 5s. per diem, and 2s. per diem for lodging money, if quarters are not found him. He wears uniform, attends the medical staff mess, and is under the usual military discipline. At the conclusion of the course, the candidate, if he passes the examination satisfactorily, is eligible for a commission as surgeon.

Me'dici (pron. *Medichi*; Fr. *Médicis*), an Italian family that first gained distinction in the 14th c., when Giovanni de M. rendered valuable aid to Walter of Brienne, Duke of Milan, especially by capturing the fort of Scarperia. His descendants Alamanno, Salvestro—one of the best magistrates Florence ever had—and Veri de M., added lustre to the name; but the family star seemed on the wane when Antonio was executed in 1397. Giovanni de M., however, a rich merchant belonging to a humble branch of the family, restored its fortunes, and dying in 1429 left two sons, Cosmo and Lorenzo, the former of whom, while continuing his father's business as banker and merchant, mainly directed his efforts to the acquisition of supreme power in Florence. Concealing a great ambition behind careless luxury and munificence, twice exiling himself that the Florentines might find how necessary he was to them, he finally established himself as the most powerful ruler in Italy. He became the princely patron of science and all liberal arts. From the ruins of the falling Eastern Empire his agents rescued priceless literary treasures—Latin, Greek, and Hebrew MSS., with which he formed the basis of the Laurentian Library; the most prominent of those engaged in reviving ancient learning were invited to live in his palace; when Constantinople was captured in 1453 the wisdom of the East was laid at his feet, and his school of philosophy, the first established in Europe, restored to Plato the eternity of fame he had nearly lost; he raised art from the dust to a throne—in his day worked Masaccio, the Piselli, the Lippi, Binozzo, Sandro, Ghirlandaio, with younger and greater men; and for him Donatello—Pygmalion-like with his Zuccone—wrought daily miracles in marble, Brunelleschi reared the Duomo that Vasari feared would make the heavens envious, and Ghiberti cast the bronze doors in San Giovanni which Michael Angelo thought fit for the gates of heaven. With all the powers of gold he bought the hearts and the liberty of his fellow-citizens; with wise precaution, moreover, he married his children to representatives of the leading families around him; and he died with the title of Pater Patriæ. The same magnificent policy was pursued by Cosmo's grandson, Lorenzo, who succeeded a weak father in 1467. His brother Giuliano, at first associated with him in the government, was assassinated in the Church of the Reparata, and to show the popularity of the family, it may be mentioned that when after this deed several hotheads of the Pazzi faction ran through the streets crying 'Liberty and the People,' the mob strung them up, shouting Palle, Palle (*the Balls*, the Medici sign). Not without strife with Pope Sixtus IV., Ludovico Sforza, Ferdinand of Naples, and others, Lorenzo yet devoted most of his years to the cultivation of science and literature. He himself wrote verses which Mirandola declared better than Dante's; he would read Plato with his philosophers in the morning, and sing his own obscene songs to the same applauding philosophers in the evening. The classical taste made fashionable by Cosmo had now gone so far that none would write in Italian, or in anything but the best Latin or Greek. Cardinal Bembo writes to a friend that he had better not read St. Paul's Epistles, for their barbarous style might corrupt his taste. Lorenzo effected some improvement here. Still, however, he continued the collection of ancient MSS., and the value of his services to European literature in this work is beyond all computation. He collected art antiquities likewise with great assiduity, and set apart his gardens adjoining St. Mark's for the study of the antique. All that could please the intellect and the senses was drawn to Florence; it had become a pagan city of delight, wherein life was a continual carnival. This was the state of matters amid which Leonardo da Vinci was dreaming his dreams of beauty, Benvenuto Cellini imprisoning his genius in wondrous gold cups and boxes, and Michael Angelo beginning to draw men as gods, upon all which the stripling Macchiavelli looked with the glance of a gamester, and Savonarola with tears in his eyes.

Lorenzo died April 8th, 1492. His son Giovanni, made cardinal at the age of thirteen, became Pope Leo X., and continued the patron of letters and art. Pietro, who succeeded Lorenzo, sacrificed Florence to Charles VIII.; but Leo again restored the family to power. Cosmo, not a direct descendant of Lorenzo, became Grand Duke of Tuscany about 1530, and founded a short dynasty, which ended in 1737. The policy of the M. was ever to indulge the inclinations of the people, and, blinding them to national interests with present pleasures, to fix firmly in their midst the foundations of an absolute monarchy. As princes they were lavish and magnificent; but as men they were, with scarcely an exception, unscrupulous, licentious, cruel. While their sun was in the meridian, men were content to take splendour for worth; but when it sank it left behind a night of corruption and fear. See Roscoe's *Life of Lorenzo de M.* (a blindly partial panegyric), and his *Life of Leo X.*; Fabroni's *Magni Cosimi Medicei Vita* (Pisa, 1789, a careful work); Galluzzi's *Storia del Granducato di Toscana sotto i M.* (Flor. 1781). For an antidote to Roscoe see Sismondi's *Histoire des Républiques Italiennes* (Geneva, 1807), Trollope's *Commonwealth of Florence* (4 vols. Lond. 1865), Perrens' *Histoire de la Littérature Italienne* (Par. 1867); and Symonds' *Renaissance in Italy* (Lond. 1877).

Medici'na, a thriving town of N. Italy, province of Bologna, 28 miles N. by W. of Imola, was formerly surrounded by walls, and has an artesian well in one of its squares. It is built on the site of the ancient *Claterna*, and possesses many fine antiquities. Pop. (1874) 11,355.

Medi'cinal Plants are very numerous, and belong to the most widely different orders; and, in some orders, particular properties are prevalent. Important properties are often characteristic of a very limited group of species, as in the case of the *Cinchonas*. In almost every country, plants peculiar to the district are used by the natives for medicinal purposes. The value of many having been fairly established by long experience, they have been adopted in other countries, and transplanted for cultivation. In many cases, however, plants so transplanted have not retained in full degree their original properties, owing probably to variations in climate and soil. The parts endowed with the medicinal properties may be used in the form of powder, or the active principles may be extracted by infusion and decoction, or by the aid of alcohol or ether. The more active ingredients may also be separated in the form of alkaloids. Officinal M. P. are those which have a place accorded them in pharmacopœias, and in the practice of educated medical practitioners; but there are many valuable plants which are not so classified. The cultivation of M. P. is carried on to a great extent at Mitcham, near London; and Cinchona trees have been recently introduced into India and successfully cultivated there for the production of quinine. See *M. P.* by Bentley and Trimen (Lond. 1877).

Medi'cine and Sur'gery, History of. The early H. of M. is involved in obscurity; but the first systematic treatises appear to have been compiled in China and India. Cholera, or a disease resembling it, was described in China, 2500 B.C., by

the very name which it now bears, viz., *hwo-luan*. The systematic Hindu works on medicine appear to have been compiled and arranged before the corruption of the primitive mythology. The Ayur-veda is allowed to be the most ancient system of medicine, but the age in which it was written is not known. It was probably compiled about the period of the Manu code of laws, 900 B.C., but fragments only are now procurable. The Charaka is the most ancient existing medical work of the Hindus, and may be compared to the works of Hippocrates, who probably derived some of his observations from this source. The work is arranged in the form of dialogues between the master and his pupils, and consists of eight books. The Susruta, supposed to be of later date, is more systematic than the Charaka, and is divided into six books, as follows:—(1) Medical doctrine, (2) Pathology, (3) Anatomy, (4) Therapia, (5) Doctrine of Antidotes, and (6) The Supplementary Section. Medicine was practised by the Vaisya caste, and it was said that 'the Brahmin learned the medical Shastres for his own interest and character; the Kshatrya, for the benefit of his health; and the Vaisya, for his subsistence, as he was alone allowed to receive recompense from the sick.'

It is probable that medical science extended from India to Upper Egypt, and from thence to Lower Egypt; for the natives of India had, from time immemorial, commercial relations with the Gulf of Aden and the Red Sea ports. The Egyptians, according to Herodotus, successfully cultivated the art of medicine, and, in practice, they divided it into distinct branches. The writings of Moses show that the Jews had paid considerable attention to medical science, more especially the highest branch of it, viz., the preservation of health, and the prevention of contagious diseases by isolation and cleanliness. The Chinese, Hindus, Egyptians, and Jews paid great attention to hygiene, and the Mosaic code of sanitary laws is much superior, in some respects, to any that have since been compiled. Cheiron, the centaur, a native of Thessaly, is fabled to have introduced the art of medicine among the Greeks, probably from Egypt, and to have instructed the heroes engaged at the siege of Troy in the art. Æsculapius (q. v.), a native of Epidaurus, and a disciple of Cheiron, is spoken of in the Homeric poems as 'the blameless physician,' who went about Greece healing diseases and raising the dead to life. After his death, divine honours were paid to him, and temples were erected to him in various parts of Greece. Two of his sons accompanied the Greeks to the Trojan war. For several centuries after the Trojan war, medical practice was confined to the Asclepiades (q. v.), the reputed descendants of Æsculapius, and the temples dedicated to him were employed, to a certain extent, as schools of medicine. According to Herodotus, the Greeks possessed more medical skill than the Egyptians in the time of Darius, the son of Hystaspes. Pythagoras, who lived 600 B.C., was the first to bring the principles of philosophy to bear upon the study of medicine, and to raise it to the dignity of a science. His pupils, Democritus and Heraclitus, paid special attention to comparative anatomy, and, probably, first dissected the human subject. Their contemporary, Herodicus, first introduced the practice of gymnastic exercises as a part of hygiene and medical treatment.

The one who contributed more than any other single individual, either of his own or of any other age, to the advancement of both medicine and surgery is Hippocrates (q. v.), who lived about 400 B.C. Taking experience as his guide, he carefully observed nature, and after collecting facts, he sought to deduce the general laws by which these facts might be explained. In his writings we meet with the first traces of physiological science. His reputation principally rests upon the improvements which he effected in the practice of medicine, yet he was evidently skilled in the art of surgery. He is said to have been the inventor of the art of bandaging; he used the trepan, and also complicated machines in reducing dislocations, and he tapped the chest in cases of hydrothorax. His sons, Thessalus and Draco, and his son-in-law Polybius, were the founders of the medical sect or school which was called the Hippocratean or Dogmatic School.

The successors of Hippocrates were, for a long time, content to follow the course of their master, and to yield unqualified assent to all his doctrines. Dioctes of Carystus obtained great celebrity for his learning and skill. He paid great attention to anatomy; the study of the vascular system; the nature of the respiratory process, and the appearances of the urine in disease. He also invented an instrument for the extraction of darts. Praxagoras of Cos was the first to distinguish the arteries from the veins, and to recognise the state of the pulse as an index of the condition of the vital powers. His surgical practice was bold rather than prudent, as, in cases of colic, he opened the abdominal cavity. Aristotle made great advances in natural history and anatomy. He was the first to point out the origin of all the blood-vessels in the heart, and he gave the name of aorta to the largest artery in the body.

The next important epoch in the H. of M. was the establishment of the Alexandrian school of philosophy by Ptolemy Soter, about 300 B.C., where students of medicine enjoyed many privileges, the most important being the opportunity of dissecting the human subject, the bodies of criminals having been given up for that purpose. The most celebrated anatomists of that period were Erasistratus (q. v.) and Herophilus, who discovered the functions of the nervous system and the lacteal vessels. At about this time the profession of medicine was divided into the three departments of dietetics, pharmacy, and surgery, each division being exercised by separate individuals. The surgeons of Alexandria attained considerable dexterity, and operated for stone in the bladder with the *apparatus minor*, as described by Celsus; and Ammonius, about this time, invented an instrument for crushing the stone in the bladder. The Alexandrian physicians formed themselves into a distinct sect called the *Empirics*, the founder of the sect being Serapion, a pupil of Herophilus. The Dogmatists maintained that the treatment of disease should be based on a knowledge of the healthy structure and functions of the body, and of the influence of remedies, and the effects of disease upon it; while the Empirics maintained that such knowledge was unnecessary and unattainable, and that simple experience should be the only guide to practice. For some centuries the progress of medicine was arrested by the controversies of the rival sects.

The next important epoch in the H. of M. was the Roman. Archagathus, a Peloponnesian surgeon, settled at Rome about 200 B.C., but his practice was so severe and so unsuccessful that he was banished. About a century after, Asclepiades, of Bithynia, acquired a great reputation, from the strict attention which he paid to the comfort of his patients. He is said to have been the first who divided diseases into acute and chronic. He was succeeded by his pupil Themison, of Laodicea, who founded a sect called *Methodics*, who adopted a middle course between the *Dogmatists* and the *Empirics*, and were the prevailing sect for the first two centuries of our era. Among the adherents of this sect were Soranus and C. Aurelianus, some of whose writings have come down to us. The *Dogmatists* broke up, finally, into various sects, the chief of which were the *Pneumatics*, represented by Aretæus (q. v.), of Cappadocia, and the *Eclectics*, of whom Archigenes, of Apamea, who practised in Rome at the time of Trajan, was the most celebrated.

The most remarkable writer of this age is Aulus Cornelius Celsus (q. v.), the first native Roman practitioner whose name has been handed down to us, who, in his work *De Medicinâ*, gives a sketch of the H. of M. He defends the study of anatomy against the Empirics, gives excellent surgical precepts regarding lithotomy, trepanning, the treatment of fractures and dislocations, the operation for cataract by depression, and the reduction of hernia. He was the first to recommend the application of ligatures to bleeding vessels. Among physicians of this age may be mentioned Andromachus, the inventor of the theriaca; Pliny, the naturalist; and Dioscorides. Heliodorus and Antyllus, celebrated surgeons of the reign of Trajan, contributed much to the advancement of surgery. The latter speaks of the operation for cataract by extraction, gives directions for the operation of tracheotomy, and the radical cure of hydrocele by incisions into the tunica vaginalis.

The writings of Claudius Galenus (q. v.), commonly called Galen, who was born at Pergamus in the year 130 A.D., form an epoch in the H. of M., and were universally acknowledged as ultimate authority until the 16th c., when they were attacked and publicly burned by Paracelsus (q. v.). Galen's contributions to medical science were so superior to those of his predecessors from the time of Hippocrates, and to those of his contemporaries, that they acted for centuries as a check to all attempts at further improvement. Paulus Ægineta lived about the middle of the 7th c., and was the last physician of any note of the Greek school of medicine.

The next epoch in the H. of M. is the advent of the Arabian school. After the conquest of Alexandria in A.D. 641, by the Moslems, the writings of Hippocrates and Galen were translated into Arabic, and enlarged by copious commentaries. About the end of the 8th c. a medical college was founded at Bagdad, and public hospitals were built. Rhazes, who lived about the commencement of the 10th c., was the first writer of note, and the first to describe smallpox and measles. Avicenna (q. v.), who flourished in the 11th c., and was called 'the prince of physicians,' wrote the *Canon Medicinæ*, a cyclopædia of medicine and the collateral sciences. Albucasis, who died A.D. 1112, was the most celebrated of the Arabian surgeons, but his practice was attended with unnecessary severity. Hæmorrhage from a bleeding stump was arrested by dipping the part into boiling pitch, a practice continued by Arabs till the present day. Avenzoar and Averhoës (q. v.), though natives of Spain, wrote in the Arabic language. The Arabian school made no advances in surgery, but did good service to medicine by the correct description of several diseases, the first record of new and important ones, the introduction of new articles into the materia medica, and by making known the first elements of pharmaceutical chemistry, as the art of distillation, and the preparation of various metallic oxides and salts.

After the extinction of the Arabian school an interval of 300 years, from the 12th to the 15th c., elapsed, during which the science of medicine fell into the lowest state of degradation. In the beginning of the 11th c. a medical school was established at Salerno, in Italy, the earliest establishment where regular medical diplomas were granted to candidates, after they had passed through a prescribed course of study, and been subjected to certain examinations. In 1163, the Council of Tours prohibited the clergy from undertaking any bloody operation, and surgery was abandoned to the laity. The Salerno school was gradually eclipsed by the medical schools at Bologna, Padua, Vienna, Paris, &c., in the 14th and 15th centuries. Mondini publicly dissected two human bodies at Bologna in 1315. Gilbertus Anglicanus, who lived about the beginning of the 14th c., is the first English surgeon whose name has been handed down to us. The 15th c. gave birth to Linacre, who, after studying at Oxford, proceeded to Bologna, Florence, Rome, Venice, and Padua, and afterwards founded the London College of Physicians. During the 15th c. syphilis first broke out in Italy; the sweating-sickness first appeared in this country, and hooping-cough and scurvy were first described. The sect of *chemical* physicians arose, headed by Paracelsus, who publicly burnt the writings of Galen, and who maintained that all the phenomena of the living body may be explained by the same chemical laws as those which rule inorganic matter; but the chemists of that age did nothing to advance medicine beyond adding several valuable metallic preparations to the materia medica.

At the commencement of the 16th c. surgery was still in a degraded condition; but at length Antonio Beneveni, a Florentine physician, insisted that the compilations of the ancients and the Arabians should be relinquished for the observations of nature. The labours of Vesalius gave birth to anatomy, and the art of surgery assumed a higher rank. The most celebrated surgeon of the 16th c. was Ambrose Paré, a native of Laval, who revived the use of the ligature in the treatment of hæmorrhage. At this time the practice of surgery was associated with that of the barber, and the barber-surgeons continued to practise for a period of nearly two hundred years. The 16th and the 17th c. was the epoch of many celebrated anatomists and physiologists, who gave a fresh impulse to medicine and surgery, the most celebrated of whom were Eustachius, Fallopius, Aselius, Harvey, Rudbeck, Fabricius, Glisson, Bartholin, Malpighi, Willis, Bellini, Hooke, Sylvius, and Marcus Aurelius Severinus, the restorer of operative surgery. The most celebrated English surgeons of the 17th c. were Richard Wiseman and William Harvey (q. v.), whose name is rendered immortal by his discovery of the circulation of the blood, the benefits of which, as regards the science of medicine and surgery, can scarcely be over-estimated. Sydenham was unquestionably the greatest physician of the time, and gave an impetus to medical science which extended over Europe. During this period, chemistry was separating itself from alchemy, and advancing to the position of a science, and, by its combination with physiology, gave rise to a new sect of physicians called the *Humoralists*, who considered that diseases were referrible to certain fermentations which took place in the blood, and that certain *humours* were naturally acid and others naturally alkaline, and that as each predominated, certain specific diseases were the result, which were to be removed by the administration of antidotes. They were soon succeeded by the *mathematical* physicians, or the *iatro-mathematical* school, represented by Borelli, Sauvages, Keill, Jurin, Mead, and Freind, who applied the laws of mechanics to the explanation of all the phenomena of the living body. These rival sects were followed by the *vitalists*, headed by Van Helmont (q. v.), who held that in the living body there is a principle which presides over and directs all the processes of the living body, and is directly opposed to the influence of chemical and mechanical agents.

During the early part of the 18th c. Boerhaave, and his pupil, Van Sweiten, were the most eminent teachers of medicine, and they adhered to the leading principles of the *vitalist* school. Haller (q. v.), the Swiss anatomist, and the father of modern physiology, maintained the doctrine that irritability and sensibility are specific properties of the muscular and nervous systems, a doctrine controverted by Professor Whytt, and Porterfield of Edinburgh. Cullen (q. v.), of Glasgow, advanced the science of medicine more by his classification of diseases than by the formation of the Cullenian school of medicine. With him and his former assistant and acrimonious rival, John Brown, the founder of the Brunonian system of medicine, theoretical medicine ceased in Europe. Since that time physicians have not been guided by any general medical theory. The 18th c. was rich in distinguished surgeons. The Dutch surgeons, Ruysch, the anatomist, Roonhuysen, the obstetrician, and Raw, the lithotomist, concealed their modes of operation, but their secret practice was discarded by their successors. France produced two surgeons of extraordinary genius—Petit and Desault; while Great Britain can boast of Cheselden, the lithotomist, the two Monros, Cowper, White, Pott, Hawkins, Smellie, and the eminent John Hunter; Italy of Lancisi and Morgagni; and Germany of Heister and Scemmering.

The present century may be considered as the epoch of physiological experiment and clinical observation, and the list of distinguished physicians and surgeons, of anatomists, physiologists, pathologists, and hygienists, is too extended even for enumeration. In no former epoch of the healing art have so many sure advances been made in medicine, surgery, and the collateral sciences. By the aid of the microscope, chemical re-agents, galvanic and electric appliances, intimate pathology, and physiology, as well as the diagnosis of healthy and morbid conditions, in the living body, are being advanced with the most astonishing rapidity. By the aid of anæsthetics, recently introduced by Sir James Simpson (q. v.), the most formidable operations may be performed without pain, and by the antiseptic system of surgery introduced by Professor Lister of Glasgow and Edinburgh, the dangers resulting from them are reduced to a minimum. The most marked triumph of medicine in the present century has been the application of vaccination, the discovery of Jenner (q. v.). Within recent years the doctrine of *contagium vivum*, and its application to medicine has been, and is still being investigated with the most wonderful results. The virus of vaccinia, small-pox, sheep-pox, diphtheria, erysipelas, and glanders, has been proved to consist of minute particles having the character of micrococci, and it is highly probable that the connection of all the specific fevers, such as typhus, typhoid, scarlet-fever, measles, and the rest of the contagious diseases, with pathogenic organisms, will soon be demonstrated. The germ problem, as applied to disease, has been investigated by Dr. Burden Sanderson, Dr. W. Roberts, Professor Lister, and most recently by Professors Tyndall and Cohn, and in 1876 and 1877 by Dr. Braidwood and Mr. Vacher, on behalf of the British Medical Association. The spirit of research is equally characteristic of all the medical schools of Europe; and America has made many valuable contributions to medicine and surgery. State medicine, which has for its object the preservation of the public health, is gradually assuming an important position, and will probably soon be represented by a Minister of Health in all civilised countries.

Med'ick (*Medicago*), a genus of *Leguminosæ*, of which the most important species has already been described under Lucerne (q. v.). Another of considerable cultivation as a fodder plan:

n the Black M. or Nonsuch (*M. lupulina*), commonly sown in admixture with grasses and clovers, and amongst farmers frequently termed trefoil from confusion with *Trifolium procumbens* and *T. minus*. There is little doubt that this plant has the best claim to the name Shamrock (q. v.). It is a very common British species. The genus M. differs from *Trifolium* by having its pod spirally curved or coiled, instead of being small and nearly enclosed in the calyx. It consists of over forty species, principally Mediterranean, but now widespread through the world as weeds. Many have the pod beset with hooked spines, which facilitate their dissemination. See HEDGEHOG PLANTS.

Medieta'te Lin'guæ, in Eng. law, is a jury half English half foreign, to try a question between a foreigner and a Denizen (q. v.).

Medi'na (Arab. *Medînat-el-Nebi*, 'city of the prophet'), a town of Arabia, in the Turkish vilayet of Hedjas, 270 miles N. of Mecca, and 130 N.E. of the sea-port of Yambu. The inner town, built in an oval 2800 paces in circumference, at the north-western point of which rises the citadel, is surrounded by a wall, 40 feet high, with thirty towers, and pierced by three gates. Beyond this extend the suburbs. The chief building of M. is its grand mosque, El Haram ('the inviolate'), erected on the site of Mohammed's house. It is 420 feet long by 340 broad, has a vaulted roof supported by 400 pillars, and in its S.E. angle contains the reputed tombs of Mohammed and the califs Abu-Bekr and Omar. Some minor mosques, and the subterranean aqueduct of Suleiman II. (16th c.), bringing water from Roba, 2½ miles distant, are the only other noteworthy objects. M. has even less trade than Mecca, but grain and dates are exported to Egypt by way of Yambu. Estimated pop. 16,000. The *Iathrippa* of Ptolemy, M. is famous as the asylum (622) of Mohammed, and the scene of his death. It was taken by the Wahabis (1804), retaken by the Egyptian pasha (1818), and, along with Hedjas, was ceded to Turkey (1867). It is now the seat of a Turkish pasha of the first rank.

Medina de Rioseco ('M. of the dry stream'), a decayed town of Spain, in the province of Valladolid, on the right bank of the waterless Sequillo, 21 miles N.W. of Valladolid. It still possesses four monasteries, three churches (one a noble Gothic building, with a gorgeous high altar and twenty-four bells), a castle, and two hospitals; and in the middle ages was the great commercial centre of Spain, its cloth and linen winning for it the title of *India-Chica* ('India Minor'). Here the French under Bessières defeated Cuesta, July 14, 1808. Pop. 4500.

Medina-Sidonia (Arab. 'city of Sidon,' the Phœnician *Asido*), a town of Spain, in the province of Cadiz, 23 miles E.S.E. of that city, contains a fine Gothic church and the ruins of the castle of the Dukes of M.-S. (a branch of the Guzman family), and has a manufacture of *alcarrazas*, or porous water-coolers. Pop. 10,800.

Medinet-el-Fayûm. See FAYUM.

Meditatio Fu'gæ, a term of Scotch law, denoting an intention on the part of any one to abscond, in order to avoid the jurisdiction of a court of law. A creditor of any one, on making an oath before a magistrate that his debtor is *in meditatione fugæ* to avoid payment, will get a warrant to apprehend the debtor and have him examined. Should the accusation appear to the magistrate to be true, he will grant a warrant to imprison the debtor until he find security *judicio sisti*. But should the creditor have proceeded on insufficient grounds, he will be liable in damages, and even the judge may be so also, if he have acted incautiously. In English law see DEBTORS, ABSCONDING.

Mediterra'nean Sea, so named on account of its position between the continents of Europe, Asia, and Africa. It was called by the earlier Greek poets simply the 'Sea;' by later prose writers, both Latin and Greek, the *inner* or *internal* Sea, in opposition to the Atlantic, or *external* Ocean, and also 'Our Sea.' The name 'Mediterranean' is not classical, occurring first in Solinus, but it has become the recognised appellation throughout Europe in modern times. The M. S. is 2200 miles long and 1200 broad, from the bay of Tunis to that of Sidra. Its area is 977,000 sq. miles. Penetrated by the peninsulas of Italy and Greece, and partly enclosed on the W. by that of Spain, it is of a most irregular shape, and bears various names in different parts, *e.g.*, the Tuscan, Ionian, Adriatic, and Ægean seas. Its chief inlets are, in Europe, the Gulfs of Lyons, Genoa, Taranto, Lepanto, Koron, Kolo-Kythia, and Salonica; in Asia, Adramyti, Smyrna, Adia, and Askanderum; in Africa, Sidra and Cabes. It receives rapid currents both from the Atlantic, through the Strait of Gibraltar in the W., and from the Black Sea, through the Dardanelles in the E., besides draining the Nile, Rhone, Po, Ebro, &c. Owing, however, to the Alps and Pyrenees sheltering it from the cold N. winds, and to its instant exposure to the hot winds of Africa, the M. has a temperature 3°05′ F. higher than the Atlantic. The temperature, it was ascertained by the expeditions of 1869–70, is uniform below 100 fathoms, where it becomes fixed about 55°. Its water contains about one-sixth or one per cent. more salt than that of the Atlantic, because of its more rapid evaporation. The depth in the Strait of Gibraltar is 5500 feet, but between Cape Bon and Sicily, where a bank nearly divides the sea, it is only 200, and in some parts diminishes to 40. The currents and tide, both of slight character, are greatly marked by the prevailing winds, which in spring are S.E. and S.W., and for the rest of the year N.E. and N.W. The highest tide in the Gulf of Venice is between 5 and 6 feet; on the coasts of Egypt it is only 1 foot. The Suez Canal (q. v.) connects the Mediterranean with the Red Sea. There are valuable tunny, anchovy, pilchard, sardine, and mackerel fisheries in the Mediterranean, which also furnishes large quantities of red coral. See *The Mediterranean*, by Rear-Admiral W. H. Smyth (Lond. 1854).

Medjidi'eh, a town in the Dobrudscha, European Turkey, nearly midway between Tchernavoda on the Danube, and Küstendjie on the Black Sea, and a station on the railway uniting these places. It was founded in 1859, and named in honour of Abdul Medjid. M. owes its origin to the immigration of Tartars from the Crimea and Kuban steppes, after the close of the Crimean war, when Russia began to deal ruthlessly with her Mussulman subjects. It is now reckoned the Tartar capital of the Dobrudscha, and has a pop. of 20,000. The inhabitants, chiefly engaged in agriculture, are an industrious and temperate race.

Medlar (*Mespilus*), a genus of *Rosaceæ* closely related to *Pyrus*. There is only one species, viz., *M. Germanica*, a low deciduous-leaved tree, native of Europe and W. Asia, and perhaps indigenous in the extreme S.E. counties of England. Its fruit, which is about the size of a very small apple, ripens in November, and can be either made into a jelly, or eaten raw when in a state of incipient decay (see Shakespeare, *As You Like It*, Act iii. Scene 2). It then has a peculiar flavour and acidulous taste, relished by some, but disliked by others.

Medull'a Oblonga'ta is the continuation of the spinal marrow into the base of the Brain (q. v.). It is connected with the cerebellum by the *pons varolii*. Its injury is fatal.

Medull'ary Rays. See EXOGENOUS PLANTS and PITH.

Medull'ary Sarco'ma. See CAN'CER.

Medu'sa, the name applied to the common kinds of Jelly-fishes (q. v.), and erroneously to the free-floating reproductive buds of Zoophytes (q. v.), which closely resemble jellyfishes in appearance. The *Medusidæ* is an order of *Hydrozoa* (q. v.), represented by the true jelly-fishes. As now constituted in modern zoology, it represents that portion of the old group *Acalephæ* (q.v.), which included the *Gymnophthalmate* or 'naked-eyed' M., in which the sense-organs situated around the margin of the body were not protected by a hood. Each member of the order constitutes a single animal, the body consisting of a bell-shaped disc, from the roof of which a single *polypite*, including a mouth, depends.

Med'way, a river of England, rises near Felbridge Park, Surrey, and flows N.E. through Kent, past Maidstone and Rochester, joining the Thames at the Nore. It is about 60 miles in length. The estuary at its mouth is an important harbour. Here are the dockyards of Chatham and Sheerness.

Meeanee' (Miani), a village in the province of Scinde, British India, on the bank of the Fulailee branch of the Indus, 6 miles N. from Hydrabad. Here Sir Charles Napier completely defeated the Beluchi army of the Ameers of Scinde, on 17th February 1843. The enemy numbered 22,000, the British only 2800. As the result Hydrabad immediately surrendered, as also did the Ameers, and Scinde was won. Sir Charles Napier did not approve of the war, and his pun on this occasion has become historical—*Peccavi*, 'I have sinned' (Scinde).

Meerane, a town of Saxony, between the Mulde and Pleisse, 10 miles N. of Zwickau by rail. It employs more than 15,000 looms in the manufacture of woollen and mixed fabrics, which are mostly sent to N. America and Japan. In 1847 M. was a mere country town with 7345 inhabitants, but in 1875 it had a pop. of 21,277.

Meer Coss'im (Mír Kásim), the last of the Nawabs of Bengal who retained any shadow of independence. In 1760 he was placed on the throne by the British, in substitution of their former creature, his own father-in-law, Meer Jaffier. The price paid was £200,000, and the cession of Midnapur, Burdwan, and Chittagong. He was an energetic man, who set himself to reform the administration, and he seems from the first to have contemplated the expulsion of the British. The rupture was precipitated in 1763 by the exorbitant demands of the Calcutta Council. The Mohammedan sepoys, though trained in the European fashion, were everywhere defeated; and the Nawab, in revenge, murdered several distinguished Hindus, and finally massacred his English prisoners at Patna, to the number of about sixty. M. is said to have died long afterwards in poverty at Delhi.—**Meer Jaffier** (Mir Jafar), the Nawab of Bengal set up by the English after the battle of Plassey. He ruled from 1757 to 1760, when he was dethroned by the English in favour of Meer Cossim, to be again set up in 1765. His death occurred in that year, and is said to have been hastened by the importunity with which the Calcutta Council pressed their claims for pecuniary compensation. He had previously won a reputation as a general, but his subservience to the English caused him to be known as 'Clive's Jackass.' His lineal descendant is still (1877) the titular Nawab of Bengal, with a pension of £150,000 a year.

Meer'schaum (Ger. 'sea-foam,' in allusion to its lightness and white colour), a soft compact mineral, a hydrated silicate of magnesia (silica 60·9, magnesia 26·1, and water 12), found in Turkey, Greece, Hungary, Moravia, Spain, France, and Morocco, but principally in Anatolia. It absorbs grease, and when newly excavated makes a lather like soap, hence the Turks use it as a detergent. Its principal use is for making tobacco-pipes and cigar-holders, an industry whose centre is Vienna. After being smoked for some time, a M. pipe assumes a rich amber-brown colour, which is due partly to the absorption of the oil of tobacco, and partly to the dry distillation of liquid fat and wax, in which the pipes are soaked before being sent into the market.

Meerut' (Mírath), the chief town of the district and division of the same name in the N.W. Provinces, British India, 25 miles from the right bank of the Ganges, and 35 miles N.E. of Delhi; pop. (1872) 81,386, of whom 29,395 were in the cantonments N. of the town. The history of M. goes back to the Buddhist period, as is proved by an inscribed column of Asoka; and the town was often sacked by the Mohammedans. It contains many old temples and tombs, and one of the largest churches in India. Though a station on the Scinde, Punjaub, and Delhi Railway, its trade is small, and there are no manufactures. It is reputed to be very healthy. The cantonments contain a European force of all arms, especially artillery, and form the headquarters of a military division. It was here that the first outbreak took place in the Mutiny of 1857. Some troopers of the 3d Bengal Cavalry had been condemned to long imprisonment for refusal to touch the 'greased cartridge.' On Sunday, May 10th, in the evening, their comrades rose, and with the 20th Infantry and all the bad characters of the town, murdered every European they met, and released the prisoners in the jail. They then made their way safely to Delhi, where the standard of the 'Great Mogul' was forthwith set up.—The *district* of M., which lies in the Doab between the Ganges and Jumna rivers, has an area of 2360 sq. miles; pop. (1872) 1,276,114. It is also watered by the Hindun, and by the Ganges and E. Jumna Canals. The crops are wheat, barley, Indian corn, pulses, sugar-cane, and vegetables; the exports are grain, sugar, saltpetre, and indigo. The chief towns are the rising railway junction of Ghaziabad, Gurhmukteswar on the Ganges, Hapur, and Sardhana.

Meet'ings, Sedi'tious. Any number of persons may in England assemble for any legal purpose of action or of deliberation. But a meeting with the object of infringing the law, or of disturbing the public peace, is seditious, and an offence at common law. When such takes place justices are warranted in swearing-in special constables (see CONSTABLE), and in adopting the precautions prescribed by 1 and 2 Will. IV. c. 41. Sedition may verge on treason, and come within the scope of 25 Geo. III. *as a levying of war*, and an attempt by intimidation and violence to alter established institutions.

Mega'ceros (Gr. 'large-horned'), or **Irish Elk,** the name given to a large genus of extinct deer, the *M. Hibernicus* or *Cervus Megaceros* of palæontologists. The remains of this genus occur in Pliocene deposits in Ireland, England, and on the Continent; and it is doubtful if the M. existed in the Post-tertiary or Recent period. The antlers were large and spreading, sometimes measuring 10 feet from tip to tip. The M. was a true deer, allied to the fallow-deer and the reindeer.

Megalich'thys (Gr. 'large fish'), a genus of fossil *Ganoid* fishes found in the Carboniferous formations. They attained a very large size. The tails were 'heterocercal,' or unequally lobed, the teeth large, conical, incurved, and usually smooth, but occasionally ridged or grooved.

Megal'odon (Gr. 'large-toothed'), a genus of fossil *Lamellibranchiate* mollusca, belonging to the family *Cyprinidæ* (q. v.). The shells of M. were very massive, and had large 'beaks.' They are characteristic fossils of the Devonian or Old Red Sandstone system.

Megalosau'rus (Gr. 'large lizard'), a genus of gigantic fossil *Reptilia*, included in the order *Dinosauria* or *Ornithoscelida*. The remains of M. occur in the Oolitic and in the Wild Clay of the Chalk series. The length of the animal has been estimated at 40 or 50 feet. The thigh and shin bones measure about 3 feet; the teeth were numerous, conical, and serrated; and, as was pointed out by Dr. Buckland, they seem to have been renewed by their mode of growth, and to have presented no appearance of wearing action. No hard parts were developed in the outer skin.

Megapod'idæ (Gr. 'large-footed'), a family of *Rasorial* or *Gallinaceous* birds, including the jungle-fowl, *Leipoa*, and the brush turkey or tallegalla. The bill is straight and weak, its sides compressed, and its tip arched. The wings are rounded, and the tarsi scaly. The hinder toe is long and rests on the ground, as in the pigeons, and the claws are curved.

Meg'aris, a small district of ancient Hellas, occupying the N. part of the Isthmus of Corinth, and in the N.E. bordering on Attica. Its chief town was Megara, the mother-city of Chalcedon and Byzantium. The Megarians claimed to be the originators of Greek comedy; they had not a good reputation among their Hellenic brethren, and are represented as sensual and dishonest. The courtesans of M., known as the 'Megaric Sphinxes,' were a dangerous race. M. has given name to a school of philosophy, the *Megaric School*, founded by Eucleides, a disciple of Socrates. It was famous for the cultivation of dialectics. Pop. of the modern town of Megara, 4023.

Megass or **Cane Trash,** is the refuse of the stalk of the sugar-cane, after the juice is expressed; it is used for fuel, and in paper making.

Megathe'rium (Gr. 'large beast'), an extinct genus of *Edentate* mammalia, allied to the existing Sloths. In length, the M. must have measured 18 or 20 feet, while its height was about 8 feet; its skeleton being massive and elephantine. No incisor or canine teeth were developed, and the molars numbered five above and four below. In shape the molar teeth are quadrangular, and have transverse ridges on their crowns. They appear, further, to have grown during the whole life of the animal, like the tusks of elephants, from permanent pulps. Collar-bones were developed; the limbs are short and powerful, and the claws large and strong. The pelvis is remarkably solid and compact, and the conformation of the hind-limbs and tail, shows that the M. had the power of raising itself from the ground so as to reach the foliage of, or even to uproot trees. The tail is very massive and thick. The remains of the M. occur along with those of the mylodon in the recent deposits of S. America. *M. Cuvieri* is a familiar species.

Megilp, a vehicle, generally formed of equal parts of linseed oil and mastic with a little sugar of lead, used by oil painters.

It flows freely from the pencil, and on drying assumes a clear gelatinous consistency.

Me'grim. See HEMICRANIA.

Mehedpore', a town of Central India, in the outlying dominions of the Rajah of Indore, on the right bank of the Seepra, a tributary of the Chumbul, 300 miles S.W. from Agra. In the neighbourhood occurred the battle of M., in December 1817, when the Mahrattas under Holkar, and the Pindarees, were decisively defeated by General Hislop and Sir John Malcolm. The result was the pacification of Central India.

Meh'emet Ali was born at Kavalla in Macedonia in 1769, and as early as his fourteenth year showed himself possessed of the duplicity and courage necessary for military service in the East. Entering the Turkish army, he was sent to Egypt in 1799 at the head of a corps of Albanians, and assisted the British against the French. Owing to his military ability he rose to be Viceroy of Egypt (1806) through the choice of the Mamelukes (q. v.), whom he exterminated in 1811. For six years he fought against the Wahabis (q. v.) of Arabia, and one of his sons conquered several provinces of Nubia. M. gave the Sultan aid against the Greeks when they declared their independence, but the large fleet despatched by him was destroyed at Navarino in 1827. In 1830 he received from the Porte the government of Candia for his services. Not satisfied with this, he demanded Syria, which he rapidly conquered, and was only restrained from marching upon Constantinople by the interference of the European powers. In 1839 the Sultan Mohammed waged war on M. in order to regain Syria, and it was not until the European powers had again interfered, until his forces were defeated and Alexandria blockaded, that he abated his pretensions, on the condition that his family should inherit the sovereignty of Egypt. Overcome with years he resigned in favour of his son in 1848, and died at Cairo, August 2, 1849. M. was certainly one of the most remarkable men who in modern years have risen to distinction in the East. Although crafty and cruel, his intellect was singularly keen and strong, and his efforts to graft the civilisation of Europe upon the traditions of the East were followed by a large measure of success. See Mouriez, *Histoire de M., Vice-roi d'Egypte* (3 vols. Par. 1855–58).

Mehemet Ali Pasha, a distinguished Turkish general, is the son of a German musician, and was born in Magdeburg, Prussia, in 1829, his real name being Jules Detroit. When aged fifteen he sailed from Hamburg as a cabin boy, but on account of cruel treatment deserted from his ship at Constantinople. Here he secured the favour of Ali Pasha, then Foreign Minister, and subsequently Grand-Vizier, who sent him to the military college. He obtained a lieutenancy in 1853, and was on Omar Pasha's staff during the Crimean War. He served as general officer in the Servian campaign of 1876. In the early summer of 1877 he commanded a division of the army in Montenegro with such success that he obtained the rank of Mushir, and on Abdul Kerim's dismissal succeeded that officer in the supreme command of the Turkish armies in Europe. In September 1877 with the Turkish right he tried to drive in the Russian left on the river Lom, but after some apparent successes, he fell back to his original positions, and was deprived of the chief command in the beginning of October.

Mein'ingen, a town of Germany, capital of the duchy of Sacho-Meiningen, on the Werra, to the S. of the Thuringian Wald, 40 miles N.W. of Coburg by rail. The ducal palace (completed 1682) contains some good pictures and a large collection of engravings. A beautiful 'English garden' or park is attached to the palace. M. is the headquarters of the Credit Mobilier of Central Germany. Pop. (1875) 9521.

Meiss'en, an old town of Saxony, picturesquely situated at the influx of the Triebisch and Meisse into the Elbe, 15 miles N.W. of Dresden by rail. The fine Gothic cathedral (936–1342) stands on the Schlossberg, 160 feet above the town, contains many interesting monuments and brasses, and has a tower (254 feet), with a beautiful open spire. Adjoining it is the Albrechtsburg (1471–83), a large castle built on a precipitous rock, and connected by a bridge of the 13th c. with an old abbey, which was converted into a school in 1543, where Gellert and Lessing received their early education. The celebrated Royal Porcelain Factory (with 600 men), formerly in the Schloss, is now established in a building in the Triebischthal, 1½ miles from M. The factory was founded in 1710, shortly after Böttiger discovered the art of making 'china.' M. has also iron foundries and engineering works. Pop. (1875) 13,002. The town was founded by Heinrich I. in 928. It was the seat of the Markgrafs of Saxony down to 1090.

Meis'tersinger or **Meistersänger**, the burgess poets, who from the beginning of the 14th c. continued the lyric poetry formed and developed by the Minnesinger (q. v.). Their origin is assigned by tradition to Heinrich Frauenlob of Meissen (1260–1318). It is probable enough that he first founded a school of M. at Mainz, and that the example was afterwards followed elsewhere, especially in the imperial cities. It was chiefly artisans (*Meister*) who formed such corporations, and their art bears throughout a thoroughly mechanical character. On Fridays they met in 'Gesellschaften' or 'Zünfte' to recite their poems and hear those of their guild-brothers. Their chief aim was to follow with nicety a system of external rules for language and metre, called 'Die Tabulatur.' They had regard only to the number and position of the verses and rhymes, and paid no heed to tone or quantity. When a member produced a poem held faultless, he was by the 'Merker' declared a 'Meister.' The M. pushed the mannerism of the later Minnesingers to a ridiculous extreme, and their reading of life is much more narrow and barren than that of the latter. Genius is seldom found among the M., and then chiefly among writers who worked in other fields of poetry, as Heinrich von Mügelin in the 14th c., Muscatblut in the 15th, and in the 16th, the Nürnberg shoemaker, Hans Sachs, who wrote 4275 'Bar' or 'Meisterlieder.' With the 17th c. the M. gradually died away; the last 'Genossenschaft' lingered on at Ulm till 1839. Our knowledge of the M. is mainly derived from Puschmann, *Gründlicher Bericht des deutschen Meistergesangs* (Görlitz, 1573; 2d ed. as *Gründlicher Bericht der deutschen Reimen oder Rhythmen*, Frankfort-am-Oder, 1596), and Wagenseil, *Buch von der M. holdseligen Kunst* (1697).

Meknas, Mekinês, or **Meknâsa**, a well-built town in Marocco, N.W. Africa, 200 miles N.E. of the town of Marocco, in a fertile valley watered by the Bet, covered with olive groves, and surrounded by well-cultivated hills. M. has a splendid marble palace, the summer residence of the Sultan. It has considerable trade, and manufactures of leather and earthenware. Pop. 15,000 (in summer 55,000).

Me'la, Pompo'nius, a Latin geographer, was born at Tingentera in Spain, and is thought to have flourished in the reign of Claudius (A.D. 41–54). His work *De Situ Orbis* consists of three books, and contains a comprehensive account of the earth's surface as known in his time. He divides the world into two hemispheres—the northern or known, which comprises Europe, Africa, and Asia, and the southern, which is unknown, and lies beyond the impassable torrid zone; and then proceeds to a detailed description of the known world. The best edition is that of Tzschuckius (Leip. 1807).

Melancho'lia (Gr. *melas*, 'black,' and *cholê*, 'bile') is one of the forms of emotional insanity. Hippocrates, in one of his aphorisms, says: 'If fear or distress continue for a long time, this is a symptom of M.;' but modern writers, before Esquirol, used the word M. to convey the idea of derangement on some particular point, whether accompanied by gloom or mirth. Esquirol suggested the word *lypemania* in the place of M., but he employs the two words indifferently. The invasion of M. may be sudden, as when it is the immediate consequence of grief, or it may be gradual and the mere exaggeration of natural character, or it may be secondary to other forms of insanity, but the period of incubation is generally prolonged and sufficiently obvious. The more obvious *psychical* symptoms are morbid despondency and gloomy apprehensions of impending evils. The subject of M. is depressed, taciturn, seeks entire solitude, loses his relish for existence, feels unequal to the ordinary duties of life, and as the disorder advances, is constantly anticipating some dire catastrophe. The mind is generally unusually active, every circumstance is exaggerated and unfavourably construed, and the early morning, or after waking from sleep, is the period for increased mental suffering. These symptoms are frequently so intensified as to develop a suicidal impulse, rendering seclusion in an asylum necessary. Attacks of M. are sometimes remittent, the disposition being associated with an acute perception

of, and love for, the ridiculous, as was exemplified in the case of the poet Cowper and the comedian Carlini. In M. the physiognomy is fixed and changeless, but the muscles of the face are in a state of convulsive tension, and express sadness, fear, and terror; the eyes are motionless, and directed either towards the earth or some distant point, and the look is askance, uneasy, and suspicious. Sometimes the arms hang loose at the side, the hands are open, and the muscular system is relaxed; at other times the arms are rigidly flexed, the hands are clasped, and pressed against the chest, or wrung in the agony of despair. In the *simple* form of M. there is no disorder of the intellect, but only a constant feeling of gloom and sadness, an exaggeration of the affective sentiments. *Nostalgia* (q. v.), or home-sickness, is sometimes a variety of *simple* M. In complicated M. there is a decided disturbance of the intellectual faculties, and the most frequent forms are the hypochondriacal and the religious. In the former case there is a great variety of delusions, some patients imagining that they suffer from loathsome or deadly diseases, or that their bodies are infested with animals, or possessed of spirits, while others impute to themselves the most atrocious crimes, or imagine that they have been ruined in estate as well as in regard to body and soul. Religious melancholy usually takes the form of a belief that the subject is visited by the Divine displeasure, or is even condemned to everlasting misery. *Revivals* and the fiery denunciations of injudicious preachers are frequently the exciting cause of *religious* M. The tendency of an attack of M. is to pass into dementia, 'the tomb of human reason.' See *Maladies Mentales*, by Esquirol; *Leçons Orales*, by Guislain; *Annals of Insanity*, by Perfect, and *Psychological Medicine* by Drs. Bucknill and Tuke (Lond. 1874).

Melanch'thon, Philipp, a great German reformer, was born 16th February 1497, at Bretten, in the Rhenish Palatinate. His proper name was *Schwarzerd* ('black earth'), of which M. is a translation into Greek. He studied at Heidelberg (1509–12) and Tübingen (1512–14), where he joined a society for the cultivation of good Latinity, and pursued studies in mathematics, medicine, and jurisprudence. After lecturing on the Greek and Latin authors at Tübingen he accepted the Greek chair at Wittenberg in 1518, his opening discourse being devoted to the reform of the curriculum. The fame of his scholarship attracted hundreds of students to the university, and M., who had been strongly influenced by the writings of Erasmus, threw in his lot with Luther. At Leipsic (June 27, 1519) he took a share in his first combat as a Humanist, exhibiting those qualities of conciliation and tact which have won for him the reputation of being the most reasonable of the Reformers. M.'s first important work, *Loci Communes Rerum Theologicarum*, appeared in 1521, and in it were concentrated the doctrines of the Protestant revolt. About the same time he also helped Luther in the more difficult portions of his translation of the New Testament, and from 1522 till 1534 he busied himself in translating the Old Testament. At Augsburg (1530), at Worms and Ratisbon (1545–46), he distinguished himself in the Protestant service, though at the time he was blamed for his tendency towards compromise. In the midst of the dispute which arose between the Lutherans and Calvinists at the introduction of the Augsburg Interim, he died at Wittenberg, 19th April 1560. Though not sufficiently aggressive to rank as an active Reformer, his work as a scholar and theologian gives him a foremost place in the great movement of the Protestant Reformation. The best edition of his numerous writings, which include classical and biblical commentaries, ethical treatises and dissertations, with a vast academic correspondence, is that of Bretschneider and Bindseil (28 vols. Brunsw. and Halle, 1834–60). See Gaile, *Versuch einer Charakteristik M's. als Theologen* (Halle, 1840); Matthes, *Philipp M., Sein Leben und Wirken, aus den Quellen dargestellt* (Altenb. 1841); Schmidt, *Philipp M.; Leben und ausgewählte Schriften* (Elberf. 1861).

Melane'sia (Gr. *melas*, 'black,' and *nēsos*, 'an island') the collective name given to the islands in the S.W. Pacific, inhabited by tribes belonging to the Papuan race. Though, strictly speaking, Australia comes within this definition, it is usually excluded from M., being treated as a continent, and the term is applied to New Guinea and the chain of islands stretching from it in a S.E. direction as far as the Fiji group. The inhabitants of M. are of a colour approaching black, and have also the crisp, curly hair and thick lips of the negro. They are of quite a distinct race from the Polynesians, who are of Malay origin and aspect, and speak a single tongue with unimportant variations of dialect. The Melanesians, on the other hand, speak languages of an entirely different character, being harsher and more complex than the Polynesian, and so diverse that it has been suggested that M. might appropriately be called Polyglottia, or the Polyglot Islands. The number of distinct languages spoken in M. has been estimated by the Bishop of Wellington, New Zealand, a competent judge, at 200. The Melanesians are daring voyagers, and in most instances ferocious cannibals. M. forms the see of a missionary bishop of the Church of England, whose headquarters are at Norfolk Island (q. v.). See also FIJI, NEW BRITAIN, NEW CALEDONIA, NEW GUINEA, NEW HEBRIDES, and SOLOMON ISLANDS.

Melanorrhœ'a (Gr. *melas*, 'black'; *rheō*, 'I flow') is the name given to a genus of *Anacardiaceæ*, the two species of which it consists supplying, by tapping, a juice that on exposure to the air becomes black, and is used as a varnish for a great variety of purposes. It is very acrid, producing painful swellings if it come in contact with the skin. Both species are natives of the E. Indies, and form great trees upwards of 100 feet high. Its native name is *Theet-tsee*.

Melano'sis. See CANCER.

Melantha'ceæ, a small natural order of endogens of doubtful limits, but in close alliance with *Liliaceæ*. The plants included in it have in general poisonous properties, many being acrid, purgative, and emetic, and some narcotic. The root-stock of *Veratrum album*, the white hellebore of the Greeks, is an irritant narcotic poison, depending on an alkaloid called Veratrine. It is sometimes given in rheumatism, neuralgia, and when it is necessary to abate the force of the circulation. The most important plant of the order is Colchicum (q. v.); see also SABADILLA and HELLEBORE. A few species are cultivated for their handsome blooms.

Melastoma'ceæ, an extensive natural order of a varied constituency, numbering about 1800 species. They are found mostly in moist, tropical countries, a few in Australia, very few in N. America and Northern India, and none in Europe. All are harmless, and the succulent fruit of some is edible, and from its often imparting a black stain to the mouth, the name of the genus is derived (*melas*, 'black'; *stōma*, 'mouth'). A large number are grown in European hothouses for their showy flowers and other features of interest—*e.g.*, species of *Pleroma* and *Medinilla*.

Mel'bourne, the capital of the colony of Victoria, Australia, is built principally on the N. bank of the river Yarra-Yarra. It was founded in 1835, and was named after Viscount Melbourne, who was premier of Great Britain at the time. Its progress was not rapid till the discovery of gold in 1851, when M. sprang into vigorous life with marvellous suddenness. It is now the most populous city in Australia. The city proper contains but a fourth of the inhabitants of M., who now (1877) number 210,000, and the principal suburbs are under distinct municipal government. The leading business streets of M. are each a mile long and 99 feet wide, well paved, lighted with gas, and lined by shops and warehouses of brick or stone equal to those of the first cities in Great Britain. Land in Collins Street, the most important thoroughfare, has been sold at prices as high as any obtained for land in the City of London. M. possesses many very fine public buildings, most of stone, but in some cases still unfinished. The chief are the Town Hall, Post Office, Treasury, Houses of Parliament, Free Library (containing 70,000 vols.), University (with 500 students), Museum, Mint, and new Law Courts. There are also several splendid churches, besides a number of charitable institutions lodged in buildings of the handsomest description. The public parks and gardens are also numerous and extensive. Four daily and fully a dozen weekly and monthly newspapers and magazines are published. M. is the see of a bishop of the Church of England and of an archbishop of the Roman Catholic Church. The climate is good, though marred by hot winds in summer. The mean temperature for midsummer is 66°, and for midwinter 48°, frost being rare. The mean annual rainfall is 27·23 inches. M. is the principal outlet for the trade of Victoria, and is now the most important commercial town in the southern hemisphere (see VICTORIA). Vessels of 600 tons can ascend the Yarra to the heart of the city. Those of

larger size discharge and load at Sandridge or Williamstown, distant respectively 2½ miles and 8 miles by rail from M., and situated on Hobson's Bay, the N. extremity of the inlet of Port Phillip (q. v.).

Melbourne, William Lamb, Viscount, was a son of Sir Peniston Lamb of Brocket Hall, Herts, and was born in London, 15th March 1779. Educated at Cambridge and Glasgow, he was returned to the House of Commons for Leominster in 1805, under the auspices of the Whigs, but before being removed to the upper house in 1828, served in the governments of Canning, Goderich, and the Duke of Wellington. During the great reform debates of 1831 M. pled for a concession to the demands to the people, dreading the consequences of refusal. In July 1834, to the general surprise, he became First Lord of the Treasury and head of the Cabinet, which he held until November, and resumed upon the reassembling of parliament after its dissolution, retaining office until 1841, when he was succeeded by Sir Robert Peel. M. was a wise and patriotic adviser of Queen Victoria in the earlier years of her reign. He died 24th November 1848. M. was a miserable speaker, and never overcame a painful sense of embarrassment with which he was afflicted. 'Everything about him,' wrote Sidney Smith, 'seems to betoken careless desolation; any one would suppose from his manner that he was playing at chuck-farthing with human happiness, that he was always on the heels of fortune, that he would giggle away the great charter. . . But I accuse our minister of honesty and diligence; I deny that he is careless and rude; he is nothing more than a man of good understanding and good principle, disguised in the eternal and somewhat wearisome affectation of a political roué.' His wife, **Lady Caroline Lamb** (born 1785, died 1828), wrote several novels, and was once famous for her admiration of Byron. See *Memoirs of Lord Melbourne*, by W. T. M'Cullagh Torrens (Lond. 1877).

Mel'chites ('royalists,' from Syriac *melcha*, a king) was the name given in the 5th c. to the orthodox Greek Christians of Egypt, to distinguish them from the Jacobites (q. v.). After the Council of Chalcedon (451) it was applied by the Monophysites (q. v.), whose tenets had been condemned by that council, to the orthodox generally as accepting their creed at the will of the Emperor, who had convened the council.

Mel'combe Regis. See WEYMOUTH.

Melegna'no (formerly *Marignano*), a town of N. Italy, province of Milan, 10 miles S.E. of Milan city, is memorable as the scene of a victory gained by Francis I. of France over the Swiss allies of Milan, 7000 of whom fell in the action, 14th September 1515. A sanguinary conflict took place here between the French and Austrians, 7th June 1859, resulting in the defeat of the latter.

Melen'dez Valdes, Juan, a Spanish poet, was born at Ribera del Fresno, Estremadura, March 11, 1754. After studying philosophy at Madrid he proceeded to Salamanca, where he became imbued with a love of English poets, Young and Thomson in particular, and where, after having gone through a course of law, he was appointed Professor of Humanity in 1781. He was made a judge in 1789, and two years later obtained a political appointment at Valladolid. M.'s first literary attempts were dramas, but they obtained little notice. In 1784 he published a volume of lyrics, which at once placed him among the finest song-writers of his country. The exquisite simplicity and subtle pathos of some of his pastorals cannot be surpassed; his anacreontics are likewise very perfect in their way. To these poems M. twice made additions. Having unhappily taken the French side in Spanish politics, he was forced to leave his country, and died in exile at Montpellier, May 24, 1817. The best edition of his works is that in 4 vols. (Madrid, 1832). Some of his pieces have been tolerably translated in Kennedy's *Modern Poets and Poetry of Spain* (Lond. 1852). See Ticknor's *Spanish Literature*, vol. iii.

Mel'fi, a town of Southern Italy, in the province of Potenza, on the N.E. slope of the volcanic Monte Vulture. Its chief buildings are a modern cathedral on the site of an older structure (1155), almost totally destroyed in the earthquake of August 14, 1851; the château of Prince Doria, formerly the castle of Robert Guiscard; a town-hall, bishop's palace, &c. There is a lively trade in wine, oil, cheese, and cattle. Pop. (1874) 11,640.

Melia'ceæ, a natural order of about 180 species of trees and shrubs, widely distributed throughout tropical regions. A strong astringent principle pervades the order, at the same time some yield useful oils and balsam, others produce edible fruit, and others furnish valuable timber. *Melia Azedarach*, a native of China, has been transported as an ornamental and useful tree to many countries. In S. Europe it grows freely, presenting when planted in avenues a very handsome effect with its numerous erect spikes of lilac flowers. The fruit consists of pale-blue berries which are strung into rosaries, and have caused the name of 'bead-tree' to be given to the tree. The Neem-tree of India (*M. Azadirachta*) yields, by tapping, a kind of toddy, and from the fruit an oil is obtained for domestic and medicinal purposes. Other noteworthy genera are *Ekebergia*, which represents the family at the Cape of Good Hope, and *Carapa* (q. v.).

Mel'ic Grass, a genus of about twenty species, distributed through temperate and subtropical regions, and represented in Britain by *Melica uniflora* and *M. nutans*. Both grow in woods and other shady places. The herbage is relished by cattle, but neither species has been practically brought into use. Others of the genus, as *M. ciliata* (European) and *M. altissima* (Siberian), are recommended for cultivation.

Melicocca, a small American genus of *Sapindaceæ*. The Genip Tree (*M. bijuga*), a native of Guiana and New Granada, is now naturalised in the W. India Islands, where the fruit is much esteemed. In Caraccas it is also used, being roasted as a substitute for chestnuts. The tree itself is remarkable for its large growth and beauty, affording an extensive and grateful shade, while the fragrant flowers attract in swarms bees and humming-birds.

Mel'ilot (*Melilotus*), a genus of annual or biennial fragrant herbs, belonging to the natural order *Leguminosæ*, and numbering about ten species, all of which are natives of warm and temperate regions of the Old World, but have spread far beyond their original limits. In England the common M. (*M. officinalis*) occurs in many parts about the edges of fields, and when intermixed with hay imparts to it both a sweet odour and an agreeable relish, so as to make the plant an acceptable constituent of fodder. The fragrance arises from the presence of Coumarin (q. v.). By adventitious introduction, *M. alba* and *M. arvensis* have also now a recognised place in the British flora. The last is from time to time renewed by being sown with foreign ryegrass and clover seed, and has often been mistaken for *M. officinalis*. *M. cærulea* forms an ingredient of the green Swiss cheese, which owes its flavour and colour chiefly to this plant; it is also used to perfume clothes, and affords by distillation a fragrant water.

Melodra'ma, a play of a popular and striking character, usually in five acts, in which eloquence of dialogue and study of human nature are less aimed at than sensational plot and spectacular effect. The word is derived from *melos*, 'a song,' music having been formerly a characteristic of such pieces.

Mel'oë, a genus of *Coleoptera* or beetles belonging to the family *Meloidæ*. M. as the type of the family is a large beetle, of dark-blue colour, seen among grass in May and August. The elytra or wing-covers are short, and the abdomen is large and ovate. The antennæ of the males are twisted and knotted. The eggs are laid on the ground near the nests of humble bees, and in the early spring the young M. are to be found on the bodies of the bees. An intermediate stage, known as that of the *semi-pupa*, is observed to take place in M.'s development, the changes between the larva and pupa state being very gradually exhibited.

Mel'on (*Cucumis Melo*) is the produce of a herbaceous or climbing annual, originally from the country about the Caspian Sea, and cultivated in Asia and Africa from time immemorial. In the warmer parts of Europe also it has been grown at least from the time of the Romans, and through France and Spain is supposed to have reached England about 1570. It succeeds in the open air as far as 43° N., but is best adapted to countries where the atmosphere is dry, and for necessary moisture the plant has to depend almost entirely on surface irrigation and on dews. The soil on which it is found to thrive best is rather strong fresh loam. The varieties of the

M. are numerous, differing in size, form, and colour. Some are round or oblate, others oblong or oval; the surface of some is smooth; of others ribbed, warted, or netted. The flesh is either white, greenish, salmon-coloured, or red. The whole range under two races—the Persians and the Cantaloups. The former are the most difficult to cultivate, requiring a very high temperature, a dry atmosphere and an extremely humid soil. The Cantaloups (so named from Cantaluppi near Rome) are grown throughout Europe with great success, but are inferior to the Persian. The water M. (*C. Citrullus*) is believed to have been earlier introduced into Europe than the foregoing. It is extensively grown in dry, hot countries, forming in Egypt the chief food and drink of the inhabitants for several months in the year. Its abundant refreshing juice is not so rich and sugary as that of the M. It sometimes attains a weight of 400 lbs. See CUCUMBER and GOURD.

Melo'ria, a rocky islet in the Mediterranean, 4½ miles W. of Leghorn, near which the Genoese defeated the united Imperial and Pisan fleets on the 3d May 1241, and the Genoese fleet almost annihilated that of Pisa on the 6th August 1284.

Melpom'ene (Gr. 'the songstress,' from *melpō*, *melpomai*, 'I sing'), the Muse (q. v.) of tragedy.

Mel'rose (Gael. *Maol-ros*, 'the bald headland;' the old M. being situated on a promontory formed by the Tweed), a town of Scotland, in Roxburghshire, picturesquely situated on the S. bank of the Tweed, near the base of the Eildon Hills, 37 miles S.S.E. of Edinburgh by rail. In the market-place is a stone cross bearing date 1642, and a gabled house of 1635 was the place where General Leslie slept before the battle of Philliphaugh. There is a large hydropathic establishment in the vicinity. Pop. (1870) 1405. The crowning glory of M. is its beautiful Gothic abbey, admired so widely through Scott's exquisite description of it 'by moonlight' in the *Lay of the Last Minstrel*. Founded by David I. in 1136, to take the place of a lowly monastery that Aidan had planted (635) on the promontory two miles down the river, the building was completed in 1146, occupied by the first Cistercians who entered Scotland, and dedicated to St. Mary. The abbey was destroyed by the English in 1322, but was gradually rebuilt under Robert Bruce and David II. in still greater magnificence. A graceful blending of the Second Pointed style and Flamboyant, it was one of the noblest works of the best age of ecclesiastical architecture. The remains include the main part of the conventual church, 258 by 137½ feet, a hexagonal tower 84 feet high, and traces of the extensive cloisters. The 'east oriel' window of *The Lay*, divided by four mullions, is delicately interlaced by 'foliaged tracery.' Only about half the size of York Minster, the whole edifice is rich to profusion in carvings of twining plants and animals, 'grotesque and grim.' It received the heart of Bruce, and contains the tombs of Alexander II., of Douglas of Liddesdale, styled 'the flower of chivalry,' and of the Douglas who fell at Otterburn. The *Chronica de Mailros* from 731 to 1275, was published first by Bishop Fell (Oxford, 1684), and then for the Bannatyne Club (Edinb. 1835), while the charters of the later abbey, under the title *Liber S. Marie de Melros*, were issued by Cosmo Innes, at the cost of the Duke of Buccleuch (Edinb. 1837).

Mel'ton Mow'bray, a town of England, county of Leicester, in a fertile valley near the confluence of the Eye and Wreak, 115 miles N.W. of London by rail. It is the great meeting-place for the famous 'Melton Hunt,' and has stabling for some 800 horses. Its main industries are the making of Stilton cheese, and the well-known M. pork pies (over two tons weekly). There are also tanneries and breweries, and an important weekly market. Pop. (1871) 5011.

Melun (Lat. *Melodunum*, Celt. *Meol-dun*, 'the bald fort'), a town of France, capital of the department Seine-et-Marne, on the Seine, 29 miles E.S.E. of Paris by rail. Its only important buildings are two churches, the Hôtel-de-Ville, rebuilt (1848) in the Renaissance style, with a statue of Jacques Amyot (q. v.), and the remains of a once famous castle. There are manufactures of cotton and woollen fabrics, hats, leather, and farm implements, and a trade in wood, coal, corn, cheese, &c. Pop. (1872) 8403. The residence of the House of Capet, M. was captured by the English (1420), and held by them for fifteen years.

Mel'ville, an island belonging to British America, and lying in the Arctic seas between the parallels 74° and 77° N. and the meridians 105° and 117° W. Fitzwilliam and Kellet Straits separate it from Prince Patrick Island on the W.; Banks Strait and M. Sound from Banks Island and Prince Albert Land on the S.; and Byam Martin Strait from Bathurst Island on the E. It was discovered in 1819 by Parry, who wintered here in hopes of finding an open passage to the W. *M. Peninsula* lies to the N.W. of the entrance to Hudson Bay, and is connected with the mainland by Rae Isthmus.

Mel'ville, Andrew, an illustrious Scottish reformer, was born at Baldovy, near Montrose, August 1, 1545, educated at Montrose grammar-school, St. Andrews, and Paris, was Regent (1566–69) in the College of St. Marcéon, Poictiers, thence went to Geneva, where Beza got him a chair of Humanity, and returned to Scotland in 1574. In the same year he made his first appearance in the Assembly, and owing to his zeal and scholarship became a leader of the Presbyterian Church. Appointed Principal of Glasgow University, he wrote, while holding that office, his *Carmen Mosis* (a Latin paraphrase of the 32d chapter of Deuteronomy), which is as fine as anything in Buchanan. But he had a consuming passion for ecclesiastical politics, and even sacred literature was a pastime rather than a labour. 'He was,' says Mr. Burton, 'the type of a class who to as much of the fierce fanaticism of the Huguenots as the Scotch character could receive, added the stern, classical republicanism of Buchanan.' In 1580 M. was appointed to the Principalship of St. Mary's College, St. Andrews; in 1581 was completed the *Second Book of Discipline*, which, based upon the Huguenot code, was put into shape by M. In the face of the Government of 1583, which had determined to reduce the freedom of speech claimed by the clergy, M., when cited before the King and Council, argued that 'they presume over boldly in a constituted state of a Christian Kirk—the kingdom of Jesus Christ—to take upon them to judge the doctrine and control the ambassadors and messengers of a King and Council greater than they, and far above them.' He was ordered to the castle of Blackness, but escaped to Newcastle, where he established a congregation with a staff of elders and deacons, who applied the system of discipline with great severity. In 1596 M., having meanwhile been reinstated in his office at St. Andrews, forced himself into the presence of the King, at a meeting of the Estates in Falkland, and denounced the Popish lords whose case they were considering. The King forced him to depart; but in the following September, at an Assembly at Cupar, M. formed one of a deputation which discussed the same subject against the royal will. His Majesty was told that he was 'God's silly vassal,' and that in Christ's kingdom, the Kirk, he was neither king, nor head, nor lord, but a member. In 1605, though prohibited by royal proclamation, M. called a General Assembly at Aberdeen. He was summoned to the English court to justify himself, and, when there, having ridiculed the decorations of the communion-table, he was handed over to the keeping of the Dean of St. Paul's, and afterwards to the Tower, where he remained for several years. In 1611 he was released, on condition that he lived abroad, and died a Professor in the Huguenot University of Sedan in 1622. Mr. Burton says—'Had it been his lot to lead a haughty ecclesiastical hierarchy, striving to subdue and control secular principalities and powers, he would have made another Hildebrand or A'Becket.' This is true so far as it goes; it points out clearly enough the peril that would have threatened secular liberty had M.'s principles triumphed, but the fearless heroism of his character stamps him with a greatness and a dignity that can hardly be surpassed. It has been stated that M. was a scholar and a poet as well as an ecclesiastical politician. In the *Delicia Poetarum Scotorum* are pieces of his which once were famous and deserve to be remembered. See M'Crie's *Life of A. M.* (2 vols. 1819; 2d ed. 1823; new ed. 1856); Burton's *History of Scotland*, vols. iv., v.—His nephew **James M.**, born at Montrose, 25th July 1556, was an able coadjutor of Andrew in his strife on behalf of Presbytery. Milder and more courteous than his great kinsman, he was nevertheless firm and decided in his opinions. In 1606 he was summoned to London for protesting against Episcopacy, was refused permission to return to Scotland, and died at Berwick-on-Tweed, 13th January 1614. He wrote several works

both in prose and verse, but his *Diary* (printed for the Bannatyne Club) is the only one possessing a permanent interest. See Wodrow's *Life of James Melville.*

Melville, Herman, an American author, born in New York, August 1, 1819, took to the sea at eighteen years of age, and for a few years off and on was before the mast. In 1846 he published *Typee*, and in 1847 *Omoo*, graphic and popular accounts of his adventures with the natives of the Polynesian Islands, by whom he had been taken prisoner in 1842. He has also written *Mardi*, a philosophical romance (1849), *White Jacket* (1850), *Toby Dick* (1851), *Israel Potter* (1854), *The Confidence Man* (1857), *Battle Pieces* (a volume of poems, 1866), &c.

Melville, Sir James, was born at Halhill, Fifeshire, in 1530, and was page to Queen Mary of Scotland. In 1564 he was sent to the English court with friendly messages to Elizabeth concerning the approaching marriage with Darnley. Two years later he acted as interim secretary to the Scotch Queen, and was an unwilling confident of Darnley, who remarked to him about the murderers of Rizzio, 'As they have brewed so let them drink.' The same year he was sent to announce the birth of James VI. of Scotland to the court of England. In 1567 he remonstrated with Mary in connection with her marriage with Bothwell, and received the answer that 'matters were not that far agaitwart.' He was afterwards carried with her a captive to Dunbar, and negotiated the surrender of Edinburgh Castle. M. was asked to undertake a mission to Denmark (1595) in connection with the proposed marriage of James VI. to the younger daughter of the King, but he escaped from the duty. 'He was,' says Burton, 'a man of a character and temper rare for that age—very pacific, yet no coward; a dealer with all parties, yet never, as it would seem, suspected of selling one party to another.' He received the last instructions of Queen Mary on the scaffold. His *Memoirs of Affairs of State*, one of the most valuable of historical references, was printed for the Bannatyne Club in 1827. He died 1st November 1607. See Burton's *History of Scotland*, vols. iv., v.

Melville, Viscount. See DUNDAS.

Membra'na Pupilla'ris, a term applied to the delicate membrane closing the pupil of the eye in the fœtus during the early months of development. The M. P. itself forms the front portion of a membrane, richly supplied with blood-vessels, which encloses the lens of the eye, and which is known as the *membrana capsulo-pupillaris.* The M. P. disappears about the seventh month of intra-uterine life.

Mem'brane, a general term applied in anatomy and physiology to indicate any soft texture made up of tissues. We thus speak of the 'membranes of the brain,' of mucous M., or serous M., while the membranes within which the embryo is contained *in utero* are named the 'fœtal M.' The term *Meninges* is applied to the collective brain membranes.

Me'mel, the most northerly town of E. Prussia at the mouth of the Dange, and on the mainland, at the N. entrance to the Kurisches Haff, 9 miles W. of the Russian frontier, and 53 N.N.W. of Tilsit. It is strongly fortified, and has a large, safe harbour, extensive manufactures of linens, cordage, sail-cloth, bone-black, chemicals, &c., large iron-foundries, distilleries, breweries, and saw-mills, and an important trade in timber, grain, hemp, flax, linseed, amber, coal, calf-skins, petroleum, and salt herrings. In 1875 (an exceedingly bad year) the total imports amounted to £1,099,450, and the exports to £1,174,530; in 1873 the value of imports and exports was £2,990,775. The value of timber exported (1875) was £735,165, of flax £125,225, of grain £46,000, and of linseed £77,000. At the beginning of 1876 there belonged to the port 85 sea-going vessels of 32,020 tons, besides 10 steamers. A railway connecting M. with Tilsit was opened 15th October 1875, and a branch to the Russian railway between Mitau and Libau, which is contemplated, will greatly extend its Russian trade. Pop. (1875) 19,801. M. was founded by the Livonian Order of Knights in 1253.

Mem'ling, Hans, one of the greatest painters of the old Flemish school, was born about 1435. Much that was formerly related of him has been entirely discredited, and now almost all we know is that he led a roving life, fought for Charles the Bold at Granson and Morat (1476), was an inmate of St. John's Hospital, Bruges, for which he painted five of his finest works, and died about 1495. His famous reliquary, the *Chasse de Ste. Ursule* (1487), in St John's Hospital, is an admirable specimen of his rare colouring and exquisite finish and fidelity. Other works by M. are at Danzig, Munich, Turin, and Lübeck.

Memm'ingen, a town of Bavaria, S. Germany, on the Aach, 45 miles S.W. of Munich by rail, has a fine Rathhaus, dating from 1526, and three churches, of which St. Martin's contains 67 choir-stalls with rich Gothic carving. The industries are hop-growing, bell-founding, dyeing, and the manufacture of starch, gunpowder, hardware, and linen and woollen yarn. Pop. (1875) 7770.

Mem'non, in Homer a son of Eos, appears in post-Homeric legends as an Æthiopian prince, son of Tithonus, who came to the relief of Priam, and, after having slain Antilochus, was laid low by Achilles. From his ashes Zeus produced a flock of birds called 'Memnones' or 'Memnonides,' which fought one another on his grave, and every year renewed the struggle. Great buildings, as well in Asia as in Egypt, were attributed to M., after whom they were called 'Memnoneia.' The two statues of M., still extant, originally stood before the temple of Amenophis III., at Thebes, in Egypt. They rose 70 feet above the floor of the temple, and were composed of a silicious conglomerate so hard and brittle that the change of temperature on the rising of the sun caused little pieces to break off. The sound thus produced gave occasion to the legend of the 'sounding statues' of M.

Mem'ory is properly only the faculty of mental retention; it preserves knowledge within the mind, but without the sphere of consciousness. But it is generally looked upon as reproductive also—and that in two ways. If the laws of association be allowed to work without the intervention of will, as in reverie, M. is then spontaneous suggestion; but if will be brought to bear on the mind's acts, it is then recollection. To the former of these processes alone ancient philosophy gave the name of M. Hamilton terms the one the Conservative Faculty, the other the Reproductive Faculty.

Diseases of M.—M., or the power of reproducing mental impressions, may be naturally weak, or become gradually impaired by age. When any change from the normal condition takes place either in the form of exaltation or blunting, it is indicative of disturbance in some part of the cerebro-spinal structure, the result of external violence, or of various physical conditions, such as fevers, intemperance, congestion, organic disease of the brain or of its membranes, &c., &c. The particular portion of the brain implicated when memory is impaired has not as yet been precisely defined; but the deviations appear to depend upon changes generally of an apoplectic nature in the anterior lobes of the brain. It occasionally happens, though but rarely, that memory is the only faculty impaired, and, when such is the case, the impairment is generally but the precursor of more extensive cerebro-mental lesions.

Mem'phis (*Men-nefer*, 'good port,' in the hieroglyphics), the ancient capital of the kingdom of Upper and Lower Egypt, stood on the left bank of the Nile, on the site of the modern Mitranieh, 10 miles S. of Cairo. Its foundation is ascribed by Herodotus to Menes, whose date is variously fixed at 4455 and 2690 B.C.; and the kings of the later dynasties vied in its adornment. Within a circuit of 15 miles it contained the temples of Isis, Apis, Serapis, Phre, and greatest of all, of Ptah—the *Hephæsteum* of the Greek geographers—with a colossal statue of Sesostris (Rameses III.), 45 feet high, and a recumbent figure of Amosis, 73 feet long. The Necropolis, with the Pyramids (q. v.), and the dyke of Menes, built to exclude the inundations of the Nile, should also be noticed. The ruin of M. began with the invasion of Cambyses (525 B.C.), was hastened by the founding of Alexandria (332), and completed by the Saracen conquest in the 7th C. A.D. See EGYPT; and Lepsius, *Denkmäler aus Aegypten* (12 vols. Berl. 1849–59).

Memphis, a city of Tennessee, U.S., on the E. bank of the Mississippi, which affords communication in all seasons with New Orleans, distant 380 miles S. by rail. It has thirty-five churches, sixty-seven free public, and thirty-two other schools, a cotton exchange, five stone-paved wharves, nearly two miles long, three daily and seven weekly newspapers. Cotton, gathered from the basins of the Mississippi, White, Arkansas, St. Francis, and other rivers, is the great article of commerce. In 1874 the total value of imports was $60,847,389, including 426,676 bales of cotton, valued at $34,006,000. During the same year there arrived 2059 steamers, and departed 2075, averaging 2000 tons each. The

amount of taxable property for 1874 was $32,500,000. Pop. (1871) 40,226. M. was incorporated in 1827. An engagement took place on the river (6th June 1862) by which the Federals captured M., which was regained by General Forrest's cavalry in August 1864.

Mena'do, a Dutch residence in the extreme N. of Celebes, has an area of 1267 sq. miles, and a pop. of 228,051. The country, broken by volcanic action into highland masses, is well adapted for the extensive cultivation of coffee and rice. In 1870 the total value of the exports amounted to 1,250,370 gulden. The town of M., situated on a bay on the N.W. of the island peninsula, has a pop. of 6000.

Menage', Gilles, an ill-tempered wit and scholar, was born at Angers, August 15th, 1613. After practising at the bar he entered the church, and became one of the lively, accomplished, graceless *abbés*, forming so unique a class in France, then ornamenting society better than religion. He died July 23, 1692. Of his numerous works we need only mention the *Dictionnaire Étymologique* (1694). See notice of his life prefixed to *Menagiana*, a collection of his good sayings (1715).

Men'ai Strait, a channel 13 miles long and from 250 yards to two miles wide, separating the island of Anglesea from Caernarvonshire, Wales. It is crossed by the M. Suspension Bridge, a fine work constructed by Telford, at the cost of Government, in the route of the London and Holyhead mail-coach road, 1818–25, and by the Britannia Tubular Bridge (q. v.), erected 1846–60. At the entrance to the channel the tide is usually about 12 feet, and sometimes rises to 30, but for expedition the route is often chosen by vessels under 100 tons. The name 'Menai' probably contains the Celtic root *man*, 'a district.'

Menan'der, the greatest poet of the Athenian New Comedy, was born at Athens 342 B.C. The comic poet Alexis was his uncle, and the philosophers Theophrastus (q. v.) and Epicurus (q. v.) were his intimate friends. Of his personal life little is known, except that his beauty and refinement of manners were remarkable, that his friendship with Demetrius Phalereus nearly cost him his life in 307 B.C., and that he was drowned in the harbour of Peiræus in 290. When the chorus of the Old Comedy was out of date, and the license of its personal attacks was repressed by law, M. created a drama of manners, character, and plot, the prototype of modern comedy. The preference given to his rival Philemon was small earnest to him of the reputation which his works afterwards enjoyed, and which is attested by their holding the stage till the time of Plutarch, and by the fact that almost all the Roman comedy is founded on them. Of more than 100 plays there are now extant only the names, and certain fragments full of gnomic wisdom, as, 'whom the gods love die young.' Of these the best edition is Meineke's *Menandri et Philemonis Reliquiæ* (Berl. 1823), reprinted in his *Fragmenta Comicorum Græcorum*, vol. iv. (1841). See Guizot, *Menandre une Étude Historique* (Par. 1855).—**M.** of Laodicea, a Greek rhetorician of the 2d and 3d centuries A.D., of whose writings are extant a treatise *De Encomiis* or *De Genere Demonstrativo* (Heeren, Gött. 1785; Walz, *Rhetores Græci*, vol. ix., 1836).

Men'chikoff, Alexander Danilovitch, Prince, a Russian statesman and general, was born in humble life at Moscow, November 27, 1672. Introduced to the service of Peter the Great by General Lefort, on the death of that officer in 1699 he became the favourite companion and adviser of the Czar. He gained the victory of Kalisch over the Swedes in 1706, greatly contributed to that of Poltowa in 1709, took Riga in 1710, Courland in 1711, and Stettin in 1713, and was appointed in succession field-marshal, baron, and prince of the empire. He wielded great power during the reign of Catherine I. (1725–27), but shortly after the accession of Peter II. was banished to Siberia, where he died, October 1729.—**Prince Alexander Sergejevitch M.**, great-grandson of the preceding, a Russian admiral and general, born in 1789, accompanied the Emperor Alexander I. in the campaigns 1812–14, when he attained the rank of general. In the war with Turkey, 1828–29, he distinguished himself by the capture of Anapa, but was wounded at Varna. On his recovery he devoted himself to the improvement of the Russian navy, becoming Minister of Marine in 1836. In 1853 he was sent as ambassador-extraordinary to Constantinople. His somewhat intemperate conduct contributed to the outbreak of war, upon which he received the chief command both of the Russian naval and military forces. Although he lost every pitched battle, he showed great tenacity and determination in his prolonged defence of Sebastopol. He was commander at Cronstadt, 1855–56. M. died at St. Petersburg, May 2, 1869.

Men'cius. See MENG-TSE.

Men'delssohn, Moses, born at Dessau, 6th September, 1729, was the son of a Jewish schoolmaster. He had a good Jewish education, studying under the Rabbi Frankel the works of Maimonides, especially the *Moreh Nebuchim* (Arab. *Delalati Al-heirim*; Lat. *Ductor Perplexorum*, 'Guide of the Perplexed'), the great source of natural interpretation of Scripture among the Jews. Struggling against poverty and an enfeebled constitution, M., now at Berlin, was introduced to mathematics by Israel Moses, and to Latin by Kisch, a physician of Prag. He read Locke's *Essay*, and a friend named Gompertz gave him the works of Leibnitz and Wolf. In 1754, M., now a partner in a silk business, made the friendship of Lessing; they wrote together *Pope ein Metaphysiker*. His first important metaphysical work was the *Briefe über die Empfindungen* (1775), or 'Letters on the Sensations,' in which he specially analyses the Ideas of the Beautiful. M. belonged to the unscientific school of Wolf. He now became the friend of Abbt, Sulzer, and the librarian Nicolai, and assisted them and Lessing in several literary periodicals, in which they sought to stir the dormant faculties of Germany. In 1767, appeared his *Phædo*, in which he infers the immortality of the soul from the indefinite perfectibility of human nature, its infinite duties, and great desire to live hereafter. His book *Jerusalem* (1783) deals with the question of toleration, and had its effect in preparing the way for the emancipation of the Jews, that his other works had in stimulating the reformation of their religion. The *Morgenstunden* (1785), an exposition of the grounds for believing in the existence of God, and containing a refutation of Spinozism (with which Jacobi had charged his friend Lessing), was interrupted by his death at Berlin, 4th January 1786. One of his daughters became a Christian, and married Friedrich Schlegel. M.'s works were published by his grandson, G. B. Mendelssohn (7 vols. Leips. 1843–45). They include translations of the Pentateuch and Psalms into German. Mirabeau did much to make M.'s works known in France. See Kayserling, *M. M., sein Leben und seine Werke* (Leips. 1862).

Mendelssohn-Bartholdy, Felix, a great German composer, grandson of the preceding, was born at Hamburg, February 3, 1809. M.'s home from 1812 was Berlin, where he was instructed in composition by Zelter and in pianoforte by Berger, and played in public at the age of eight. He could compose skilfully in 1821, received additional piano lessons from Moscheles in 1824, and in the next year devoted himself entirely to music, though of independent fortune. His first great work was the overture to *Sommernachtstraum* (1826); his next, the overture entitled *Meeres-stille und Glückliche Fahrt* (1828). A comic opera, *Die Hochzeit des Gamacho* (Berl. 1827) was a failure. M.'s introduction to the public properly dates from his visit to England in 1829, where the first-named work excited the warmest interest. The overtures, *Isles of Fingal* and *The Hebrides*, and the wonderfully picturesque Scotch symphony, were the fruits of a Highland tour in the same year. In Italy (1830–31) he wrote the *Reformations Symphonie*, and the first *Walpurgis Nacht*. On a London visit in 1832 he played his noble *G-Minor Concerto* (May 28th). On October 4, 1835, he began his great and useful career as Director of the Gewandhaus Concerts at Leipsic, and what may be called his period of *travel* came to an end. M. directed all his energy to bringing out the finest music before the public, industriously composing at the same time. On May 22, 1836, his oratorio *Paulus* (Paul), was first performed (Düsseldorf), and on September 20th it was given at the Birmingham Festival, M. himself conducting. To 1837 belong the *D-Minor Concerto* and the *42d Psalm*; to '38 three violin quartetts, and the *Serenade and Allegro Giojoso*; to '39 the *Pianoforte Trio in D-Minor*; to '40, the *Lobgesang* ('Hymn of Praise'). In 1841 M. was made Ph. Doc. by the Leipsic University, and *Kapellmeister* to the King of Saxony, while the King of Prussia gave him the Order of Merit, and the post of general musical director at Berlin. The year 1843 (April 3) saw the establishment of the Leipsic Conservatorium. M. proposed the scheme, worked hard for it, and was one of the first teachers. In the same year he completed the music for the *Sommernachtstraum*, and composed *Athalie*. In 1844 he was

again in London performing and conducting; in '45 he resigned his Berlin post and began composing *Elias* (Elijah). This oratorio, his grandest choral work, only second in popularity to the *Messiah*, he conducted at the Birmingham Festival, August 25, 1846. Excessive exertion was wearing out his nervous constitution, but the sudden death of his sister Fanny (May 14, 1847) gave him a shock from which he never recovered. He went to Switzerland for change, but returning to Leipsic became much worse, and died there, November 4, 1847. M. was a noble successor of the greatest masters, and, unlike many of them, he was enthusiastically loved and admired in his lifetime, not less for his pure and genial character than for his splendid attainments. Full of tenderness, passion, and sympathy, his compositions glow with the divine ardour of genius. Though a brilliant improvisatore, M. was an ardent student, and possessed, moreover, a range of liberal culture far beyond the average of great composers. Besides the works named, he wrote much for the piano, and many songs; his *Lieder ohne Worte* ('Songs without Words') are widely known. Much also remained unfinished—*e.g.*, an opera *Lorelei*, and the oratorio *Christus*. See his *Reisebriefen* ('Letters from Italy,' 1861; Eng. trans. Lond. 1863); Reissmann, *Felix M., sein Leben und seine Werke* (Berl. 1866); E. Devrient, *Erinnerungen an F. M. B.* (Eng. trans. 1869); Hiller, *Briefe und Erinnerungen* (Eng. trans. 1874); and Lampadius, *Leben des M. B.* (Eng. trans. 1877).

Men'dicant Orders of monks were certain orders which took their rise in the 13th c. The old orders had so given themselves up to sloth, luxury, and vice, that they had become a scandal to the Church in the eyes of the people. It was at this time that Francis of Assisi founded the first M. O., by drawing around him a society whose members came under a vow of absolute poverty, extreme asceticism, and constant efforts for the conversion of sinners, in the strictest obedience to the Apostolic See. Although the formation of any new order had been forbidden by the pope (1215), the suitableness of this new order to the wants of the Church was at once recognised, and it was established by Pope Honorius III. 1223. (See FRANCISCANS.) The order of Dominicans (q. v.) was founded at the same time, and these two were followed by the Carmelites (q. v.) and the Augustine-Eremites. (See AUGUSTINES.) The partiality shown towards the new orders by the popes, whose influence they had greatly increased, and the reverence felt by the people for those so distinguished by sanctity from the monks of the old orders, increased the number of orders and members to such an extent that Pope Gregory X. in the Council of Lyon (1272) limited them to the four orders mentioned above. See FRIARS.

Men'dip Hills, in Somersetshire, England, extend inland from the Bristol Channel for about 30 miles in a S.E. direction parallel to the river Axe, and attain their greatest height of 1100 feet in Black Down. They consist mainly of limestone and Old Red Sandstone, were once covered by a forest that belonged to the crown, and are rich in lead, iron, calamine, manganese, red ochre, and other minerals which have been mined from the most remote times. In 1862 Professor Ansted discovered near Wells a mass of the refuse of old mines containing some 600,000 tons of metal, worth half a million sterling.

Mendo'za, the capital of a province of the same name, in the Argentine Republic, at the E. base of the Andes, at a height of 2891 feet above the sea, and 115 miles E.N.E. of Santiago. It was a thriving town with 15,000 inhabitants in 1861, when it was totally destroyed by an earthquake. It was, however, rebuilt on the old site, and has now a pop. of 6000.

Mendoza, Don Diego Hurtado, a Spanish author and statesman, was born of a noble family at Granada in 1503. After leaving the university of Salamanca he joined the Spanish army in Italy, where he continued his studies. He became ambassador at Venice in 1538, commander at Siena in 1547, and shortly afterwards ambassador to Rome. He was dismissed from the court by Philip II. in 1567. He died April 1575. His best works are his *Lazarillo de Tormes* (Antw. 1554, Par. 1627, Gotha, 1810), an admirable satirical romance, the earliest of the *Gil Blas* class of novels, in which Spanish literature is so rich, and his *Guerra contra Los Moriscos*, an eloquent history, so impartial and outspoken that its complete publication was prohibited till 1776. His poems were published (the only edition) in 1610. He gathered a magnificent collection of MSS., now in the Escurial. See Ticknor's *History of Spanish Literature* (vol. i.).—**Juan Gonzales de M.**, born at Toledo about 1540, served for some years in the Spanish army, afterwards entered the order of St. Augustine, and was sent to China in 1580 by Philip II. to gather information regarding the country. On his return he published *Historia de las Cosas mas notables Ritos y Costumbres del Gran Reyno de la China* (Madr. 1586). It was translated into English in 1588 (reprinted by the Hakluyt Society, 2 vols. 1853–54), and is a work that still possesses both interest and value. M. ultimately became Vicar-apostolic of Mexico (1607), and Bishop of Popayan, New Granada, where he died in 1617.

Mendun-men, the name of the present king of Independent Burmah. Previously known as the Prince of Mendun, he gained the throne in February 1853 by leading a successful revolution against Pagan-men, whose cruelties had rendered him odious. Among the early acts of the new king was to found the new capital of Mandalay. Though retaining all commerce as a monopoly in his own hands, he has on the whole shown a desire to maintain smooth relations with his British neighbours. M. was recrowned at Mandalay in 1874. He is reported to be a zealous Buddhist, but kindly disposed to European residents. See Dr. Anderson's *Mandalay and Momein* (Lond. 1876).

Menela'us, King of Lacedæmon, one of the bravest of Homer's heroes, was the younger brother of Agamemnon (q. v.) and husband of Helen (q. v.). After the fall of Troy, to which, under the protection of Hera and Athena, M. greatly contributed, he and Helen wandered for eight years in the eastern parts of the Mediterranean, at length reaching Sparta on the very day when Orestes buried Clytæmnestra and Ægisthus. After this they lived happily together at Sparta, in a palace glorious as the sun.

Mengs, Anton Rafael, son of an artist, who trained him with excessive severity, was born, 12th March 1728, at Aussig, in Bohemia, went to Italy (1741), remained there for four years, and on his return to Dresden his pictures in crayon so pleased the king that he was nominated court painter. Returning to Rome he produced the 'Holy Family,' and married the peasant-girl who sat to him as a model. In 1749 he was commissioned to paint an altar-piece for a new Catholic church at Dresden; in 1754 he took the direction of the new school of painting established at the Vatican. After achieving fame with his 'Cleopatra,' 'Magdalene,' and others, he went to Spain in the suite of Charles VII. (1761). The 'Ascension' and 'Meeting of the Gods' are fruits of his labour at that time. After a residence in Italy he returned to Spain (1775), and in two years executed the 'Triumph of Trajan' and the 'Temple of Glory.' He died at Rome, 29th June 1779. M. conscientiously strove to reproduce the characteristic qualities of the greatest masters, and in a large measure he succeeded. It is agreed, however, that though his taste is good and his technical skill irreproachable, he is at best but a successful imitator. M. left writings on art in German, Spanish, and Italian.

Meng-tse, or **Meng-ko** (Lat. *Mencius*), a Chinese philosopher, was born at Tseou, in the modern province of Shan-tung, about 398 B.C. After receiving a careful education from his mother, M. became a pupil of Tsze-sze, the grandson and disciple of Confucius, and then travelled from court to court, inculcating the doctrines of *hiao*, or filial piety, under which head he included all the relations of social life. Meeting, however, with but small success, he passed the last twenty years of his life in retirement, and died about 314 B.C. M.'s conversations with princes and others form the so-called *Book of M.*, the fourth and most considerable portion of the *Sse-chou* of Confucius (q. v.), and have been translated into Latin by P. Noel (Prague, 1711) and Stanislas Julien (2 vols. Par. 1824, with text), into English by Collie (Malacca, 1828), into French by Pauthier (Par. 1831), and into German by Ernst Faber (Elberfeld, 1877). See Dr. Legge's *Life and Works of Mencius* (Lond. 1873).

Menin, a town of Belgium, province of W. Flanders, on the Lys, 30 miles S.W. of Bruges by rail, has some manufactures of lace, tobacco, beer, &c. Pop. (1874) 10,396.

Meningi'tis (Gr. *mēninx*, 'a membrane') is the term employed in medicine to designate inflammation of the *arachnoid* and *pia mater*, the investing membranes of the brain. The earliest symptoms are acute pain in the head, intolerance of light and sound, sleeplessness and delirium. The countenance

is flushed, the conjunctivæ red, the eyes suffused, and the pulse quick. As the disease advances, there are frequent spasmodic twitchings or convulsions, and eventually coma and complete relaxation of the limbs. M. may be simple and idiopathic, or it may be the result of some zymotic or constitutional disease, such as the specific fevers, or the rheumatic, strumous, or syphilitic cachexia. It is sometimes connected with teething. M. may be caused by exposure to the heat of the sun, by great mental work or anxiety, but most frequently by the excessive use of alcoholic liquors. M., in the child, is generally *tubercular;* in the young, the result of specific fevers, such as scarlatina and measles. *Treatment:*—Depletion and active cathartics are useful, when not otherwise contra-indicated. The hot bath, and cold applications to the head, such as ice or evaporating lotions, are generally serviceable, and counter-irritants to the nape of the neck may be often of advantage. The patient should be kept on low diet, and excitement of every kind should be avoided.

Menipp'us, a cynic philosopher, and follower of Diogenes, was born a slave at Gadara, in Cœle-Syria, and flourished about B.C. 60. He is said to have committed suicide on being cheated out of a large fortune which he had collected by usury. The satirical works which contained his teaching are lost, though some fragments remain of Varro's *Saturæ Menippeæ*, written in imitation of them.

Menisperma'ceæ, a natural order of exogens, chiefly climbing shrubs of tropical countries. They possess a bitter principle—some being tonic, others narcotic, and even poisonous. Some are used for the cure of snake bites. The estimated number of species is about 350, and the genera of greatest economic value are noticed under CALUMBA, CISSAMPELOS, and COCCULUS.

Menn'o, or **Meno Sim'ons**, founder of the sect of the Mennonites, was born in 1496 at Wittmarsum, in Friesland, and was a Catholic priest first at Pingjum (from 1524), afterwards at his native place. In 1536 he joined the Anabaptists, of whose tenets he became a teacher at Groningen. After the execution of Jan of Leyden (q. v.) and the other leaders of the Anabaptists (q. v.), M. set himself to the work of reorganisation, for this purpose travelling through Holland and N. Germany, till persecution drove him to Wismar, where he held the *Colloquium Vismariense*, preserved by Johann Wigand in his work *De Anabaptismo* (Leips. 1582). He finally found a retreat in Holstein, where he died, 13th January 1561, at Oldeslohe. M. was a good man, whose temperate example did much to remove the fanatical violence of his followers. Before his death they had split into *Die Feinen*, an extreme, and *Die Groben*, a moderate party, the latter being also called 'Flemings,' 'Flandrians,' or 'Waterlanders.' The milder section again divided into the Armenian 'Galenists' and the Calvinistic 'Apostolists,' but these were united in 1801. In Germany, from which in 1783 many Mennonites removed to the banks of the Dnieper, they now number 14,000, and in Holland there are 120 congregations. In 1870 the Russian Mennonites numbered 40,000, but of these, owing to the imposition of the conscription in 1871, large numbers have emigrated to the United States, where there are 500 Mennonite churches, with 250 pastors, and 60,000 members, and also to Canada, where they were welcomed in September 1877 by Lord Dufferin, the Governor-General, in a speech distinguished by admirable sense, and a noble and winning catholicity of sentiment.

Menop'oma, or **Men'opome** (*Protonopsis horrida*), a genus of *Amphibian* vertebrates, allied to the newt and salamander (*Urodela*), and also known as the 'hell bender,' 'mud devil,' &c. This creature inhabits the Ohio and Alleghany rivers, and attains a length of 2 feet. It is voracious, has numerous small teeth, and devours large quantities of fishes. The colour is a bluish-grey, variegated with darker spots. Its repulsive appearance has procured for it the evil but unfounded reputation of being venomous.

Menstrua'tion, otherwise known as the menses and catamenia, is the name applied to the sanguineous discharge which proceeds from the genital organs of the human female at monthly intervals. M. corresponds with the period of 'heat' and 'rutting' in lower animals, and marks the period of reproductive activity. M. may be regarded as being the sign of the deeper process of *ovulation, i.e.*, the rupture of a Graafian vesicle and the discharge of the *ovum* or egg, which, when duly fertilised, is capable of developing into an embryo. The first occurrence of M. in temperate climates takes place from the 14th to the 16th year. Its advent happens much earlier in warm climates, and is delayed in colder latitudes. It ceases during pregnancy and generally during *lactation* or nursing, although it may supervene during the latter period, and has been known to persist during the whole period of utero-gestation. The menstrual period extends over three or four days, but in this respect, as well as in respect of the interval that elapses between the periods, M. exhibits great variations. The function usually ceases between the 45th and 50th years of life, but cases of protracted M. are by no means rare. The menstrual secretion consists of blood effused from the mucous membrane of the uterus, mixed with the mucous secretion of the passages. It coagulates less rapidly than ordinary blood, and exhibits as a rule an acid reaction. The value of M. and its irregularities as symptomatic of uterine and ovarian disease can hardly be over-estimated.

Diseases of M.—When M. is absent at the normal period of life, the disease is termed *Amenorrhœa* (q. v.); and when the discharge is excessive in quantity, and more than naturally frequent in occurrence, it is termed *Menorrhagia*. Uncomplicated menorrhagia generally depends upon debility, and is most successfully treated by the administration of tonics, the topical application of cold on the lumbar region, and over the lower part of the abdomen, and also by cold astringent injections. When the normal discharge is attended with much pain the affection is termed *Dysmenorrhœa*. This condition may depend upon a congenital state of the *os* or *cervix uteri;* or of the *uterus* itself; but it is more frequently a symptom of some disease of the Uterus (q. v.). It frequently happens that M. is perverted through other channels than the natural one, as the lungs and the nose, the rectum and the skin, such cases being called *vicarious* M.

Mensura'tion is the branch of applied mathematics which treats of the measurement of the areas of surfaces and of the volumes of solids. To the surveyor and gauger a knowledge of its methods is indispensable; and a knowledge of its principles, which in the main depend upon the simplest geometry, though not absolutely necessary, is distinctly to be desired. The rectangle is the simplest possible figure of which the area can be calculated, and after it come parallelograms and triangles of every description, and all polygons which can be broken up into triangles. When the one side of a figure is curved, the calculation of its area is in general less simple, and as a rule methods of approximation are alone applicable. The ordinary method is to break up such a figure into parts, which may be treated as true rectilinear polygons, and then sum the area of the parts to find the area of the whole. The same remarks apply to the calculation of volume in which the rectangular parallelopiped occupies the same position which the rectangle does in the mensurement of areas. When one of the bounding surfaces is curved, the same methods of approximation must be adopted, except in particular cases, when the figure is one of the simpler surfaces of revolution of the second degree. See SURVEYING, TRIANGULATION, TRIGONOMETRY, &c.

Menta'na, a small Italian village, 13 miles N.E. of Rome, noted for a battle fought November 3, 1867, in which Garibaldi was defeated by the combined French and Papal troops. On his retreat he was taken prisoner by the Italian regulars of Victor Emmanuel. In honour of the victory the pope instituted the M. medal.

Mento'ne (Fr. *Menton*), a town of France, department of Alpes Maritimes, on a beautiful bay of the Gulf of Genoa, 1½ miles from the Italian frontier, and 2 E. of Nice by rail. Its delightful climate attracts invalids from all parts of Europe,—the lowest winter temperature for ten years, according to Dr. Siordet, being 48° 75'. The Maritime Alps, rising to a height of 4000 feet, are flanked by luxuriant orange, lemon, and olive groves, and between them and the sea winds the only level road, the Cornice. Near M., and 88 feet above the sea, are celebrated bone-caves, rich in pre-historic remains. A fossil human skeleton, now in the Paris Museum of Natural History, was found here, March 26, 1872. M. has a brisk trade in fruits, fish, and perfumeries. Pop. (1872) 5540. Formerly attached to Monaco, M. was transferred to France by vote of the inhabitants in 1860, and on payment of four million francs.

Men'tor, a son of Alcimus, and friend of Odysseus, who intrusted to him his house on setting out for Troy. In the second *Odyssey*, Athena, in the form of M., conducts Telemachus to Pylos. From Fenelon's portraiture of her thus disguised M. has become an appellative for a 'guide, philosopher, and friend' of youth.

Menu. See MANU.

Menu'ra. See LYRE-BIRD.

Menza'leh, Lake, the largest lagoon of Lower Egypt, extends eastward from Damietta, and is only separated from the Mediterranean by a narrow line of sandbanks, pierced by several openings. It is 50 miles long by 25 broad, has a depth of from 1 to 10 feet, is studded with islands, and abounds in fish and wildfowl. The Suez Canal (q. v.) traverses it from Port Said to Kantara, a distance of 27 miles.

Mens'el, Wolfgang, a German historian, novelist, and critic, born at Waldenburg in Silesia, 21st June 1798, took part in the war with France in 1815, after which he studied philosophy at Berlin and Bonn. From 1825 he lived at Stuttgart, devoting himself almost entirely to literature, and died there, April 23, 1873. His first work was *Streckverse* (1823), a critical work, strongly opposing the popular views of poetry and the excessive praise of Goethe. This is also the tenor of his *Europäische Blätter* (1824-25), *Literaturblatt* (1825-48), and *Die Deutsche Literatur* (1828). In 1837 Börne called him 'Der Franzosenfresser,' from his bitter opposition to French influence in German literature. Of political history M. has written *Geschichte der Deutschen* (1824-25; 5th ed. 5 vols. 1856; Eng. trans. 3 vols. 1848), *Geschichte der letzten 120 Jahre* (6 vols. Stuttg. 1460; continued in 3 vols. to 1870), and *Allgemeine Weltgeschichte* (12 vols.; *ib.* 1862, *et seq.*), in a piquant and racy style, if somewhat one-sided spirit. He is also favourably known as the writer of the novels, *Rübezahl* (1829), *Narcissus* (1830), and *Furore* (1851); *Mythologische Forschungen* (1842), *Die Gesänge der Völker* (1851), *Christliche Symbolik* (1854), *Naturkunde im Christlichen Geist* (3 vols. 1851-57), and *Deutsche Dichtung* (3 vols. 1858-59).

Mephistoph'eles, in the Faust legend, is the *famulus* of that famous magician. Old German chapbooks and puppet-plays give three spellings of his name, M., Mephistophiles, and Mephistophilis, the last being also the form adopted by Marlowe, whilst Shakespeare (*Merry Wives of Windsor*, act i. sc. 7) has a fourth variant, Mephistophilus. The etymology again of the name is doubtful, whether it is a barbarous Greek compound, *mē-phisto-philēs*, 'not loving the light;' a derivative of the Lat. *mephitis* and Gr. *philos;* or, as is most probable, from two Hebrew words, *mephir*, 'destroyer,' and *tophel*, 'liar.' The wholly human, mirthful, sneering M. of the medieval legend, invested by Marlowe with 'an awful melancholy,' stands forth in Goethe's drama as the spirit that denies, 'the devil,' as Carlyle says, 'not of superstition but of knowledge.' See FAUST.

Mepp'el, an old town in the Netherlands, province of Drenthe, at the junction of several canals and streams which flow into the Zuider Zee, 9 miles distant, by the Meppeler Diep. It has considerable linen manufactures and trade in agricultural products. Pop. (1870) 6644.

Mer'cantile Law. Efforts to make a *Codification* (q. v., under *Code*) of international M. L., appear to have been co-existent with the medieval development of European commerce. Of the results of these, the earliest of note is the *Consolato del Mare* (q. v.), constructed towards the end of the 13th c. from the trading laws and customs of the great commercial cities of the Mediterranean; these laws and customs having had their origin in the Roman law, the mercantile part of which again was founded on the laws of Phœnicia and Carthage. Along with English law in general, the M. L. of England, gradually, as its connection with France became severed, diverged from the Continental system, and it deteriorated in consequence of its isolation. Lord Mansfield appears to have been the first English judge who re-directed the footsteps of English law towards the path followed by European nations in general, and subsequent authorities have shown much legal acumen in developing in England the doctrines of Roman M. L. as adopted by modern Continental jurisprudence. Endeavours have frequently been made to assimilate the mercantile laws of England and of Scotland, in the latter of which countries M. L. has always been carefully and successfully cultivated. A result of this endeavour is the *M. L. Amendment Act*, 19 and 20 Vict. c. 97, which makes various regulations respecting bills of exchange. See *Bill of Exchange*, under BILL. The 19 and 20 Vict. c. 60, for assimilating the mercantile laws of the two kingdoms, enacts that no acceptance of a bill of exchange, inland or foreign, in Scotland, shall bind the acceptor unless it be in writing.

Merca'ra (Mahadwapete, 'the town of Siva'), the capital of the state or province of Coorg in S. India, on a tableland 4506 feet above the sea, 130 miles S.W. of Bangalore and 315 W. of Madras: pop. (1871) 8146. It was founded about 1681, and the fort, built in 1773 by Hyder Ali, was restored to the native Rajah by the treaty with Tippoo Sultan in 1792, but in 1832 it was occupied by the British, and has ever since been the headquarters of our administration. In the neighbourhood is a promising plantation of cinchona.—The *district* of M. has an area of 265 sq. miles; pop. (1871) 32,132.

Merca'tor's Projec'tion, a convenient method of projecting and developing the surface of the earth so as to represent the whole of it, with the exception of the portions near the poles, upon one continuous plane surface. Assuming the earth to be a sphere, conceive a right cylinder with its axis coincident with the earth's axis to be circumscribed round it. Every point upon the earth's surface is projected upon the cylinder by simply producing the radius through that point till it meets the cylinder. The cylinder is then unrolled to a plane. The countries in the higher latitudes are, of course, upon a larger scale than those in the equatorial regions; but the length is extended in the same proportion as the breadth, and therefore the shape of a given district suffers no distortion. The meridians are represented by equidistant parallel lines, while the parallels get farther and farther from each other as the latitude increases. The poles are at an infinite distance, and therefore cannot be represented upon such a chart; but this is of no practical moment.

Mer'chant Shipping Act, 17 and 18 Vict. c. 104, deals with questions of marine discipline, with the legal rights of seamen, with the relative rights and duties of the Board of Trade, and of ownership, with questions of Wreck and Salvage (q. v.), and of Pilotage (q. v.), and generally amends and consolidates the entire statute law relative to merchant shipping. Act 36 and 37 Vict. c. 85 deals with the agreements of seamen under the former Act, and gives them compensation for unnecessary detention on charge of desertion. The Act also empowers the Board of Trade to establish mercantile marine offices, and to hold examinations at certain ports.

Merchants' Marks. See TRADE MARKS.

Mercu'rius (from the same root as *merx*, 'merchandise,' *mercari*, 'to buy'), the Roman god of trade and gain, identical with the Etruscan Turms. M. was also identified by the later Romans with the Greek Hermes (q. v.), but to this the Feciales (q. v.) always objected, owing to the very slight resemblance between the two conceptions. The festival of M. fell on the 15th of May, when merchants were wont to sprinkle themselves and their goods with the water of a well sacred to the god, which was near the Porta Capena. M. had a temple at Rome as early as 495 B.C., and as *M. Malevolus* he had a statue in the *Vicus Sobrius*, where buying and selling were forbidden, and libations were poured to him of milk instead of wine.

Mer'cury, or **Quick'silver** (atomic weight, 200; symbol, Hg, from Lat. *hydrargyrum*), a metallic element, and the only known metal which is liquid at the ordinary temperature, solidifying at −39°44 C., and boiling at 360° C. At ordinary temperatures its specific gravity is 13·6. Its specific heat is small, and its almost constant coefficient of expansion for moderate temperatures has made it invaluable in thermometry. (See THERMOMETER.) It is frequently found native, but the chief source is the mineral cinnabar, a sulphide of M. (HgS), which is procured usually from Idria in Austria, from Almaden in Spain, from China, and from New Almaden in California. The metal is obtained ordinarily by roasting the sulphide with lime, when the M. passes off in vapour, leaving sulphate of lime behind. There are two oxides, the *black* or *mercurous oxide* (Hg_2O), and the *red* or *mercuric oxide* (HgO). The former is obtained by decomposing the mercurous chloride with solution of potash, and washing with water. It is easily decomposed by the action of light, or a gentle

heat, into mercuric oxide and the metal. *Mercuric oxide* is formed on the surface of M., when the metal is heated in air near its boiling point. It is black when hot, but red when cold. It is ordinarily prepared by calcining the nitrate of M., when it is obtained as a red crystalline powder, known in the arts as *red precipitate*, which is completely decomposed into its elements at a red heat. Both the oxides combine with acids to form salts, which are distinguished as mercurous and mercuric salts respectively. M. forms two chlorides, *calomel* or mercurous chloride (HgCl), and *corrosive sublimate*, or mercuric chloride ($HgCl_2$). The latter is formed by heating together common salt (NaCl) and the sulphate of M., which is first obtained by evaporating to dryness a mixture of two parts by weight of the metal with three parts of strong sulphuric acid. The corrosive sublimate, as the name implies, condenses from the vapour state in the cooler part of the vessel in heavy, lustrous, but colourless masses. It is soluble in water, alcohol, and ether, melts at 265° C., and boils at 295° C. When a solution of it is mixed with ammonia, the *white precipitate* of pharmacy, chemically known as the amido-chloride of M. (HgH_2NCl), results. Calomel is insoluble in water, and is obtained as a dingy white precipitate, when a soluble chloride is added to mercurous nitrate. It is most easily prepared by subliming an intimate mixture of corrosive sublimate and M. ($HgCl_2 + Hg = 2\ HgCl$). Mercuric iodide is a brilliant scarlet powder, which, if dissolved in potassic iodide, with the addition of a little M., gives a very delicate test for detecting ammonia, known as *Nessler's test*. M. forms two sulphides, the black mercurous sulphide (Hg_2S), Ethiop's mineral of old writers, being, however, a very unstable compound, decomposing readily into the metal, and the mercuric sulphide (HgS). The latter is the principal ore of M., some varieties of which, from their brilliant colour, are called *vermilion*. M. unites readily with other metals to form what are known as *amalgams*. This property is turned to useful account in the extraction of gold and silver from their ores, in the silvering of looking-glasses, and in the *amalgamating* of the zinc plates of a galvanic battery.

Medicinal Properties of M.—M. was first employed, medicinally, by the Arabian physicians Avicenna and Rhazes, but they only used it externally against vermin, and in cases of cutaneous disease. Paracelsus was the first European physician to recommend its use internally. M. was formerly given in a liquid state, with a view of overcoming, by its weight, obstructions in the intestinal canal, but it is not so used now; and as a metal it is seldom given alone, and only in a state of minute subdivision. M. is cholagogue, purgative, and alterative, and powerfully affects the mucous membranes of the intestinal canal and the salivary glands. It is absorbed in all the tissues of the body. It is chiefly used in cases of congestion, in acute and chronic inflammation, and specially in syphilis and certain forms of ophthalmic disease. It is applied externally as a topical stimulant to indurated and chronically inflamed parts, and sometimes with the view of its being absorbed into the system. M. is much less frequently and more cautiously administered than formerly, and, being a dangerous remedy, it should never be used except under medical supervision. The pharmaceutical name of M. is Hydrargyrum, and there are many preparations of it in the British Pharmacopœia.

Mercury, the nearest known planet to the sun. Its greatest and least distances are 42,669,000 and 28,115,000 miles respectively, giving an eccentricity of ·2056. The mean sidereal year is 87·9693 days; but the period of rotation assigned (24h. 5m. 28s.) cannot be regarded as established, on account of the difficulty of getting a proper view of the surface. At its greatest elongation it appears only as a half disk, and its proximity to the sun renders it a very unfavourable object for observation. The orbit is inclined 7° 0′ 8″·2 to the ecliptic; but the inclination of the equator is not known. Its diameter is estimated at 3050 miles; its volume $\frac{1}{17}$ that of the earth; and its density $\frac{1}{6}$ greater than the earth's. Transits of M. across the sun's disk are frequent, and are important to the astronomer as affording him opportunities of observing the peculiarities of such phenomena, which are of so great value in the case of Venus (q. v.). The orbital motions of M. show irregularities which, according to Leverrier, indicate the existence of intra-mercurial planets, whose combined mass is comparable to that of M.

Mercury, Dog's (*Mercurialis*). A genus of erect herbs, belonging to natural order *Euphorbiaceæ*, and of which six species are recorded. Two of these are natives of Britain. Common Dog M. (*M. perennis*) is plentiful in woods and shady places, forming extensive patches of a dark-green hue. It is a poisonous plant. The annual Dog M. (*M. annua*) is becoming more widespread as a weed in the outskirts of towns, but it is questionable whether it holds a grade of nativity higher than that of a colonist. On the Continent the leaves are boiled and eaten as a pot-herb. The prefix 'dog's' denotes worthlessness, and is properly confined to the first-named species. The English M. or all-good, a desirable pot-herb, is *Chenopodium Bonus Henricus*.

Mergan'ser (*Mergus*), a genus of *Natatorial* or swimming birds, forming the type of the sub-family *Merginæ*. The bill is slender, and hooked at the tip, its edges being notched, and the horny notches aid the bird to secure fishes. The wings are pointed, and have their first and second quills longest. The tail is short and rounded, and the great toes are united by a web, the hinder toe being lobed. The M. inhabits northern regions. The goosander (*M. castor*) is a good example of the M., and the *M. serrator*, the sandbill or red-breasted M., and hooded M. (*M. cucullatus*) are also well-known species. The latter is common in N. America. The allied genus *Mergellus*, includes the smew (*M. albellus*) and other birds. The smew is a winter visitant to the shores of England, and has a white head and neck, a black back, and a grey tail.


Merganser (Hooded).

Mer'gui, the chief town of the district of the same name in British Burmah, on the sea-coast: pop. (1872) 10,200. In 1874–75 the exports were valued at £46,894; the imports at £39,260.—The *district* of M., a narrow strip between the sea and the mountains, forms the extreme S. of British territory, and geographically belongs to the Malay peninsula: area, 7700 sq. miles; pop. (1872) 47,192, the sparsest population in all British India. The products are timber and tin; coal has been found. The *M. Archipelago* consists of a cluster of islands off the coast, of granite formation, some of which are 3000 feet high. They are infested with wild beasts, and thinly inhabited, but are visited by the Malays and Chinese for the sake of the edible bird's nest.

Mer'ida, (1) a town of Spain, in the province of Badajoz, on the right bank of the Guadiana, and 33 miles E. of Badajoz by rail. A decayed place, with a pop. of 3800 inhabitants, it has been called the 'Rome of Spain,' from its noble monuments of antiquity, which include an amphitheatre, naumachia, aqueduct, several triumphal arches, and a bridge of eighty-one arches. M. was founded (B.C. 23) as a *colonia* of the retired veterans (*emeriti*; hence the name) of the 5th and 10th legions, speedily rose to be the capital of Lusitania, with a garrison of 90,000 men, was taken by the Moors (713), and recovered by Alfonso IX. (1230).—(2) A town of Mexico, capital of the state of Yucatan, 28 miles S.W. of the seaport of Sisal, has a noble cathedral (1598), thirteen churches, a bishop's palace, decaying university, four newspapers, and manufactures of sugar, tobacco, ropes, and leather. It was founded (1542) by Francisco de Montijo on the site of the Indian *Tihu*. Pop. 33,025.—(3) A town of Venezuela, capital of the province of the same name, 151 miles S. of Maracaybo, is the seat of a bishop, has a college and seminary, and carries on a trade in coffee, cotton, and woollen fabrics, carpets, &c. It was founded (1558) by Juan Rodriguez Suarez, and in 1812 was almost destroyed by an earthquake. Pop. (1873) 9727.

Mer'iden, a town of Connecticut, U.S., on the New York, New Haven, and Hartford railway, 94 miles N.E. of New York. It has extensive manufactures of woollens, silver-plated articles, cutlery, and hardware generally. Pop. 10,495.

Merid'ian of a place is the great circle which passes through it and the poles, and by means of which the *longitude* of the place is determined. See LATITUDE and LONGITUDE. The *magnetic M.* of a place is the intersection of the earth's surface with the vertical plane in which a freely suspended vertical

needle lies. The angle which it makes with the true M. is called the *declination* or *variation* of the needle. See TERRESTRIAL MAGNETISM.

Mérimée, Prosper, a French litterateur, was born at Paris, 28th September 1803, educated at the Charlemagne College, early made an acquaintance with English and Spanish literature, and became one of the pioneers of the Romantic School. His first work appeared in 1825 under the title of *Théatre de Clara Gasul, Comédienne Espagnole,* and professed to be a collection of prose translations from the Spanish drama. It exercised a great influence; it may even be said to have precipitated the revolution in favour of the new literature. In 1827 *La Guzla* followed, the result of some reading in the field of Slavonic poetry. During the next ten years there appeared in rapid succession, in the *Revue de Paris* and the *Revue des Deux Mondes,* romances, numerous novelettes, historic episodes, &c., of which the chief are *Tamango, La Prise de la Redoute, La Venus d'Ille, Les Ames du Purgatoire, La Vision de Charles IX., La Peste de Tolède, La Partie de Trictrac, Le Vase Etrusque,* and *La Double Méprise.* M. took office after the Revolution of 1830, and in 1834 became inspector-general of historical monuments. His travels in this latter capacity through Corsica resulted in the romance of *Colomba* (1841), which Sainte-Beuve chooses to compare with the *Electra* of Sophocles. It is a masterpiece of studied character, with an accurate delineation of scenery and customs. Three or four volumes of travels were also the product of his observations during this period. History then occupied his attention more exclusively, and in 1844—the year in which he was elected a member of the French Academy—there appeared his *Études sur l'Histoire Romaine; Histoire de Don Pedre I.,* in 1848; *Mélanges Historiques et Littéraires,* in 1855. During the same period he contributed to the magazines some valuable criticisms in art. In 1853 M. was appointed a member of Senate, and in 1858 president of a commission for reorganising the imperial library. He was also nominated Commander of the Legion of Honour in 1860, and a member of the Academy of Inscriptions. M. died at Cannes in October 1870. In 1872 appeared the posthumous *Lettres à une Inconnue,* followed in 1875 by *Lettres à une Nouvelle Inconnue,* both of which excited quite a sensational interest in France. M. had a vivid, dramatic, and delicate talent; and his originality of criticism was finely controlled by good sense and elegant scholarship. See Sainte-Beuve, *Portraits Contemporaires* (vol. i. and ii.), *Causeries du Lundi* (vol. vii.).

Meri'no. See WOOLLEN MANUFACTURES.

Merino, also named the 'Spanish Sheep,' is a familiar variety or breed of sheep, largely bred in Europe, Australia, and America. The M. originally came from Spain. In 1464 some of the Cotswold breed of English sheep were sent to Spain, and the mixed breed produced from these sheep and the M. may be held to represent the modern breed of M. These sheep are cultivated for the sake of the wool; the flesh, although palatable, being surpassed by that of other breeds, and the feeding of the M. being very expensive. The M. sheep has large and strong limbs, and the horns of the male are large and spirally twisted. The female is usually hornless. The black tint which occasionally crops out in the M. is greatly improved or even altogether abolished by careful breeding. Immense herds of M. sheep are reared in Spain: they are kept in the mountains in summer, but are drawn to the winter pastures about September.

Meri'oneth (named after *Merion,* an ancient British champion), the most mountainous county of Wales, is bounded N. by Carnarvon and Denbigh, S. by Cardigan, E. by Montgomery, and W. by Cardigan Bay. Area, 602 sq. miles; pop. (1871) 46,589. Its coast-line, 38 miles long, is in part sandy and in part cliffy, and a considerable area has been reclaimed in Traeth Mawr, Traeth Bach, &c. M. is a highly romantic country of wild and volcanic peaks, and fair, fertile valleys, of resounding cataracts and beautiful highland lakes. The greatest heights are Arran Mowddy (2955 feet) and Cader Idris (2914); the principal rivers are the Dee, Dovey, and Mawddach; and the largest lake is Bela, which, like the smaller lakes, abounds with trout and other fish. In 1876 there were 17,783 acres under corn crops (chiefly oats, barley, and wheat), 4220 under green crops (potatoes, turnips, and Swedes), 15,362 in clover, sanfoin, and grasses, and 113,698 in permanent pasture, exclusive of mountain-land and heath. The number of horses (1876) was 5808, of cattle 41,002, of sheep 376,986, and of pigs 10,087. Other products are lead, copper, slates, and limestone; gold was found in considerable quantity in several places about the year 1866, but the working has since proved unproductive. The inhabitants, who mostly speak Welsh, manufacture some flannel, woollens, and hosiery. The chief town is Dolgelly. M. returns one member to Parliament.

Merivale, (1) **John Herman,** an English scholar, born at Exeter, August 5, 1779, studied at St. John's College, Cambridge, joined the bar in 1805, and became Commissioner in Bankruptcy in 1833. He published *Chancery Reports* (3 vols. 1815–17), and was author of part of *Translations from Greek Anthology* (1806), *Collections from the Greek Anthology* (1833), *Poems Original and Translated* (2 vols. 1828–38), and an admirable translation of the *Minor Poems of Schiller* (1844). He died April 25, 1844.—(2) **Herman,** economist, son of the preceding, born in 1805, studied at Oxford, was called to the bar in 1832, and appointed Professor of Political Economy in Oxford in 1837. His *Lectures on Colonisation* (1841–42; new ed. 1861) are most important contributions to that subject. He was Under-Secretary for the Colonies 1848–59, and for India 1859–74. He published *Historical Studies* (1865), completed and edited the *Memoirs of Sir Philip Francis* in 1867, and was joint-author of a *Life of Sir Henry Lawrence* (1873). He died February 8, 1874.—(3) **Charles,** Dean of Ely, brother of the preceding, born in 1808, studied at St. John's, Cambridge, of which he became a fellow and tutor. He was select preacher to the University (1838–40), preacher at Whitehall (1839–41), Rector of Lawford, Essex (1848–69), Hulsean Lecturer, Cambridge (1861), Boyle Lecturer (1864–65), chaplain to the Speaker of the House of Commons (1863–69), and Dean of Ely (1869). He is author of a scholarly *History of the Romans under the Empire* (8 vols. 1850–65), *The Conversion of the Northern Nations* (Boyle Lectures, 1864–65), a translation of the Iliad into rhymed verse (2 vols. 1869), a *General History of Rome* (1875), &c.

Merle D'Aubigné, Jean Henri, a well-known ecclesiastical historian, descended from a Calvinistic family of Nîmes, was born near Geneva, 16th August 1794, studied in his native place and at Berlin, for five years acted as French pastor to the Protestants of Hamburg, and until 1830 as chaplain at Brussels to King William. He then became Professor of Church History at Geneva, where, with the exception of travels in England and Scotland, he steadily devoted himself to the publication of sermons and treatises. The work which entitles him to a place in literary history is his *Histoire de la Réformation au seizième Siècle* (5 vols. Par. and Gen. 1835–53; 2d ed. 1861–62). It is written with animation, eloquence, and faith in the finality of the Reformation, and the English translation has obtained an immense circulation in England and the United States. M. died at Geneva, 21st October 1872. It was continued by his *Histoire de la Reformation en Europe au Temps de Calvin* (3 vols. Par. 1863–65). His other works, *La République d'Angleterre aux Jours de Cromwell* (Par. and Gen. 1849), and *Trois Siècles de Luttes en Écosse,* may be regarded as contributions to the great history to which he devoted his life.

Mer'lin (*Hypotriorchis æsalon*), a species of *Falconidæ* or Falcons (q. v.), also named the 'Stone Falcon,' from its habit of perching upon stones. It is the smallest of British falcons, attaining only a length of from 10 to 13 inches. The sexes vary in colour. The general colour is a slate-grey, mottled with dark or blackish streaks, while a brown tint predominates in the body feathers. The chin and throat are white, the under parts a reddish-fawn; and the legs and toes yellow. The plumage of the female has more brown than that of the male. The M. is readily trained to fly at game. It is a sharp, active, and courageous bird, and will follow its quarry with great persistence. Its flight is usually low, but it shoots upward in a spiral manner, and is able to ascend with great swiftness. The M. is common in Europe, N. and S. Africa, N. America, and is found in N. Asia. Allied to the M. are the American Pigeon Hawk, and the Cliquera Falcon of India.

Mer'lin, a famous magician and prophet of the Arthurian Romance. There is no reason for supposing him to be a historic character. Neither Gildas, nor the Chronicle, nor Bede knows

anything of his existence. He first appears in Nennius (8th or 9th c.), but not by name. In chap. 40–42 of Nennius' chronicle there is a story of a boy magician called *Ambrosius*, who surpasses in sagacity all the wise men of King Vortigern. This incident is woven into the history of M. first found in the *Historia Brittonum* of Geoffrey of Monmouth, but whether. M is a creation of the Archdeacon's lively fancy or the distorted expression of some older legend, it is impossible to tell. The name may be a Latinised form of the Welsh Myrddin (q. v.), and some traditions of the ancient Welsh bard may have started the wild myth of the middle ages. His name soon spread, and by the romantic poetry of the Trouvères was carried over all Western Christendom. In the article ARTHUR it has been shown that the scene of that leader's exploits was Strathcumbria, not Wales, the northern not the southern Cymric Land; and if we could put any faith in the medieval romance which associates M. with Arthur, it would be the *M. Caledonius* in whom we should look for some traces of reality. Of this M. there is a metrical life, professing to be based on Armoric materials, which was published by the Roxburghe Club in 1830. But as Geoffrey of Monmouth removes Arthur to S. Wales, so M. is carried thither also. He is represented as the result of the intercourse of a demon with a Welsh princess, as endowed with miraculous powers, and as the adviser in succession of Vortigern, Ambrosius, and Uther Pendragon, and the author through medicinal enchantments of Arthur himself. He is known as *M. Ambrosius*, and in the Romances—both French and English—is the worker of thousands of impossible marvels. In the Advocate's Library in Edinburgh there is a MS. romance (unfinished) on *M. Ambrosius*, which was published by the Abbotsford Club in 1848. Tennyson's Idyll of *Vivien* has worked a miracle which the magician himself could not work—it has restored him to life after the lapse of a thousand years. See F. von Schlegel, *Geschichte des Zauberers M.* (Leips. 1804); Villemarqué, *Contes Populaires des Anciens Bretons* (2 vols. Par. 1842); Grässe, *Sagenkreise des Mittelalters* (Dresd. 1842).

Mer'maids ('sea-maids'), the name given to certain fabulous creatures that were said to present in their upper parts the likeness of a woman, the lower part of the body terminating in a fish-like tail. The medieval M. is identical with the ancient 'siren.' Perhaps the most exquisite embodiment of the idea is the 'Lorelei' of the Rhine, made immortal by the genius of Heine. In the lists of zoology there are certainly to be found marine animals which present a singular resemblance to the human face and figure. Thus the seals have countenances of a very human type, and the same remark may be made of the manatees or sea cows and dugongs. It is noteworthy that the latter animals have the habit of raising themselves into a semi-erect posture in shallow water, and as the mammary glands are situated on the breast, the resemblance to the form of a female figure is by no means far-fetched, especially when the animals are viewed from a distance. It has also been alleged that the young are held to the breast by means of the 'flippers,' or fore-limbs. If this statement be true, there can be no doubt that it adds greatly to the likelihood that these animals represent the 'sirens' of old navigators, and the 'mermaids' of medieval or modern sailors.

Mermaid's Glove, the popular name of a species of Sponge (q. v.) common round the British coasts, and known scientifically as the *Halichondria palmata*. The popular name is derived from its somewhat finger-like shape. It is of a pale yellow colour, and may attain a height of 2 feet, although specimens of smaller size are more common.

Merr'imack, a river of New England, U.S., rises in New Hampshire, flows S. into Massachusetts, where it winds N.E., entering the Atlantic at Newburyport, after a course of 130 miles, of which 15 are navigable. It is chiefly important for the water-power it gives to Concord, Manchester, Nashua, Lowell, Lawrence, and Haverhill, and its navigation is being extended (1877) by the Government. Below Lawrence there are valuable fisheries. At the mouth a shifting bar greatly impedes commerce.

Mer'seburg, an old town of Prussia, province of Saxony, on the Saale, 60 miles S.S.E. of Magdeburg by rail. It has a grand cathedral, founded in the 10th c., now consisting of a choir of the 13th, and a late Gothic nave of the 15th c., and containing a magnificent organ (4000 pipes) and a brass monument of Rudolf of Swabia, who was slain in a battle against Heinrich IV. in 1080. The castle, an imposing structure of the 15th c., with many towers, was once a residence of the Saxon princes. M. has manufactures of cottons, woollens, tobacco, paper, &c., and its beer is considered about the best in Germany. Near M. the Hungarians were defeated by Heinrich the Fowler in 934. Pop. (1875) 13,678.

Mer'sey, a river of England, is formed by the Thane and Goyt on the N. border of Derbyshire, flows in a westerly direction, receiving the Irwell, Bollin, and Weaver, separating Cheshire and Lancashire in its lower course, and expanding below Runcorn Bridge, and 16 miles from its mouth, into an estuary—the Liverpool Channel—from 1 to 3 miles in breadth. It is about 70 miles long, and is navigable to its junction with the Irwell, the difficulty of its sandbanks being obviated by an excellent system of pilotage. The M. has fisheries of flounders, congers, shrimps, and sparlings.

Mer'thyr-Tyd'vil (named after the daughter of an ancient British king), a town of S. Wales, on the N. border of Glamorganshire, and at the confluence of the greater and lesser Taff and the Morlais and Dowlais streams, 23¼ miles N.N.W. of Cardiff by rail. Surrounded by hills 500 feet above the sea level, it is a great railway centre and a metropolis of the iron industry, but presents a mean, murky appearance. It has a good drainage system and water-supply (since 1865), and the death-rate, formerly excessive, has been materially lowered of late years through the improvements made by the Local Board of Health. With little to boast of architecturally, M. has (1877) 2 Established churches, 15 Dissenting chapels, a market-house, theatre, Temperance Hall, and Drill Hall. The collieries and ironworks of the district are of vast magnitude, and probably comprise more than half the number throughout Glamorganshire. The output of finished iron consists chiefly of iron and steel rails, bars, girders, and ship-plates. The great bulk of the inhabitants are Welsh, and are employed in the ironworks as labourers, comparatively few being skilled workers. There is a very large trade in fine steam coal, which is chiefly sent by rail to Cardiff, Newport, and Swansea for exportation. In the vicinity are the extensive works of Dowlais (q. v.), Cyfarthfa, Plymouth, and Penydarren, the three last, owing to the stagnation in the iron trade, having been stopped for some years. Cyfarthfa Castle, about 1½ miles from M., is the home of the Crawshays, the great ironmasters. Pop. (1871) 51,949; of parliamentary borough, which includes Aberdare and two other outlying districts, 97,020. M. returns two members to Parliament.

Mer'ton College, Oxford, was first founded at Malden in Surrey (1264), and transferred to Oxford (1270), by Walter de Merton, Bishop of Rochester, and Lord High Chancellor of England. The foundation consists of a warden, 34 fellows, 18 post-masters (2 of them collegers of Eton), 4 scholars, 2 exhibitioners, and 2 chaplains. The hall, chapel (with a lofty tower, fine stained glass, brasses, ancient tapestry, &c.), and library, are among the most ancient and beautiful of Oxford buildings, and have been recently restored by Sir Gilbert Scott. M. C. presents to 18 livings, and in 1876 had 175 members of Convocation, 70 undergraduates, and 295 members on the books.

Mer'ulidæ, or **Turd'idæ**, a family of Insessorial birds represented by the blackbirds, redwings, and others of the thrush group, the orioles, &c. The bill is strong, and has its sides compressed. The wings are long, but the tail is of moderate length. This large group includes many sub-families, such as the *Formicarinæ* (ant-thrushes), *Oriolinæ* (orioles), *Timalinæ*, &c.

Mer'wings, or **Merwing Dynasty**, takes its name from Merowig, a Frankish chief of the 5th c., and was founded by Hlodowig, who put an end to the Roman rule in Gaul, adopted Christianity, and became the sole head of his race. At his death in 511 A.D. there was a partition of his estates among his four sons, Theodorik getting Austrasia, Hildebert the country round Paris and Armorica, Hlodomir, Orleans and the W. of Gaul, Hlotair, Soissons. Hlotair became in time sole king, and in 567, after his death, Frankish Gaul was divided into the three kingdoms, Austrasia, Neustria and Burgundy, which, being distributed among four kings, were for ever at war. In 595 the Frankish empire was under the kingship of three children, each of which had a mayor of the palace, but in 613 Hlotair II. became sole king, and was succeeded in power by Dagobert I.

who fixed his throne at Paris, and raised the Merwing monarchy to the highest point it ever reached. On his death in 638 the dynasty may be said to have practically terminated. Henceforth, until 752, when Hilderik III. was deposed by Pippin, their kingship was merely nominal, all real power being concentrated in the hands of the mayors of the palace. The later M. are called by French historians *Rois fainéants* ('Do-nothing kings'). See Kitchin's *History of France* (vol. i. 1873).

Mesagna (anc. *Messapia*), a walled town of S. Italy, province of Lecce, beautifully situated 9 miles W. of Brindisi. It has a trade in fine oil and fruits, and near it are many old sepulchres and broken columns. Pop. (1874) 8511.

Mesembrya'ceæ, a natural order of plants with thick succulent opposite leaves, solitary-stalked flowers, consisting of numerous petals and stamens of brilliant colours opening in the sunshine, and a capsular fruit embedded in the calyx. It comprises fully 400 species, the greater portion belonging to the genus *Mesembryanthemum*. With a few exceptions they are natives of S. Africa, growing in dry, hot, sandy places. They vary exceedingly in the form of their leaves, often having them three-sided, with a toothed margin resembling the jaws of various animals, giving current names of tiger-jaws, dog-jaws, cat-jaws (*M. tigrinum*, *M. caninum*, *M. felinum*), to different species. The capsules after ripening shut and expand according to the moist or dry state of the atmosphere, and are often brought home as curiosities. The fruit of the Hottentot fig (*M. edule*) is eaten by the Hottentots, and that of *M. æquilaterale* by the natives of Australia; both yield a really palatable food. Upwards of 250 species have from time to time been brought into cultivation by botanical amateurs.

Mes'entery (Gr. *meson*, 'the middle,' and *enteron*, 'the intestine') is the name given to the broad fold of the *peritoneum* or lining membrane of the abdomen, which supports the various viscera or organs of the digestive system, and which especially attaches the intestines to the spinal column. The M. proper originates from the left side of the second lumbar vertebra, and extends across the spine to the right side in an oblique fashion, being attached to the cavity or hollow of the right iliac bone. The edge of the M. to which the intestine is attached is puckered or thrown into folds. The M. specially supports that portion of the intestine which lies between the jejunum and the cœcum. It attains a breadth of 4 inches, and at its lower border divides into two layers which enclose the intestine, and afford support to the mesenteric nerves, vessels, lymphatics, and glands.

Mesenteric Disease.—The *Mesenteric Glands* are subject to all those diseases which implicate the glandular system, but they are specially affected in many diseases, such as typhoid or enteric fever, in which they are invariably enlarged at the very commencement of the disease. One form of scrofulous disease exceedingly common, especially among children, is called *Tabes mesenterica*, the term *tabes* being the Latin equivalent for the terms phthisis and consumption. The mesenteric glands enlarge and become charged with tubercular matter, the enlargement being commonly connected with scrofulous disease, and ulceration of the mucous follicles of the intestines, interfering with the functions of the lacteal vessels, and the consequent supply of nutriment to the body. During the periods of childhood and youth the lymphatic glands, especially the mesenteric and the cervical, are exceedingly prone to scrofulous inflammation, from the secretion or separation of the matter of tubercle from the blood; but in adult age tubercles are most frequently deposited in the respiratory organs; or, in other words, consumption, among children, is most frequent in the abdomen, constituting the disease *tabes mesenterica*, and among adults, in the lungs, the disease being named *pulmonary consumption* or *phthisis*. In the earlier stage of *tabes mesenterica* the only indications are the symptoms of general tuberculous disease of which the disease of the mesenteric glands is usually but a subordinate part. At a later period the symptoms are generally much the same as those of tubercular peritonitis; but if the peritoneum be free from disease, the abdomen is less tense and less tender, and the large glands present an irregular, nodulated surface which can be detected through the abdominal walls. The treatment of *tabes mesenterica* mainly consists in the administration of cod-liver oil, and the same dietetic and hygienic management as in any other form of phthisis. Stimulating liniments and iodine ointment over the abdomen are serviceable, and the comfort of the child is much promoted by wearing a well adapted flannel bandage over the abdomen by night and day. See M. M. Rilliet and Barthez, *Traité des Maladies des Enfans* (Par. 1853); Dr. West, *Diseases of Infancy and Childhood* (Lond. 1865).

Mesh'id or **Mash'ad**, the capital of the province of Khorassan, Persia, on the Tehjind, 472 miles E. of Teheran, and 201 N. W. of Herat. It is surrounded by mud walls, 4 miles in circuit, and pierced by five gates, and is bisected by the Khiaban, a magnificent boulevard, shaded by fine plane trees. In its centre is a large open space, 160 by 75 yards, paved with gravestones, surrounded by double storied cloisters, fronted with mosaic work, and entered by high arched gateways of exquisite architecture, faced with blue enamelled tiles, covered with gold and white inscriptions. On one side is the great shrine of M., the famous mosque of Imaum Reza, with its gilded dome and beautiful minarets, erected by Shah Abbas. Possessing the Imaum's tomb, M. is the Mecca of Persia, the great seat of the Shiites, and has several colleges, twenty-two caravanserais, and manufactures of silk velvets, coloured kerchiefs, satins, cotton checks, steel for the famous watered sword-blades, shagreen, &c. There is a great trade in shawls, fine silks, sugar, spices, indigo, tobacco, opium, saffron, lacquer-work, &c. Pop. 100,000, a large proportion of whom are Syads or 'holy men.'

Mes'mer, Franz, was born at Itzmang, on the Lake of Constance, 23d May 1733, graduated M.D. at the University of Vienna in 1766, and published in the same year a dissertation upon the influence of the planets on the human body. About 1772 he began, along with Father Hell, a Jesuit, to investigate the effect of the loadstone upon disease; but as the former, in a book upon the subject, described M. as a mere assistant, a great controversy arose. The result was that M., being voted an impostor, began to travel, and in 1778 arrived at Paris, where he practised with great success the new treatment by mesmerisation. The French Government offered him a competency if he would permit a scientific committee to report upon his cures, but he declined, and afterwards travelled in England. He died in obscurity at Meersburg, in Swabia, March 5, 1815.

Mesmerism is the name given to the influence which certain individuals can exert upon others, so that the latter become unconscious, and more or less dependent upon the will of the former. Mesmer attributed this influence to a peculiar kind of *animal magnetism*. This name, however, is vague and misleading, for the phenomena seem to be due simply to a mental condition induced in the victim—a state somewhat similar to that of waking sleep. In both cases an external occurrence produces in the mind an idea, or succession of ideas, which in the one case results in a determinate action or speech, in the other in a dream. See ANIMAL MAGNETISM.

Mesne is the English law term for *intermediate*. It is applied to any incidental issue, or process of execution, between the beginning and end of a lawsuit. M. Profits are the rents drawn from real property by one wrongfully in possession of it.

Mesopota'mia (Gr. *mesos*, 'middle,' and *potamos*, 'a river'), an extensive district in Western Asia, named from its position between the Euphrates and Tigris. It is mentioned as a kingdom in the Bible under three names, one of which, 'Aram Naharaim ('Syria of the Two Waters,' Gen. xxiv. 10), is only translated in the Gr., which did not come into use probably till after Alexander's invasion of the E. Almost surrounded by the two great rivers, the country is fairly described by the modern Arabic name, *El Jezeh*, 'the island.' The inhabitants, mostly Arabs, Kurds, and Syrians, live by cattle rearing and trading. Cultivation has greatly lapsed under Turkish rule.

Mesozo'ic (Gr. 'middle-life'), or **Sec'ondary Pe'riod**, in Geology, comprises the Trias, the Lias, the Oolitic or Jurassic, and the Cretaceous formations, and is distinguished as much from the Palæozoic as from the Kainozoic by its fossils. See the special headings.

Mess, Military or Naval. Every officer in the army subscribes thirty days' pay of his grade to the mess of the regiment to which he is appointed, as well as an annual payment of twenty days' pay to the band and mess, besides a monthly charge

for servants and sundries. Officers absent on duty are exempt from this latter charge, and married officers usually pay half the monthly charge, and can breakfast, dine, or lunch when they desire to do so. No officer is compelled to take any meal at his mess, but he must pay for the dinner whether he partakes of it or not, and a continuous avoidance of the mess dinner is not allowed. A grant of £25 per annum per company is made by Government to the mess expenses, and is called the Regent's allowance, having been instituted by the Prince Regent. Regimental messes vary much in their rules and bye-laws. On active service in the field the officers' mess is usually broken up, but not so in the case of the rank and file. Serjeants have a mess to themselves. Corporals and privates mess together, and a sum in proportion to the number of days they are in mess is deducted each month from their pay. The mess expenses in the navy are limited to £3 per month in the ward-room, where the superior officers mess, and £1, 10s. in the gun-room, which is used by junior officers.

Mess'ages and Mess'engers. Messages in a parliamentary sense are of three kinds. 1. From the Crown to either House of Parliament. 2. From the Commons to the Lords. 3. From the Lords to the Commons. Messengers, Kings' or Queen's, are officers employed by secretaries of state to carry despatches.

Messengers-at-Arms are legal officers employed by the Scotch Courts of Session and of Justiciary to execute a Summons (q. v.), or Letter of Diligence (q. v.), civil or criminal. They are appointed by the Lyon King-at-Arms (q. v.), and are under his control.

Messalli'na, Valeria, daughter of Marcus Valerius Messalla Barbatus, and of Domitia Lepida, granddaughter of Mark Antony. In A.D. 38, when only sixteen years of age, she became the third spouse of Claudius, who three years later was made Emperor. Her career—if we may trust the story of Tacitus and the verse of Juvenal—was one of unparalleled infamy and crime. To a licentiousness that knew no restraints, she added a cruelty that was without remorse. The daughters of Germanicus and Drusus, Appius Silanus, Valerius Asiaticus, M. Vinicius, Justus Catonius, and many others perished—the victims of her hate, her jealousy, or her fears. In A.D. 48, when only twenty-six years of age, she was put to death by command of the Emperor, who was persuaded that she aimed at his destruction. M. is perhaps the most appalling example on record of the vice and corruption of pagan Rome.

Messe'nia anciently formed the S.W. part of the Peloponnesus, and was separated on the E. from Laconia or Sparta by the range of Taÿgetus, on the N. from Elis and Arcadia by the Phigalian chain and the deep ravine through which the Neda flows, while on the S. and W. it was washed by the Ionian Sea, which ran far into the land, forming the Gulf of Messene (mod. *Gulf of Koron*). In the centre of the country rose abruptly Mount Ithome (mod. Vuscano) from the earliest times the centre of the religion and polity of the region. But most of M. was level, and its plains were famous for their wheat harvests. The chief stream was the Pamisus, flowing S. from the borders of Arcadia into the Gulf of Messene, and receiving numerous affluents; the chief cities were Messene, Methone, and Pylos. Historically M. is celebrated for three wars with Sparta—the first (according to the common chronology) in B.C. 743–724 when the sacred fortress of Ithome was taken; the second in 685–668, when disaster again overtook the Messenians, and many emigrated to Zancle (see MESSINA); the third, in 464–454, which resulted in M. being annexed to Sparta. Epaminondas restored its independence in 369; but in 146 M. shared the general fate of Hellas, falling under the power of Rome. M. forms a *nomarchy* of the modern kingdom of Greece (q. v.).

Messi'ah (Heb. 'anointed'). It has been said that what distinguished the Jewish religion, at least in the latest centuries before Christ, from that of other nations of antiquity, was not merely monotheism, but even more, faith in the future. While among other nations men looked fondly back to a golden age irrecoverably lost, the Israelites persisted in turning their eyes in the opposite direction, and became all the more firmly attached to the idea of a coming period of virtue and happiness that the existing situation seemed to give the lie to their hopes. This period was to be ushered in by a great Restorer of the people of God and the world in general, who was known as the M., the Anointed of the Lord (*i.e.*, the King), the king of Israel (Matt. ii. 4, xxiv. 23, xxvii. 37; Mark xv. 32; Luke iii. 15, xix. 38, xxiii. 2; John i. 41, 49), or simply He who was to come (Luke vii. 19). Leaving out of account the disputed passages in the Pentateuch (Gen. iii. 15, ix. 26, xii. 2, 3, xlix. 10; Num. xxiv. 17–19; Deut. xviii. 18, and others relating to 'the angel of the Lord'), which, whether they actually refer to the M. or not, contain nothing definite about his nature, the idea as it appears first among the prophets is indefinite, and does not necessarily include a person. With the prophet Joel it is a longing for better times, while some consider the *Servant* of Jehovah, in the later part of Isaiah, to be the ideal, true Israel, who, although righteous themselves, had to suffer as a part of the nation, and bear the iniquity of the nation (*cf.* xli. 8, xliv. 1, 2, 21, xlv. 4, xlviii. 20, xlix. 1–7, liii.).—2. The next phase of the idea is connected with a personal M., a prince of the house of David, 'introducing a new and glorious era of righteousness, reigning triumphantly on the throne of his ancestors, and exalting the nation to universal sovereignty;' a phase which appears especially in the Psalms and in Isaiah and Micah.—3. With the later prophets, about the time of the Captivity, the idea relapses to its original, general form.—4. A fourth phase appears in the Book of Daniel, namely, that the M. was something above man (*cf.* vii. 13). The belief that the M. had been taken up to heaven, from which he would return, was entertained by this time, and although he is still human in the Book of Daniel (the Son of Man, vii. 13), there is this new trait introduced, which leads to a higher conception. A further development in this direction is found in the Book of Enoch (q. v.) about 100 B.C., in which he appears as the appointed judge of the living and the dead, of men and angels, as chosen and concealed before the creation of the world, and sitting on the throne of the divine majesty as the representative of God, receiving the title of the Son of God. At the time of Christ the ideas regarding the M. had assumed a threefold form:—1. The ordinary prophetic and Talmudic form, that he was to be a prince of the house of David, the conqueror of the Gentiles, and the righteous ruler both of Jews and Gentiles; 2. That he was to be a great prophet like unto Moses, according to Deut. xviii. 15; and 3. The form which appears in the Books of Daniel and Enoch, that he was heavenly as well as human, the Son of God (Matt. xxvi. 63). It is maintained by some and disputed by others, that the further idea of a *suffering* M. was familiar, or at least not unknown to the Jews at the time of Christ, an opinion which is founded on such passages as Psalms xxii., xlii., lxix.; Isaiah liii.; Dan. ix. 24–27; Zech. xi.–xiii.; Luke ii. 35; John i. 29. The precise time when the M. was to appear was a mystery (Matt. xxiv. 3; Luke xvii. 20), but was determined so far that its approach was to be indicated by certain signs. The first of these was an increase of corruption and of the consequent calamities of all kinds: wars, famines, pestilences, earthquakes, fearful sights, and great signs from heaven (Matt. xxiv. 3–31). In short, the coming of M. was to be preceded by that of Antichrist, a being uniting in himself all the tendencies hostile to God, and thus provoking heaven to a manifestation of omnipotence (1 John ii.–8). The more immediate signs were, first, the appearance of an extraordinary star (Matt. ii. 2), and then of Elijah, of Moses, or Jeremiah, or of some one of the Old Testament prophets, come back to earth to announce the advent of the M. (Mal. iii. 1, iv. 5; Sir. xlviii. 10; 2 Macc. xv. 13; Matt. xvi. 14, xvii. 3, 10). The object of the coming of the M. was to establish 'the kingdom of God,' which meant a political, moral, and religious restoration of Israel, including deliverance from the Roman yoke (Judg. xvi. 17; Sir. l. 24; Luke i. 67, ii. 38), the recall of all Jews scattered abroad (Tob. xiii. 10, xiv. 5; 2 Macc. ii. 18), and the re-establishment of the throne of David (Acts i. 6), the restoration of God's favour to the Jews in consequence of the punishment of the wicked and the sufferings of the people, and the conversion of the Gentiles (1 Macc. iii. 8; 2 Macc. vii. 38, viii. 5; Tob. xiv. 6; Luke i. 74). At the actual appearing of the M., on a signal with a trumpet given by the attendant angels, the dead were to rise from their graves and present themselves for judgment (Dan. xii. 2, 3; 2 Macc. vii. 23–36). A glorious transformation was to pass upon the earth to fit it to be the abode of 'the elect,' and an everlasting kingdom to be established, with its centre at the New Jerusalem (Tob. xiii.; *cf.* Rev. xxi.).

Such were the Jewish notions regarding the M. at the time of Christ, and it is not difficult to understand why his disciples found such a contradiction and difficulty in the idea, and afterwards in the fact of his death (Matt. xvi. 22; Mark viii. 32, ix. 32; Luke ix. 45, xviii. 34), or why the Jews as a nation failed to see in him their expected M. The idea of a kingdom of God which was *not of this world* (John xviii. 36) was entirely new to them, and they have not yet come to see that the kingdom of God, purely spiritual and universal, which Jesus the Christ established, is more glorious than the one they had been expecting and are expecting still. See Reuss' *Histoire de la Théologie Chrétienne* (3d ed. Strasb. 1864).

Messi'na, the chief commercial city of Sicily, and chief town of the province of the same name, situated on the Strait of M., nearly opposite Reggio, and 59½ miles N.N.E. of Catania by rail. The seat of an archbishop, a university, and an appeal court, it is a stately modern city, with many spacious squares, has one of the finest harbours in the world, and lies at the foot of a jagged mountain range. The harbour is formed by a crescent-shaped peninsula (hence its old Gr.'name *Zancle*, 'a sickle'), and strongly defended by a citadel and several forts. The chief buildings are the cathedral (begun 1098, partly rebuilt in 1865), with a richly decorated interior, the university, containing valuable art collections, and a handsome custom-house, opened in 1876. In 1875 the exports—olive oil, rice, lemons, wine, silk, and sulphur, amounted to £1,678,635; the imports to £1,429,371. There entered the port 4350 vessels of 1,282,177 tons, including 3083 steamers of 381,376 tons. Pop. (1874) 70,307. About 493 B.C. fugitives from Samos and Miletus took possession of the defenceless Zancle, and soon afterwards they were followed by great numbers of Messenians, who gave to the city the name of Messana. It suffered greatly during the Punic wars, and was taken by the Saracens in 842 A.D. The massacre known as the Sicilian Vespers took place here in 1282. In the 16th c. Pelidoro da Caravaggio founded a celebrated school of painting at M. The town was almost destroyed by an earthquake in 1783.

The Strait of M. (It. *Faro di M.*, 'Ferry of M.,' Lat. *Mauritinum fretum*) separates Italy from Sicily, and connects the Ionian and Tyrrhenian seas, is 26 miles long, from 2 to 12 broad, and of great depth. The tide is very irregular, and the ebb and flow succeed each other rapidly. The curious phenomenon *Fata Morgana* (q. v.) is witnessed here. See also SCYLLA AND CHARYBDIS.

Mess'uage, in English law, denotes a dwelling-house with or without land annexed.

Metalliferous Mines, Regula'tions Act. This Act applies to every mine to which the Coal Mines Regulations Act does not apply (see COAL MINES, LAW AS TO). No boy under twelve years of age, and no female of any age, is to be employed below ground. The hours of employment of boys under sixteen years of age are the same as in coal mines, and the boys are under the same regulations.

Met'allurgy is the act of extracting metals from their various ores. The processes employed are partly mechanical and partly chemical, and the details of treatment differ in many particulars for the different metals. There are, however, several essential features common to the entire range of metals, and while referring for details of each to their own proper headings, the operations they undergo in common may be here briefly alluded to. Metals occur in nature either native, or in the form of ores. Gold and platinum are the only two metals found exclusively in the native or metallic condition; but sometimes copper, silver, mercury, and bismuth are also obtained native. Ores are compounds of metals with other chemical elements, the chief of which are sulphur forming sulphides, oxygen whence are the oxides, carbonic acid yielding the carbonates, and chlorine which gives rise to the chlorides. Many ores again contain two or more metals, and these in such proportion that it is profitable to extract and reduce both or all the metallic constituents. Ores are rarely extracted from the mine in a state of purity; but usually they are associated and intermixed with earthy or rocky matter; and to free them as far as possible from these impurities they are first dressed by reducing them to a convenient size, and separating the purer pieces from the more earthy by hand picking. The separation of the comparatively pure and consequently heavy ore from the impure is frequently effected by the stamping and dressing mills worked in connection with running water, which accurately arranges and separates the crushed ore according to its specific gravity. The process of washing is also employed to enrich and improve crushed ores by removing the earthy matters associated with them. In most cases previous to smelting, the ores have to undergo the operation of calcination or exposure to a high temperature with the air excluded, or of roasting, in which the material is similarly treated with access to air. By calcination, moisture, carbonic acid, and bituminous ingredients are driven off; in roasting, sulphur and other volatile constituents are vaporised, and the metal is left combined with oxygen. In the process of smelting which follows, the prepared ore is mixed with a flux substance for promoting the fluidity of the metal, and at the same time for aiding in its reduction from the compound in which it exists. The smelting takes place in crucibles or in furnaces of various construction, according to the nature or quantities of the materials operated on, and the 'heat of reduction' of course varies enormously for the different metals. The products are the metal in a more or less pure condition, and slag—a glassy compound of the impurities associated with the ore and the fluxing materials employed in its reduction. The wet process or hydro-metallurgy now employs an important part in the production of Copper (q. v.).

Metals. See ELEMENTS, CHEMICAL.

Metals, in Heraldry, are either *or* ('gold'), or *argent* ('silver'). The former is represented in engravings by dots, the latter by a plain surface.

Metamor'phic Rocks (from Gr. *meta* and *morphē*, 'change of form') are rocks which, though undoubtedly of aqueous origin, have through the action of heat or pressure become quite altered in character, so as to lose all or nearly all trace of their original structure. Those in which the structure is still visible may be grouped in three classes—arenaceous, argillaceous, and calcareous. To the first belong grauwacke and quartzite, both altered sandstones. The various kinds of clay, indicating by their planes of cleavage the direction of the pressure which metamorphosed them, belong to the second group; and marble, dolomite, serpentine, and various porphyries are included in the third. More metamorphosed than these, but still showing in their foliations their original stratification, are the so-called schistose rocks—mica-schist, gneiss, chlorite-schist, hornblende-schist, &c. The last group of M. R. includes those which have lost all trace of original structure—such as granite, syenite, diallage-rock, &c. Many of these are not distinguishable from true igneous rocks which have cooled from a molten condition; and indeed, just as there is a gradual transition from simple stratified rocks through contorted strata to M. R., so there is a gradual transition from the latter to igneous rocks. These again are slowly weathered away, and their particles are carried off suspended in water, and are deposited on the bed of some lake or ocean, where they collect in time, and form a new series of aqueous formations.

Metamor'phosis (Gr. *meta* and *morphōsis*, 'the act of changing form'), in Mythology, denotes the 'transformation' of human beings into beasts, trees, stones, fire, water, &c., fabled in countless legends of the Greeks, Romans, Teutons, and other Aryan peoples. The mysterious changes of outward nature doubtless first dictated a belief which was widened by the popular acceptance of poetic imagery as actual fact, and by the tendency of superstition to assign the inexplicable to the supernatural. Eastern poets employed it much in moral allegory, and this use of M. is frequent in such Greek writers of the Alexandrian age as Callisthenes, Antigonus, Nicander, and Parthenius. The metamorphoses of Greek mythology proved a rich storehouse for the poetry of Ovidius (q. v.), as in later times did those of the old German magic and fairy tales to Wieland and Herder. Traces of the old were-wolf, swan-maiden, and vampire superstitions linger on in the belief—still current in some out-of-the-way corners of England—that a witch has power to transform herself into a hare or other animal.

Metamorphosis of Animals, the name given to the changes of greater or lesser extent which many animals undergo

in passing from the egg to the mature and adult state. Strictly speaking, every animal may be said to undergo M. in the course of its development. The development of a chick within the egg is a series of changes of very marked and definite nature, and which result in the production of a new being. But the term M. must rather be held as applying to those phases of *Development* (q. v.) which are exhibited outside the egg, and in the course of which the young animal shows phases of existence of a kind or nature often widely different from those seen in its adult state. The egg of a butterfly, of a fly, or of a beetle, gives origin to a *caterpillar* or *larva*, which after passing its existence in the work of nutrition, next assumes a quiescent state, and becomes the resting *chrysalis* or *pupa*, within the body of which the lines of the future animal are, as it were, laid down, and from the elements of which—accumulated in the larval state—the adult insect or *imago* is finally formed. The young frog, toad, or newt, again, leaves the egg in the form of a tadpole. Gradually acquiring outside gills, it lives an aquatic life. Next, the outside gills become internal, and the limbs are duly developed. In the last place lungs are produced, and in the frog and toad, the tail of the tadpole state becomes abortive in the adult, which also gets rid of its gills, and breathes throughout its after-life by means of lungs alone. Similarly, the young crab, barnacle, and the young of many other *Crustacea* (q. v.) leave the egg as little free-swimming beings, each known as a *nauplius*, and through the M. of this nauplius-larva the perfect forms are sooner or later evolved.

That modifications of development have taken and still take place, is proved by the fact that recently the *Axolot* (q. v.) of Mexico has been experimentally metamorphosed into the *Amblystoma*, a N. American eft, by careful attention in inducing the axolote to leave the water and to gradually adapt itself to a land existence. If, therefore, modifications may take place even in the structure of the adult animal, during development, and in the process of early growth, such modifying processes may be regarded as having operated in the past in inducing and perfecting M. To quote Mr. Darwin's words, which apply very well to the whole question of M. and development: 'Embryology rises greatly in interest, when we look at the embryo as a picture, more or less obscured, of the progenitor, either in its adult or larval state, of all the members of the same great class;' and again, 'community in embryonic structure reveals community of descent.'

M. of Organs, in Botany.—Goethe was the first to propound the theory, though somewhat poetically, that all the organs of the higher plants can be referred back to a single, or, at least, to a very small number of fundamental forms; that, in fact, every organ is either axial (stem), or foliar (leaf), or is compounded of these two. That this is actually the case is shown, not only by the history of development, but also by close investigation of those abnormal processes which are called M. According to Goethe, a foliar organ must be considered the more highly developed the higher it stands on the axis of the plant, the nearer therefore it is to the centre of the flower; and an ascending series can be constructed as follows:—leaf, bract, sepal, petal, stamen, carpel. The M. may be either progressive or retrogressive, according as the transformation of the foliar organ takes place in the direction of a higher or a lower member of the series. Instances of *retrogressive M.* are commonly furnished by the rose, where the seplas are transformed into bracts or leaves; the tulip, where the three carpels and six stamens become petaloid; and the white waterlily (*Nymphæa*), where we can plainly trace the chain of transition from stamens to petals. Double flowers are produced in like manner, and as a necessary consequence are sterile. When the retrogressive M. goes back still further than the doubling of the flower, the parts become green and leaf-like, as is not uncommon in clover and other Leguminosæ. Instances of *progressive M.* are rarer, though a number have been recorded. It is not, for example, uncommon to find the shepherd's purse (*Capsella*), instead of bearing four petals and six stamens, having ten stamens, and the same has been noticed with the wallflower. Sometimes also in willows the stamens are changed into carpels, and bear ovules, rendering a naturally dicœcious plant apparently monœcious.

Met'aphor (Gr. *metaphora*, 'a transference') is that trope which substitutes one name for another, because of a real or imagined likeness between the objects. It may substitute the animate for the animate, the inanimate for the inanimate, the animate for the inanimate, or the inanimate for the animate. Examples:—'Cato barked at Scipio,' 'A sea of glass,' 'Mother Earth,' 'the Iron Duke.' A common fault of style is mixed or incongruous M.; as, 'The evils flowing from such a view have their root,' &c. Addison's rule for its avoidance is that the M. should be fancied as painted on canvas.

Metaphys'ics, a term of uncertain origin, first occurs as the title of that part of Aristotle's writings which concerns itself with the highest speculative ideas, and may have been given to this as coming after the books on physics (*meta ta physika*). The word was rarely used by the ancients, but has established itself in modern times as *the* name of the science which treats of the mind, and its relations to the phenomenal universe. It embraces Ontology (q. v.), or the theory of being, and Psychology (q. v.), or the analysis of the properties and laws of the mind. Physicists somewhat scornfully refuse to M. the name of a science, on the ground that no positive knowledge has been secured by all the laborious disquisitions that have been written on the subject since the days of Aristotle.

Metasta'sio, Pie'tro (properly **Pietro Trapazzi**), son of a common soldier, was born at Rome, January 3, 1698. The jurist Gravina, observing the boy one day on the street amusing his schoolfellows by improvising verses, became interested in him, and educated him for the law. When twelve he translated the Iliad into *ottava rima;* and at fourteen he composed the tragedy of *Giustino*. At Naples, Brugnatelli the actress admitted him to her establishment, and to her influence M. attributed much of his success in writing for the stage. Early abandoning classical drama, M. strove to bring to the aid of opera all that was capable of musical illustration. His plots are often absurd, but his characters are strongly marked and contrasted; his lyrics are exquisite, and very frequent—for it was his habit to cut short recitative; and over all he cast a glamour of romance and spirituality which blended with the charms of music enchantingly. In Italy he wrote *Endimione* (1721), *Gli Orti Esperidi*, and *Angelica* (1722), *Didone abbandonata* (1724), *Catone in Utica* (tragedy, 1728), *Ezio*, *Alessandro nell' Indie*, *Semiramide*, and *Artaserse* soon after. He went to Vienna in 1730 as imperial poet, and there produced *Adriano in Siria*, *Demetrio* (1731), *Issipili* (1732), *Giuseppe*, *Demofoonte*, and the *Divine Olimpiade* (1733), *La Clemenza di Tito* (1734), *Achille in Sciro* (1736), *Ipermestra*, *Temistocle* (1738). M. died at Vienna, 12th April 1782. There are numerous editions of his works, among which may be noted those of Paris (12 vols. 1782), Parma (20 vols. 1820), and Florence (6 vols. 1819–23). See Burney's *Memoirs of M.'s Life* (Lond. 1796).

Meta'yer is the term used in France for a labourer or peasant who receives an allotment of land from his proprietor, and pays his rent in a certain amount of the produce which remains after a deduction has already been made to keep up the stock. The word is derived from the Lat. *medietarius*, found in Med. Lat. documents, 'one who pays half,' *i.e.*, of his produce. The terms of contract vary in different countries, but the lease itself passes down from family to family. M. cultivation has been comparatively unsuccessful in France, but, according to the testimony of Châteauvreux and Sismondi, it has been accompanied with the best results in Italy. Its weak points consist in the absence of motive towards the severest exertions, inasmuch as half at least of the produce is alienated from the M., and in the unlikelihood of the cultivators laying out their savings upon the further improvement of the land. Where it flourishes it is said to operate in favour of connubial prudence, and other virtues of an estimable order. See Sismondi, *Nouveaux Principes d'Économie* (book iii. chap. v.), and J. S. Mill's *Principles of Political Economy*.

Met'calfe, Sir Charles (afterwards **Lord**), a distinguished Indian civilian, was the son of a successful Bengal officer, and was born at Calcutta, 30th January 1785. He was educated at Eton, and arrived in India as a writer at the age of fifteen. He was early selected for the political (or diplomatic) department, and in 1808 was sent on the first British embassy to Runjeet Singh, the Sikh Rajah. M. was afterwards Resident at Delhi and Hyderabad, and Member of Council at Calcutta. In 1835–36 he acted as Governor-General of India, and signalised himself by removing

all restrictions on the press of that country. He was the first Lieutenant-Governor of the newly-formed N.W. Provinces. On his return to England M. was appointed Governor of Jamaica (1839–41), and subsequently Governor-General of Canada (1843–45). In both colonies he acted with great moderation in troublous times. He was raised to the peerage in 1845, and died at Malshanger, near Basingstoke, 12th September. See Sir J. W. Kaye's *Lives of Indian Officers* (Lond. 1867).

Metempsycho'sis is a Greek word denoting the transferring of the soul from one body to another. See TRANSMIGRATION OF SOULS.

Meteoric Iron, the metal of which the great mass of Aerolites (q. v.) are composed, is an alloy of iron with nickel and cobalt. The iron meteorites often contain nodules of iron, phosphoret of iron, and nickel and graphite. When polished, the surface is very brilliant, but it usually rusts quickly from the presence of chlorine.

Meteorol'ogy is the science which treats of atmospheric phenomena, of their causes and effects. Among the ancients, except by the collection of weather portents, M. could make but little progress, since the indispensable instruments of meteorological research, the barometer and thermometer, were unknown. The invention of these instruments forms an epoch in the history of the science, and since then the development has been gradual but continuous. At the present day, it is true, there are doubts as to whether M. can be truly reckoned a science, there being comparatively so little of the certainty and accuracy that mark other sciences. There can, however, be no doubt that the principles upon which M. depends are being rapidly discovered and applied. The reason of the slow development of meteorological science is that it is not strictly an experimental science. The investigator cannot order nature as he likes, but must accept things as they come. It is thus somewhat similar to astronomy, except that there are many more causes at work whose resultant effect, even if these causes themselves were fully known, is therefore the more difficult to understand. The chief source of all our climatic variations is the solar heat and light, combined with the earth's rotation, the configuration of land and water, and the action of the moon. Further, the sun appears to exert other influences than are attributable to mere thermal action. The established connection between sun-spots and magnetic storms, and between sun-spots and periods of rain and drought, is a discovery which cannot but lead to wider views of the whole economy of nature. For a proper study of M., observatories are necessary, and when these are established distinct from the astronomical observatories we may hope for a rapid development of the science in all its branches. To such articles as ATMOSPHERE, CLIMATE, CLOUDS, CURRENTS, HYGROMETER, WINDS, &c., the reader is referred for the ordinary facts of M. The best general treatise on M. is that of Kaemtz; while the writings of Dove, Colding, Bravais, Glaisher, Forbes, Buchan, and others on special parts of the subject are of great value.

Me'teors. See AEROLITES.

Meth'odists is the name which was given in banter by their fellow-students at Oxford to John Wesley (q. v.), his brother Charles, and the other young men who in 1727 organised themselves into a brotherhood for the study of the Bible, visiting the poor, observing Wednesday and Friday fasts, &c., or, in short, for the promotion of personal piety according to the principles and practice of the Church of England. In 1735 this brotherhood consisted of about fifteen members, including J. and C. Wesley, Whitfield, Hervey, Ingham, Clayton, and Broughton; and after Wesley's return from Georgia in 1738 the movement was revived in London on similar principles. Wesley's views at this time underwent a great change. In Georgia he had been a High Churchman, but having now experienced what he considered his real conversion, the corner-stone of his creed was now the Doctrine of Assurance. Under the impression that he was excluded from the churches of the land, he took to preaching in the fields, and in unauthorised places of worship, and began to employ lay agents as assistants to his ministry. He had no intention of separating himself from the Church of England, indeed, repudiated that idea to the last, but he had now accepted the principle 'that the order of that Church was to be put aside whenever the spiritual interests to which it was justly subservient could be best promoted by its neglect.' He was partly influenced in this by his intimacy with the Moravians (q. v.), but it was only another step in the direction of forming a religious association over which he might have complete control when he separated himself from that body; the separation removed one of the main barriers in the way of the course of unfettered personal action on which he now entered. It tended still further to alienate Wesley and his followers from the Church, and give them the constitution of a separate sect, when in 1784 he assumed the office of a bishop and consecrated certain clergymen as bishops ('superintendents,' as he called them) and presbyters ('elders'), and when in 1786 he authorised his preachers to use the Book of Common Prayer in their services. At Wesley's death in 1791 the society he had founded extended throughout the whole of England and Wales and across the Atlantic; and as soon as his personal influence, on which the whole organisation was dependent, was withdrawn, it became apparent that he had really founded a sect. Dissension immediately sprang up regarding (1) the management of the society, and (2) the administration of the sacraments independently of the Church; there being three parties, which might be described as a Church party, a dissenting party, and an intermediate or Wesleyan party. The middle party had the most influence, and the questions in dispute were settled in 1795, when eighteen 'Articles of Pacification' respecting the sacraments and discipline were drawn up. According to these articles the sacraments of Baptism and the Lord's Supper were only to be administered in Methodist chapels by the consent of the Conference, but it was not long till the practice became almost universal.

Almost the only events of importance in the later history of the M. consist of the formation of new sects. The principal of these are the following:—'New Connection' or 'Kilhamites,' who seceded in 1797 under the leadership of A. Kilham, because their preachers were not allowed to administer the sacraments, and laymen were excluded from the Conference. They are chiefly found in the northern counties of England, numbering, in 1870, 22,633 members. The Welsh Calvinistic M. owe their origin to Howell Harris, an Oxford disciple of the Wesleys, and friend of Whitfield. When he began itinerant preaching in Wales in 1736, he followed the latter in his Calvinistic theology, and the former in his organisation. The organisation of the sect was completed in 1811 by T. Charles of Bala. In 1823 they adopted a Confession of Faith founded on the Westminster Confession. The sect numbers at present about 60,000, with 200 ministers and 250 lay preachers. The Primitive M. owe their origin to L. Dow, an American, who introduced into England the institution of 'camp meetings,' and was supported by two local preachers, Clowes and Bourne, who desired by 'revival services' to gain converts to the sect by the same kind of excitement as Wesley and Whitfield had aroused. Bourne and Clowes, being expelled from the main body in 1808 and 1810 respectively, at once founded a new sect, which in 1870 numbered in England 150,169, and elsewhere 12,000, with 961 ministers, and 14,332 lay preachers. The Bryanite M. or 'Bible Christians' owe their origin to a local preacher of Cornwall named O'Bryan, who separated from the Wesleyan M. in 1815. Almost the only difference between the Bryanite M. and the latter is that they allow women to preach, and have a larger proportion of the lay element in their organisation. In 1870 they numbered 18,466. The Wesleyan M. Association was founded in consequence of the expulsion of Dr. S. Warren from the M. body by the Conference of 1835, for the part he had taken in the dispute about the establishment of the Wesleyan Theological Institution. Within two years he was joined by about 20,000 others, who formed themselves into the new sect of Associated M. Another sect called the Wesleyan Methodist Reformers was formed by the excommunication of a large number of M. who had ventured to criticise the conduct of the Conference from 1844 to 1848. In 1857 these last two bodies formed themselves into a new sect called the United Methodist Free Churches, which in 1870 numbered in England 62,898 members, with 5786 on trial, and 5000 elsewhere.

In America the leading sect of M. has an episcopal constitution. Whitfield had gone thither in 1738, after Wesley's lamentable failure in Georgia, but the first Methodist congregation was formed by some Irish emigrants in New York, in 1766. The sect, which in 1783 numbered 14,000 members,

with 43 preachers, received a constitution from Wesley in 1784. He sent out to them Dr. Coke and Mr. Asbury, whom he had ordained as 'superintendents,' enjoined upon them the use of his abridged Book of Common Prayer, and gave them Twenty-Five Articles of Religion. This Episcopal constitution of bishops, elders, and deacons, with the general organisation of the English M., the sect has ever since retained under the name of the Methodist Episcopal Church, numbering in the United States about 1,250,000, with about 17,000 preachers. A sect called the Methodist Reformed Church separated from the main body in 1814, repudiating episcopacy and slavery. Although augmented by another secession from the Methodist Episcopal Church in 1843, they only number yet about 25,000, with about 600 preachers.

Organisation.—The systematic form of Methodism, which consisted at first merely of 'a machinery for keeping together those people who adhered to the ministry of John and Charles Wesley,' was adopted in 1742, and in 1743 the Society rules which are still in force were drawn up. The present organisation is as follows:—(1) The *classes*, to one of which every Methodist must belong, and several of which make a 'society' or congregation, consist of from twelve to thirty persons, who meet once a week, and after praise and prayer, follow the leader of the class in detailing their spiritual 'experience' during the past week. Besides this object, however, the class has an important connection with the finances of the community, since each member has to contribute at least one penny weekly and one shilling quarterly to the general fund, out of which the ministers are paid. (2) A *circuit* comprehends generally the chapels in a town, and the villages round. To each are appointed from one to five ministers, or 'travelling' preachers (so called because they are not allowed to continue in the same circuit for more than one or two years), and a number of lay or 'local' preachers. The senior minister has the general supervision of all the societies and preachers in a circuit, and is called the 'superintendent.' (3) The *districts*, of which there are thirty-three in England and Scotland, contain each on an average eighteen circuits. The preachers in a district meet at appointed times as a local committee of the Conference when it is not sitting. (4) The *Conference*, which consisted originally of certain travelling preachers invited by Wesley every year to meet him for consultation (the first time in 1744), but was properly constituted in 1784 by a Deed of Declaration to consist of 100 travelling preachers, meets once a year in London or other large town, its members now being all travelling preachers, who have acted as such for five years, and have been admitted into 'full connection.' (Originally the unit of Methodism was the *band*, which consisted of from five to ten persons, who met once a week for the purpose of confessing their sins to each other, and praying for each other. This institution, which was copied from the Moravians, fell off greatly after Wesley's death. Its purpose, so far as is thought to be practicable, is now served by the class.) The *theology* of the M. is formally that of the Church of England, as expressed in the Thirty-Nine Articles and the *Book of Common Prayer*, and expounded in Wesley's *Sermons and Notes to the New Testament*. Like all the Laudian school, to which Wesley belonged, he received the epithet of 'Arminian,' a title which he accepted in the sense of Anti-Calvinistic, in respect of the Calvinistic doctrines of a limited Atonement (q. v.), Election (q. v.), and Reprobation (q. v.). It was on these points that Whitfield and he had their controversy, and on which the Calvinistic M. differ from the Wesleyan M. See Southey, *The Life of J. Wesley and the Rise and Progress of Methodism* (Lond. 1820), Taylor, *Wesley and Methodism* (Lond. 1851), Smith, *History of Wesleyan Methodism* (Lond. 1857), Wesley's *Works; Minutes of Conference;* Tyerman's *Life and Times of Wesley* (1870); Urlin's *Wesley's Place*, &c. (1870); Blunt's *Dict. of Doct. and Hist. Theol.* (1872), and *Dict. of Sects*, &c. (1874).

Meth'yl, a hypothetical compound radical, homologous with Ethyl (q. v.). Its formula is CH_3. Marsh Gas (q. v.) may be thus regarded as the hydride of M. Its other compounds are obtained from methylic alcohol or Pyromylic Spirit (q. v.), whose formula is $(CH_3)HO$. The most important are methylic ether or oxide of M. $[(CH)_2O]$, iodide of M. (CHI), salicylate of M. or *oil of winter green* $(CH_3.C_7HO_3)$, and formiate of methyl $(CH_3.CHO_2)$. It forms also a sulphide bromide chloride cyanide, exactly as ethyl does (see HYDROCARBONS). If the iodide be heated with zinc a gas having the composition CH_3 is obtained, so that in this point it differs from ethyl, which cannot be obtained in a separate state.

Methyla'ted Spirit is spirit of wine with a little wood naphtha or methylic alcohol added, to prevent persons from drinking it. It is generally used in the preparation of varnish, and for preserving specimens in museums.

Meton'ic Cy'cle, the cycle of nineteen years, invented by Meton (430 B.C.), after the lapse of which the new moons fall on the same days and the eclipses occur in nearly the same order. The reason of the phenomenon is that nineteen years nearly correspond to 235 lunations.

Meton'ymy (Gr. *metonymia*, 'change of name') is the trope which substitutes one name for another on account of some actual association between the things, whether physical or historical, as when 'grey hairs' stands for 'old age,' 'blue jackets' for 'sailors,' or 'Bacchus' for 'wine.'

Met'opé, in Doric architecture, the part of the frieze between two Triglyphs (q. v.). It was sometimes plain, sometimes carved in high relief, and was called M. (Lat. *columbarium* or *interpignium*) from its being 'between' (Gr. *meta*) the 'openings' (Gr. *opai*, Lat. *tignorum cubilia*) into which were fitted the ends of the beams supporting the roof.

Me'tre is the rhythmical arrangement of syllables which distinguishes verse from prose. With the ancients M. was determined by quantity—the succession of long or short syllables; in modern poetry it is regulated by accent. Modern metres have commonly been associated with rhyme; and alliteration and assonance, though found in classical writers, became distinctive of the poetical measures of the Low German languages. The varieties of M. are treated separately in this work. For those of our own language, see Guest's *History of English Rhythms* (Lond. 1838), and Sylvester's *Laws of Verse* (Lond. 1870).

Met'ric Sys'tem is the system of weights and measures which was introduced into France in the beginning of this c, and which is gradually finding its way into other countries. The basis of the system is the *mètre*, which was originally defined as the ten-millionth part of the quadrant of the meridian of Paris, but is practically, like our yard, determined by a standard length preserved in the archives of France. The unit of mass is the *gramme*, which is defined as the mass of a cubic centimetre of distilled water at its point of maximum density. The unit of capacity, the *litre*, is the 1000th part of a cubic metre, and the unit of surface, the *are*, is 100 square metres. The length of the metre in inches is 39·37079, and an inch is equal to 2·539954 centimetres. For the method of nomenclature of the multiples and submultiples of the units of this system, see DECIMAL SYSTEM.

Met'ronome, a box containing a pendulum moved by clockwork, for determining, or rather describing, the various *rates* of musical compositions.

Metropol'itan, or chief bishop, is so entitled because consecrated in the metropolis of his province. The Metropolitans of the Church of England are the Archbishops of Canterbury and of York. A M. is *enthroned*; other bishops are *installed*.

Mett'ernich, the name of a noble German family, originally belonging to the Lower Rhine, which in the 16th and 17th centuries reckoned three ecclesiastical princes, two of Trier and one of Mainz. It branched off into several lines, of which that of M.-Winneburg is the most notable. To this belonged by far the most famous member of the family, **Clemens Wenzel Nepomuk Lothar, Prince von M.-Winneburg**, the son of Franz George Karl M., a diplomatist of mark. M. was born at Koblenz, 15th May 1773, educated at Strassburg and Mainz, and was attached to the Austrian embassy at the Hague in 1794. In 1795 he married the heiress of Kaunitz (q. v.), and at Rastatt he represented in Congress the Westphalian nobility, after which he proceeded to St. Petersburg. M. was minister at Dresden in 1801, ambassador at Berlin in 1804, and after Austerlitz and the Peace of Presburg he was accredited to the Court of Napoleon, where amidst much personal provocation he retained his dignity and good humour. He became Foreign Minister of Austria (1809), and planned the marriage of Napoleon with an archduchess, which ended in Maria-Louisa (q. v.) being conducted to Paris. This did not hinder Austria from taking advantage of

the check offered to France in Russia, and under M.'s policy war was declared (1813). On the field of Leipsic M. was made a prince of the empire. He presided at the Congress of Vienna, and inspired the reactionary policy of the Holy Alliance. For thirty years no man wielded greater influence on the Continent. At the revolution of 1848 he was driven from Vienna, and took refuge in England. Though he returned to Austria in 1851, his influence was practically gone. He died at Vienna, 11th June 1859. M. was one of those statesmen whom the French Revolution of 1789 had thoroughly alarmed, and who had formed the fatally erroneous notion that the people could never be trusted, that repressive measures were necessary to prevent social anarchy, and that the welfare of Europe could only be secured by the coalition of despots. His accomplishments in art, science, and letters, were of a high order. See Schmidt-Weissenfel, *Biography of M.* (2 vols. 1859–60).—His son, **Richard Clemens Lothar Hermann, Prince von M.**, born 7th January 1829, was Austrian ambassador at Paris 1859–71, and was a great favourite in French society.

Metz, the chief town and fortress of German Lothringen, lies in the wide basin of the Moselle, which sends off several arms through the town, and here receives its affluent the Seille, 35 miles N. of Nancy by rail. One of the greatest strongholds in Europe, it is now (1877) defended by eleven bastions and by seven forts placed on the surrounding heights. It is the seat of a bishop, and a civil and commercial tribunal, and has a magnificent Gothic cathedral of St. Stephen, begun in the 13th c. and consecrated in 1546 (restored 1830–35), with a fine tower 387 feet high, containing a bell of 13 tons. Other buildings and institutions are the churches of St. Vincent, dating from the 13th c., and St. Eucharius, from the 12th c., the handsome Palais de Justice, a college, a school of artillery, a museum of Roman antiquities, a library of 30,000 vols., a botanical garden, an arsenal, &c. A spacious esplanade is laid out with pleasant walks and flanked by extensive barracks. The manufactures are woollens, silk, embroideries, brushes, felt, leather, paper, iron and copper wares, drugs, &c., and there is a large trade in wine, timber, grain, and hides. Pop. (1875) 45,673, almost entirely French, and exclusive of a garrison of some 10,000. M., the *Divodurum* of the Romans, was the chief town of the Gallic *Mediomatrici*, from whom about the 5th c. the town received the corrupted name *Mettis*, hence the modern M. It was the capital of Austrasia, and passed to Germany on the partition of the Frankish empire. Treacherously seized in 1552 by the French, who held it against a siege by Karl V. from October 1552 to January 1553, it was formally acknowledged to be a French possession by the Peace of Westphalia, 1648. M. was greatly strengthened by Napoleon III., and its inglorious surrender (27th October 1870) was one of the main events in the Franco-Prussian War. A French army of 173,000 men, 6000 officers, and 3 marshals, became prisoners of war. The Germans acquired possession of war material worth £3,200,000, comprising 800 guns, furniture for 85 batteries, 66 mitrailleuses, 300,000 muskets, a vast quantity of sabres, cuirasses, &c. M. was ceded to the German empire by the Peace of Frankfurt, 10th May 1871. See Coster's *Geschichte von M.* (1871).

Meu'don, a town of France in the department of Seine-et-Oise, 5 miles W. of Paris by rail, has stone-quarries and lime-kilns, and a château erected (1699) by Philibert Delorme for the Dauphin, and almost entirely destroyed by fire, January 30, 1871. Pop. (1872) 5101. Rabelais was curé of M. (1551–53), and here the besieged troops of Paris were repulsed in a sortie, January 13–14, 1871.

Meurthe-et-Moselle, a frontier department in the N.E. of France, formed, 11th September 1871, from the portions of Meurthe and Moselle remaining after the Peace of Frankfurt. Area, 2025 sq. miles; pop. (1872) 365,137. It is entered by spurs of the Vosges range, which bounds it on the E., and is watered by the Moselle and its affluents the M., Madon, Seille, &c. Much of the country is richly wooded, and the broad fertile valleys produce abundance of grain, wine, fruits, flax, colza, &c. There are valuable mines of rock-salt, and the manufactures are chiefly linens, muslins, lace, leather, paper, crystal, and iron wares. The chief town is Nancy.

Meuse, a department in the N.E. of France, occupying the angle between Luxemburg and Elsass-Lothringen. Area, 2405 sq. miles; pop. (1872) 284,725. It consists mainly of the wide basin of the M. (see MAAS), enclosed by parallel ranges of hills, and is also watered by the Aire, Othain, Ornaine, and Saule. The products are timber, wheat, and wine of good quality, cattle, horses, sheep, and swine, and iron, limestone, gypsum, &c. The chief town is Bar-le-Duc.

Mexi'co or **Mej'ico** (Aztec. *Mexitli*, a name of the tutelary deity), a federal republic of N. America, after the United States and Brazil the richest and most populous country of the New World, is situated in lat. 15° 40′—32° 47′ N. and long. 87° 4′—117° 8′ W. Extending from the Gulf of M. and the Caribbean Sea on the W. to the Pacific Ocean on the E., and from the United States on the N. to Guatemala and Honduras on the S., it resembles a curved horn in outline, and is 1950 miles in extreme length and only 140 miles broad in the S. at the Isthmus of Tehuantepec, expanding as it stretches N. till it attains an extreme breadth, from the mouth of the Rio Grande to the W. coast of California, of 750 miles. The coast line, is more than 6000 miles long. The following are the areas and populations of the states, according to the Diario Oficial of 7th June 1875:—

States.	Area in sq. miles.	Pop. 1875.	Chief towns.
Aguas Calientes	2,895	89,715	Aguas Calientes.
Campéche	25,832	80,366	Campéche.
Chiapas	16,048	193,987	San Cristoval.
Chihuahua	83,746	180,668	Chihuahua.
Coahuila	50,890	98,397	Saltillo.
Colima	3,743	65,827	Colima.
Durango	42,510	185,077	Durango.
Guanajuato	11,411	900,000	Guanajuato.
Guerrero	24,550	320,069	Bravos.
Hidalgo	8,163	404,207	Pachuca.
Jalisco	39,168	966,689	Guadalajara.
Mexico	7,838	663,557	Toluca.
Michoacan	25,689	618,240	Morelia.
Morelos	1,776	150,384	Cuernavaca.
Nuovo-Leon	23,635	178,872	Monterey.
Oaxaca	33,591	648,779	Oaxaca.
Puebla	12,021	697,788	Puebla.
Querétaro	3,207	153,286	Querétaro.
San Luis Potosi	27,500	460,322	San Luis Potosi.
Sinaloa	36,198	168,031	Culiacan.
Sonora	79,021	109,388	Urea.
Tabasco	11,851	83,707	San Juan Bautista.
Tamaulipas	30,225	140,000	Ciudad Victoria.
Tlaxcala	1,620	121,663	Tlaxcala.
Vera Cruz	26,232	504,950	Jalapa.
Yucatan	29,567	422,365	Mérida.
Zacatecas	22,998	397,945	Zacatecas.
Territory of California	61,562	23,195	La Paz.
Federal District	461	315,996	Mexico.
	743,948	9,343,480	

Of the total population rather more than one-half are pure Indians, while about a million are whites, 6000 negroes, and the rest mestizoes, zamboes, mulattoes, &c.

Physical Aspect.—The heart of the country, to the extent of three-fifths, is occupied by the plateau of Anahuac (*tierras frias*), which has an elevation of from 6000 to 8000 feet above the sea, and is skirted by semi-tropical terrace-lands (*tierras templadas*), and by the luxuriantly productive but unhealthy lower-lands (*tierras calientes*), which stretch inland 20 or 30 miles from the coast to the base of the mountains. The great table-land is a treeless plain, traversed by sierras, opening in extensive basins, and dropping to the E. coast by broad fertile valleys and rolling savannahs, with rugged bluffs overhanging the streams, and to the Pacific by steep slopes and woody defiles. The mountain system is a continuation of the Andes (a name never used in M.), divided into several branches, of which the principal, the Sierra Madre ('mother-range'), extends the whole length of the country from the Isthmus of Tehuantepec in the S. Another coast-range stretches along the Gulf of M., while the centre of the country is also traversed in a northerly direction by the Cordillera de Anahuac, which separates the valleys of M. and Puebla. Near the latitude of M. city six volcanoes rise in a line passing from E. to W. at right angles to the main ranges. Of these Popocatepetl, the highest, reaches an altitude of 17,540 feet; Orizaba, the most easterly, and now extinct, is 17,176 feet high; Iztaccihuatl, the twin of Popocatepetl, is 15,705 feet; Jorullo, the most recent (1759), is 7155 feet; Nevado de Toluca, 90 miles N.W. of Popocatepetl, is 16,616 feet; and Colima, the most westerly, is 10,800 feet. The lesser volcanoes of Jorullo and

Martin Tuxtla are now the most active, but Popocatepetl still occasionally sends forth clouds of smoke. There are many other mountains varying from 10,000 to 12,000 feet, but none in addition to those mentioned that rise above 15,000 feet, the line of perennial snow. In the N. the country, like the main plateau, is traversed by wide valleys and by lower mountains, while from the N.W. depends for 750 miles in a direction parallel to the coast the narrow rocky peninsula of Old or Lower California. In the extreme E. the peninsula of Yucatan, including Campéche, is a vast plain with only a slight elevation above the sea. The southern states of Chiapas and Tabasco are included geographically in the mountain system of Central America.

Hydrography.—M. is singularly destitute of navigable rivers. The boundary river, Rio Bravo or Rio Grande del Norte, 1800 miles long, separating M. on the N.E. from Texas, is by far the largest, but is only navigable by vessels of light draught for 60 miles of its lower course. On the Pacific slope the principal river is the Rio Grande del Santiago, 500 miles, in its upper course called the Lerma, in its middle course the Tololotlan. It rises in Lake Lerma, in the central valley of Toluca, flows W. through Michoacan and Jalisco,and is rendered unnavigable by numerous cataracts. The Rio Colorado which enters the Gulf of California is only a Mexican river for some 80 miles above its mouth. There are besides, many short rivers entering the Gulf of M. and the Bay of Campéche which are navigable in the lowlands, and of these the most important are Panuco, Alvarado, Coatzacoalcos, Grijalva, and Usumasinta. The Coatzacoalcos forms part of the commercial highway across the isthmus of Tehuantepec, where a gap in the Cordilleras is highly favourable to the construction of a proposed railway. The scarcity of water is the great drawback of the central plateau, which is only irrigated by a few torrents and springs. There are numerous large lakes, but most of them are tainted with carbonate of soda. Of these the chief are Chapala, 50 miles long, between Jalisco and Michoacan; Parras, in Coahuila; Tezcuco, and four others in the vicinity of M. city. The Gulf of M. is fringed by many lagoons, of which the largest are Terminos and Tampico.

Climate.—In tropical or lowland M., where the mean annual temperature varies from 68° F. in the N. to 78° in the S., there are only two seasons, the dry and the rainy. These are of irregular duration, but the latter usually lasts from May to October, the heaviest rains falling in September. During the dry season, violent gales (*nortes*) frequently sweep along the E. coast, rendering navigation somewhat perilous. With a W. Indian climate, the coasts are remarkably rich in tropical vegetation, but are rendered almost uninhabitable by the prevalence of yellow fever. In the *tierras templadas*, a region of perpetual spring, the mean temperature ranges from 65° in the N. to 70° in the S. Here the atmosphere is occasionally foggy, the country being nearly on the level of the clouds. The *tierras frias* is only 'cold' in a relative sense, having a climate as mild and equable as that of Naples. Visitors in winter are caused some discomfort, however, by the rarefaction of the atmosphere.

Botany.—Nearly all the European cereals are grown in the uplands, and in addition to these M. produces an unusual variety of indigenous plants. Its flora embraces 100 species of timber trees and cabinet woods (mahogany, rosewood, ebony, &c.), 17 oil-bearing trees and plants, 12 species of dyewoods, 8 of gum trees, and over 60 of medicinal plants, including copaiva, sarsaparilla, and jalap. The staple food of the inhabitants everywhere is Indian corn: wheat and barley grow to perfection in the central valleys. The lower land produces abundance of rice, sugar, tobacco, cotton, coffee, cacao, and indigo, besides oranges, lemons, olives, mangoes, bananas, pineapples, grapes, yucas, &c. From the juice of the maguëy or Mexican aloe is made the famous *pulque*, the national beverage, and in Yucatan a plant of the same species yields the *heniquen*, a fibre that is now the chief commercial product of the peninsula. There are many varieties of the cactus, one of which is cultivated extensively as food for the cochineal insect. The mulberry thrives in various parts, but the rearing of the silkworm has fallen off greatly of late years. Coahuila, Durango, and Sinaloa in the N. are the great cotton growing States, while the tobacco of Vera Cruz and Tabasco, the cacao (chocolate) of Tabasco, Oaxaca, and Chiapas, and the coffee of Michoacan and Colima are unsurpassed by those of any other country. A feature in the flora of M. is the abundance and variety of magnificent flowers.

Zoology.—The domestic animals of Europe are successfully reared, and the wild animals are very numerous. The bison or American buffalo during mid-winter enters the country in immense herds from the forests to the N.W. Other wild animals are the puma, tapir, jaguar, ocelot, wolf, and coyote, several species of bears, deer, and monkeys, the sloth, skunk, glutton, and porcupine. Alligators abound in the lagoons and mouths of rivers; rattlesnakes and other venomous ophidians are common, as well as many noxious insects, including scorpions and tarantulas. The forests are alive with song-birds and bright-plumaged parrots and humming-birds, and there are also many kinds of wild fowl and game. One of the most valuable animals is the cochineal insect, the chief article of export next to the precious metals. The domestic animals, with the notable exception of the turkey, a native of this country, were all introduced by the Spaniards, the ancient Mexicans not having succeeded in taming wild animals. The States in the N. are celebrated for the quality and numbers of their horses, sheep, and cattle. The coast-seas and lakes are well stocked with fish; amber is found on the shores of Yucatan; and there is a productive pearl fishery in the Gulf of California.

Geology and Mineralogy.—A great part of M. has experienced volcanic action, and vast fields are covered with basalt. Granite forms the foundation of the central table-land and of the mountain-system of Oaxaca, while the mineral-bearing superstructure is mainly porphyry. There are numerous caverns, that of Cacahuanilpa being one of the largest in the world. The mineral wealth of M. is enormous. More silver has been taken from its mines than from all the rest of the world, and the supply is practically illimitable. Its gold mines have only been surpassed by those of Peru, and later by those of California and Australia. Gold was the great mineral treasure of the Aztecs, who made little use of silver on account of the difficulty of reducing the ores. Early, however, in the Spanish period, gold gave place to silver as the great staple product of the country. In the first half of the 16th c. the silver mines of Tasco, Sultepec, Pachuca, &c., were developed by Cortes and his successors. Subsequently the rich mining districts of Guanajuato, San Luis Potosi, Zacatecas, and Durango were discovered and wrought, but it was not till the 18th c. that they attained a world-wide celebrity. The famous Veta Madre ('mother-vein') eventually yielded, according to Humboldt, one-fifth of the silver then current in the world, having far exceeded the mountain of Potosi in Upper Peru. The annual yield of the Veta Grande of Zacatecas alone amounted at times to £625,000, and the mines of Cotorce (San Luis Potosi) produced in seventy-seven years £31,250,000. Many proprietors of the great *bonanzas* became counts and marquises, virtually by purchase from the Spanish crown, and the vast mineral wealth of M. was in the hands of a wealthy aristocracy till the long war of independence (1810-20) ruined the mining interests. On the establishment of a republic a fever for Mexican mines pervaded the London money-market, and many English companies were formed, but nearly all of these collapsed within a few years, mainly because of bad management and the ignorance of the mining engineers. The mines are now almost entirely in the possession of Mexican capitalists, and are gradually recovering their prosperity. The Spanish 'mining-code,' the most elaborate in the world, is still in use, and every year is bringing improved processes of extraction and reduction, cheaper means of transport, and larger supplies of coal and quicksilver. In 1876 there were eleven mints in M., and these coin on an average £4,167,000, of which less than £20,800 is in gold. The total production of the mines up to 1875 is estimated at £895,833,000, and the total coinage for the same period is stated at £638,262,515, of which not more than 5 per cent. was gold. Copper is also found extensively. Iron occurs in immense masses in Coalcoman, Lagos, and Durango; in the last State the Cerro del Mercado is a solid mountain of magnetic iron ore. Valuable quicksilver mines have recently been wrought in Morelos and Guerrero, and small deposits of coal have been discovered in many parts, though it is nowhere mined on a profitable scale. Other minerals are tin, lead, bismuth, and platinum; quarries of marble, alabaster, gypsum, and rock-salt are numerous; sulphur is found in the craters of the volcanoes, and mineral springs occur in many localities.

Industry, Commerce, &c.—The great mass of the inhabitants are engaged in agriculture, either in the tillage of their own small plots, or in the cultivation of the great plantations. In

addition to the mining industries, there are also a few iron-foundries, several extensive sugar refineries (in Morelos), and cotton and woollen factories, a number of small paper, grist, and sawmills, &c. The goldsmiths excel in filigree work, and superior glass-ware and porcelain are made at Puebla, Texcuco, and other cities. Other industries are the making of *rebozos* or shawls, and of saddlery of fine quality, and the weaving by hand of cotton and woollen cloths. In 1874 the total value of exports was £5,087,000, and of imports £5,697,000. The value of silver exported was £3,000,000; the other leading exports were copper ores, cochineal, indigo, hides, mahogany, and other woods, heniquen or Sisal hemp, coffee, vanilla, tobacco, India-rubber, orchil, and sarsaparilla. In 1875 the exports to Great Britain amounted to £721,907 (silver £7919), and the imports from Great Britain to £884,901. The Pacific coast has many splendid harbours, but on the Gulf side Acapulco is the only good one, all the bays and inlets being silted up by the current of the Gulf. Of 3131 vessels that entered the ports in 1874, 2227 were coasters and other vessels under the Mexican flag, 332 belonged to the United States, 162 to Great Britain, 115 to France, and 112 to Germany. The roads throughout M. are wretched, and mail and passenger traffic is effected by twenty-four lines of diligences managed by a single company. Pack-mules and ox-carts are employed in the transport trade. In July 1876 there were 372 miles of railway open for traffic, and 300 additional miles were in course of construction. The main line, the 'National Mexican,' runs from Vera Cruz to the city of M., with a branch to Puebla. The telegraph lines are (1876) 5760 miles long.

Government, Army and Navy, &c.—The constitution of 1857, which declares M. a federal republic, and grants to each State the power to manage its own local affairs, was twice overthrown and restored (1858–60 and 1863–67), and was amended in 1873–74. The legislative power is vested in a Congress, consisting of a Senate and a Lower House of Representatives, and the executive in a President, who is elected by Congress for four years. Deputies (331) are elected to the Lower House by popular suffrage for two years; the senators (56) are elected for four years. The President is assisted in carrying on the administration by a council of five members, who are heads of the departments of Justice, Finance, Army and Navy, Foreign Affairs, and Public Works. The revenue, chiefly derived from import and export duties, was returned in the budget of 1875–76 at £3,741,407, and the expenditure, of which nearly a half is for the army, at £4,985,955. The finances of M. have been for many years in the greatest disorder, the expenditure constantly exceeding the revenue. In 1876 the total public debt was estimated at £79,100,000, but the whole of the debt has been repudiated by the republic except £7,000,000, and even the interest on this sum has not been paid for many years. M. maintains (1876) an army of 21,136 men and 1251 officers, but the navy is little more than nominal, consisting of four steamers recently constructed for coast-guard service.

Religion, Education, &c.—The Roman Catholic Church formerly owned about one-third of all M., but in 1856–59, its property was nationalised, its convents abolished, and many of its churches were sold or seized for public use. Since then toleration has been extended to all churches, State recognition to none. The Roman Catholic hierarchy has three archbishops and twelve bishops. There are several thriving American Protestant missions in M., besides the 'Church of Jesus,' an undenominational Protestant organisation, which has some twenty churches and mission-stations. In 1876 the sum voted for education was £13,790. The University of M., abolished in 1856, has been replaced by a military college, and by special schools of law, medicine, music, agriculture, engineering, mines, commerce, fine arts, and literature. The local governments of the various States support common schools in all the larger towns, and higher schools in the capitals. Throughout the republic there are no fewer than 40,000 schools, and the number is increasing. Spanish is the universal language of the white population, but as many as thirty-five distinct dialects, including Aztec, are spoken by the Indian tribes.

Ancient Civilisation and Modern History.—The Toltecs occupied M. from about the 7th c. to the 12th c., when they gave place to the Aztecs. To the latter the Toltecs bequeathed an elaborate form of government, a set of singularly humane laws, a calendar more exact than that of Egypt, Greece, or Rome, a system of hieroglyphics, many advanced processes in agriculture and mining, and various superior arts, such as the weaving of textiles, a species of feather-embroidery, and the making of pottery. Among the wonders of M. to the present day are the remains—especially at Palenque, Uxmal, and Mitla—of vast palaces, pyramids, aqueducts, and bridges, evincing the marvellous skill acquired by this isolated people in the arts of construction and sculpture. The Aztecs, a sterner people, though they had an emperor, were actually governed, and that most despotically, by the priests. They believed in a supreme invisible Creator, and in some 200 minor divinities, and practised human sacrifice to an extent and with a contempt of life perhaps unexampled in the history of pious atrocity. In 1519 the Spaniards, lured by the fabled wealth of the country, descended in force under Cortes (q. v.) on the coast of Vera Cruz, and after some two years of desperate fighting were successful in asserting Spanish supremacy. The conquest was accompanied by fearful carnage, and subsequently every vestige of Aztec civilisation was stamped out by the Catholic clergy. For three centuries M. remained the principal colony of Spain, and its government was mainly characterised by pride, avarice, and indolence. At last the oppression of the natives by the Gachupines or pure Spaniards led to an insurrection which lasted for eleven years, and resulted in the independence of M., 1821. After the short-lived rule of the dictator, Iturbide (q. v.), a republic was proclaimed by Santa Anna (q. v.) in 1822, but the country was utterly disorganised by the struggles of the aristocracy (*Escosses*) and reformers (*Yorkinos*), and for the next twenty years M. passed from one dictatorship to another. Texas secured its independence in 1836, and its subsequent union with the United States led to the war of the latter power with M. in 1845–48. The two great events in the later history of M. are the 'war of reform,' or party struggle for power (1857–60), and the war of 'French intervention' (1861–67), through both of which the life of the republic was zealously defended by Benito Juarez. To the latter period belongs the ephemeral 'empire' presided over (1864–67) by Maximilian (q. v.). Juarez (q. v.) remained President till his death in 1872, and had the good fortune to see public order restored, and the constitution for which he had so nobly striven established on a firmer basis. He was succeeded by his chief follower Sebastian Lerdo de Tejeda, who still holds office in 1877. See Humboldt's *Königreich's Neu-Spanien* (1809–13), Prescott's *Conquest of M.* (1843), Alaman's *Historia de Mexicana* (5 vols., Mex. 1849–52), Chevalier's *Le Mexique ancien et moderne* (Par. 1866), Helps' *Life of Cortes and Conquest of M.* (1871), Myer's *Remains of Lost Empires* (1873), Vignes' *Travels in M.* (2 vols. 1874), and Cubas' *Geographia de Mexicana* (Mex. 1874).

Mexico, capital of the republic of the same name, is situated near the S.W. corner of Lake Texcuco, on a fertile plain, 7435 feet above the sea, and surrounded by lofty volcanic mountains, 200 miles W.N.W. of Vera Cruz by rail. It is a beautiful city, the architecture being solid and handsome, occupies a level site, and has a circumference of 16 miles. The cathedral, erected 1593–1677 at a cost of $2,500,000, is unsurpassed for the splendour of its decorations. Other notable buildings are the vast government palace, formerly the residence of the Spanish viceroys; the old Inquisition, founded in 1571, now used as a school of medicine; the National Museum, containing the great calendar stone of the Toltecs, a large statue of Huitzilopochtli, and other Aztec remains; the academy of San Carlos, which has the largest and finest collection of pictures in America; the National Library, lately rebuilt, with its 103,000 vols.; and the 'Cinco de Mayo' Library, opened in 1870. Water is supplied by two noble aqueducts, and the markets are stocked with fruits and flowers brought on canals from the *Chinampas* or 'floating islands.' Besides the Alameda, which is shaded by superb trees, the public resorts are the Paseo de la Viga, extending along a canal of that name, and the Paseo de Bucareli, the great public drive, adorned with trees and fountains. M. is of but slight commercial importance. Its manufactures are cigars, gold lace, saddlery, &c., and there is considerable transit trade, and some industry in connection with the mint. It was built by the Spaniards on the site of the ruined Tenochtitlan. Pop. in 1803, 137,000; in 1838, 205,430; in 1875, 230,000.

Mexico, Gulf of, the great inlet of the Atlantic on the E.

shore of N. America, between the peninsulas of Yucatan and Florida. It has an area of some 800,000 sq. miles, and is entered through the Yucatan Channel by the Gulf Stream (see CURRENTS), which traverses it in a curve, and leaves it through the Channel of Florida. The temperature of its waters is thus raised several degrees above that of the Atlantic.

Mey'erbeer, Gia'como, a gifted operatic composer, was the son of a rich banker called Beer, and was born September 5, 1794, at Berlin. He studied music under Lauska and B. A. Weber, and dramatic composition under the Abbé Vogler at Darmstadt. After composing *Jephthah* (1812) and *Die beiden Khalifen*, he went to Italy and heard Rossini's new works, which gave his activity a fresh direction. In Italy his first successful operas were produced, the best of these being *Crociato* (1825). But it was at the Grand Opera in Paris, in which city he settled in 1826, that he achieved his greatest triumphs. The fantastic and beautiful *Robert le Diable* (1831), evoked delirious enthusiasm. His magnificent *chef d'œuvre*, *Les Huguenots*, appeared in 1836. M.'s later grand operas are *L'Etoile du Nord* (1847), *Le Prophete* (1849), *Dinorah* (1859), and *L'Africaine* (1865; posthumous). In all, he wrote 18 operas, 2 oratorios, 6 sacred works, 11 cantatas, and a multitude of songs and instrumental pieces. M. held the office of General Musical Director to the King of Prussia from 1841 till his death, which took place at Paris, 2d May 1864. See H. Mendel's *G. M.; sein Leben und seine Werke* (Berl. 1869).

Me'zen, a town in Russia, government of Archangel, 140 miles N.E. of the town of Archangel, on the estuary of a river of the same name, which falls into the White Sea, after a N.W. course of 450 miles. M. has a considerable trade in furs and fish. Pop. 2000.

Mézières, a town of France, capital of the department of Ardennes, on the right bank of the Meuse, opposite Charleville, with which it is connected by a bridge. It is strongly fortified, and has a fine church of the 15th c., an arsenal, and antiquarian museum, besides tanneries, powder-mills, and iron-foundries. Pop. (1872) 4031. M., which was successfully defended by Bayard (1521) against 35,000 Austrians, capitulated to the Germans under General Von Kamecke, January 2, 1871.

Mezqui'te is the vernacular name of *Prosopis glandulosa*, a leguminiferous tree (*Papilionaceæ*) of Texas, and the region to the west. In some situations it grows to a height of 30 feet, and yields an excessively hard and durable timber; it also affords a large quantity of a gum resembling gum-arabic. *P. pubescens*, also a native of Texas, New Mexico, and California, is the screw-bean or screw-M. of the Americans, and the Tornillo of the Mexicans. It is named from the screw-like form of its pods, being twisted into rigid cylinders more than an inch long. It has recently been recommended for growth in Australia, as a food for cattle and horses.

Mezzofan'ti, Giusepp'e, was born at Bologna, September 17, 1774. He was ordained priest in 1797; after delivering a course of lectures on Arabic, was elected Professor of Greek and Oriental languages in the university of his native town; in 1833 became keeper of the Vatican library at Rome, and obtained a cardinal's hat five years later. He died at Rome, March 15, 1849. His fame rests on his linguistic acquirements—greater by far than those of any contemporary. He spoke more than fifty languages, with many of their dialects, and had so fine an ear that in conversing with foreigners he detected the smallest provincialisms, replying often in the appropriate *patois*. Russell's *Life of Cardinal M.* (Lond. 1858; 2d ed. 1863).

Mezzoju'so (a corruption of the Arab. *Menzil-Yusuf*, 'station of Joseph'), a town of Sicily, in the province of Palermo, 23½ miles S.S.E. of the city of that name. It is one of four Albanian colonies—Piano dei Greci, Palazzo Adriano, and Contessa being the others—founded here since 1482, and a portion of its inhabitants still partially retain the Skipetar language, and adhere to the Greek Church. Pop. (1874) 7161.

Mezz'o-Rilie'vo. See ALTO RILIEVO.

Mezz'otin'to (Ital. 'middle-tint'), a method of engraving invented in the 17th c. by Colonel Louis von Siegen, in the service of the Landgraf of Hessen-Kassel, from whom Prince Rupert, often called the inventor of the process, acquired his knowledge of it. M. is rapidly executed, and consists in indenting small dots over the metal surface, which in this condition would yield an impression equal to the darkest shades of the picture. The subject is then traced, and the lights and shadows are obtained by scraping and burnishing the burr of the plate. See ENGRAVING.

Mhow, an important British military station in India, within the territory of Holkar, the Mahratta Rajah of Indore, 2019 feet above the sea, 13 miles S.W. of Indore, and about 420 miles N.E. by rail from Bombay. It is the headquarters of a military division, numbering 2800 European and 3800 native troops, and the cantonments are large and well built. It has been the scene of some serious outbreaks of cholera, and also of a great military scandal. In 1857 the sepoys broke into mutiny, but the place was saved by the energy of the officer in charge of a battery of European horse artillery, though the army of Holkar had revolted at Indore.

Mia'ko, or Kiyo'to, the ancient capital of Japan and former residence of the Mikado, is situated towards the S. of Nipon, about 50 miles N.E. of the thriving port of Hiogo, with which it is connected by a railway opened in 1876. It lies picturesquely to the S.W. of the great Lake Biwako or Umi, and is in great part composed of deserted mansions of the old daimios. M. is now an educational centre. In 1871 there were sixty-four public schools. Foreign languages, English, French, and German, are widely taught. Pop. (1872) estimated at 300,000.

Mia'mi, a river in Ohio, U.S., rises towards the W. of the States at a height of 1335 feet, flows S.W. through a rich, populous valley, and joins the Ohio River below Cincinnati, after a course of 150 miles. *M.*, or *Miteami*, was the name of a tribe of Algonquin Indians who formerly occupied great part of Ohio and Indiana.

Mian-Mir, the military cantonment of Lahore, 3 miles E. from that city; pop. (1868) 15,757. The troops were removed here in 1852, on account of the unhealthiness of Lahore. The garrison now includes about 1000 Europeans. In 1857 four regiments of sepoys were quickly disarmed, on the first news of the Mutiny at Meerut.

Mias'matic Diseas'es (Gr. *miasma*, 'a stain, pollution'), according to the nosology of Dr. Farr, form an order of the zymotic class of diseases, and are caused by (1) paludal malarious poison; (2) animal malarious poison; and (3) specific disease poisons. The term *miasma*, however, is generally used as synonymous with *malaria*, and M. D. are described as those depending upon effluvia proceeding from the surface of the earth. The Italian physician, Lancisi, in his work, *De Noxiis Paludum Effluviis*, published about 1695, was the first to put forth correct ideas regarding malaria, which consists in certain invisible effluvia or emanations from the surface of the earth which were formerly called *marsh miasmata*. The malaria is a specific poison, producing specific effects upon the human body, and is not simply bad or impure air; but the exact nature of this telluric miasma, and the circumstances under which it is formed, have not as yet been definitely established. Chemical analyses and microscopic examination of the air have not detected any special ingredient in localities where M. D. are prevalent; but such localities are most commonly marshy places, although not invariably so, and the influence of the poison in tropical climates is greater than in the temperate zone, leading to the inference that malaria is a product of vegetable decomposition occurring under certain conditions of heat and moisture. The endemic character of M. D. pertains more to locality than to climate; for such diseases are not equally prevalent in all the localities of which a district may be composed. M. D. vary from simple intermittent fever to a fever of a pernicious type, and the soil from which they originate varies both in constitution and appearance from the old classic marsh to the sandy desert. The more unhealthy localities, in the tropics, are the lowlands along the coast bordering upon estuaries where large rivers empty themselves into the sea, and which are periodically inundated. Heaps of decayed vegetable matter are deposited at the mouth and along the borders of the rivers, and this with the rank marsh vegetation forms along the coast an extensive zone of endemic malaria. In all malarial districts the period of infection is most intense shortly before sunrise and after sunset, when the miasma

drawn out by evaporation is suspended with the watery vapours under the form of a fog on low-lying surfaces. In inter-tropical Africa, more especially, paludal fevers are developed among the labourers, on the breaking up of virgin soil for agricultural purposes, in districts where M. D. were not formerly prevalent; but after two or three seasons of cultivation, more especially if the land be drained, such fevers disappear and the place becomes comparatively healthy. In estimating the dryness of the soil its superficial appearance is often deceitful; for the soil may be a level plain of sand, with a perfectly dry surface, and with little or no vegetation, but it may be found to be saturated with water to within a few inches of the surface, and to be an intensely malarious district. Such was found to be the nature of the soil when our troops took up the encampment of Rosendaal and Ousterhout in S. Holland in the summers of 1748 and 1794, when they suffered so severely from M. D. So also along the coast of Peru, where vegetation is very scarce and where ague is very common, the miasma finds its way freely through the open sand to the atmospheric air. In many hot climates, the most deadly sites for encampments have been the dried-up beds of rivers or their immediate vicinities, and, as a general rule, troops are not encamped where the level of the soil water is near the surface. M. D. are frequently prevalent in rocky countries, as Gibraltar and the Ionian islands, but in such cases the rocks are percolated by water; and, during the hot season, the difference between the temperature of the rocks and the atmosphere is often very great. Humboldt, on ascending the Orinoco, found the country at the great fall depopulated with fever, which the natives ascribed to the heat of the rocks, their temperature being 118° F., while that of the surrounding atmosphere was only 79°. Some soils are peculiarly favourable to the decomposition of vegetable matters, and those countries most celebrated for M. D. are said to have a similar geological formation, so that marsh miasma may be the product of the reaction which takes place between certain atmospheric conditions and the hydro-geological elements of the soil.

In regard to infecting distance, it may be stated that the danger is in proportion to proximity to the infecting focus. In Italy, an altitudinal range of from 1400 to 1600 feet is necessary to secure immunity; but in the W. Indies an elevation of from 2000 to 2500 feet is necessary. In Eastern Africa, where M. D. are notoriously prevalent, a considerable degree of immunity is secured by having the sleeping apartments in the upper flat of the house, the rooms being well ventilated, and the bed being enclosed by a close-meshed mosquito curtain. The extent to which miasma may extend over land is much more difficult to determine; but it is well known that a belt of trees intercepts to a considerable extent its extension, the supposition being that the vapours condense on their leaves. See AGUE.

Mi'ca (from Lat. *mico*, 'I glitter'), a mineral consisting of silicate of alumina, with small quantities of the silicates of potash and iron oxide. It has a pearly lustre, is tough and elastic, occurs in laminæ of extreme tenuity, and is ordinarily obtained crystallised in oblique rhombic prisms. There are three well-marked varieties, known as *Muscovite*, *Phlogopite*, and *Biotite*. The first is biaxal, occurs in granites and other igneous rocks, and has lethia and magnesia as well as potash in its composition. The second is also biaxal, and is found in granular limestone and serpentine. The third, known also as Magnesia M., is uniaxal, and contains large quantities of potash, magnesia, and oxide of iron. Formerly huge masses were found in Siberia; and the mineral abounds in Finland, Greenland, Sweden, Norway, Maine, New Hampshire, &c.

Mi'cah (Heb. a contraction of *Micayahu*, 'Who is like Jehovah?' *cf.* 2 Chr. xiii. 2), a Hebrew prophet called the Morasthite (i. 1), that is, a native of Moresheth (perhaps in the territory of Gath, *cf.* i. 14), in order to distinguish him from Micaiah the son of Imlah (1 Kings xxii. 8). The time at which he prophesied is stated in the superscription of the Book of M., which is the sixth of the minor prophets, as the reigns of Jotham, Ahaz, and Hezekiah, kings of Judah, *i.e.*, within B.C. 758–697; according to which he was the contemporary of Isaiah, and somewhat later than Joel, Amos, and Hosea; but the prophecies contained in the book, at any rate all but i. 1–16, were uttered in the reign of Hezekiah (*cf.* Jer. xxvi. 18). The *style* of M. is highly poetical, very similar to that of Isaiah, especially in the frequent play upon words.

Mica-Schist or **Mica-Slate**, a metamphoric rock with the same constituents as gneiss, but containing more mica. It is ordinarily distinguished from gneiss by its foliated structure; but in many cases it appears to be simply less metamorphosed than this other widely-distributed metamorphic rock.

Mi'chael, St. (Heb. 'who is like unto God'), the 'first of the chief princes,' or archangels (Dan. x. 13), 'which standeth for the children of thy people' (xii. 1), he who 'disputed with the devil about the body of Moses' (Jude ix.; *cf.* 2 Peter ii. 11), and 'fought with his angels against the dragon' (Rev. xii. 7). In Rabbinical tradition he was regarded as the tutelar saint of the Jewish nation, as now he is the patron of the Church militant, and guardian of redeemed souls. He is usually represented in art as clad in armour, a sword in one hand, and in the other a pair of scales, with which he weighs the souls of men. Michaelmas, or the Feast of St. M. and All Angels, falls on September 29.

Michael VIII., surnamed **Palæologus**, the founder of the dynasty of the Palæologi. See BYZANTINE EMPIRE.

Michaelis, Johann David, a German theologian, born at Halle, 27th February 1717, is the greatest name of a family distinguished in biblical science since the Reformation. After studying at Halle, he travelled in England and Holland, was made (1745) Professor of Philosophy at Göttingen, where from 1753 to 1770 he was joint editor of the *Göttinger Gelehrten Anzeigen*. During the Seven Years' War he was chiefly engaged in making preparations for an expedition of discovery to Arabia, which was subsequently undertaken by Karstens Niebuhr and Forskaal. M. died at Göttingen, 22d August 1791. In a period of transition from the old orthodoxy, his works helped to pave the way for the subsequent rationalism. The chief are *Einleitung in die Göttlichen Schriften des Neuen Bundes* (2 vols. Gött. 1750; Eng. trans. by Bishop Marsh, best ed. 1823), *Das Mosaische Recht* (6 vols. Frankf. 1770–75; Eng. trans. by Dr. A. Smith, 1814), and *Die Moral* (Stäudlin, 3 vols. Gött. 1792–1823). See his *Lebensbeschreibung von ihm selbst abgefasst* (Leips. 1793).

Michaelmas Daisy. See ASTER.

Michaelmas Day, 29th September, is an English money term. There is also a law term of Michaelmas. It begins on the 2d, and ends on 25th November.

Michelet, Jules, a French historian, was born at Paris, August 21, 1798, educated at the Lycée Charlemagne, and afterwards taught languages, philosophy, and history for a livelihood. In 1821 he became professor in the Collége Rollin, in 1830 chief of the historical section of the royal archives, in 1838 Professor of History and Morals in the Collége de France, and in the same year was elected a member of the Académie des Sciences. The Revolution of February 1848 opened the way to a political career, but, though an ardent political theorist, he wisely shunned the perils of office. Nevertheless after the *coup-d'état* he lost his professorship by refusing to swear fidelity to Louis Napoleon. M. died at Hyères, February 9, 1874. His literary career began in 1826 with *Les Tableaux Synchroniques de l'Histoire Moderne*. This was followed in 1831 by *Principes de la Philosophie de l'Histoire* (Par. 1831); *Précis de l'Histoire Moderne* (Par. 1833), a work which has gone through numerous editions; *Origines du Droit Français* (1837), &c.; but the greatest monument of his genius and industry is the *Histoire de France* (16 vols. 1837–67; new ed. 1871, *et seq.*), parts of which are published as separate monographs—*e.g.*, the *Histoire de la Revolution Française* (7 vols. 1847–53; new ed. 1868). The 2d and 3d vols. of *L'Histoire du XIX^e Siècle* were issued posthumously in 1875. During his tenure of the chair of history he assailed with more than Gallic vehemence the principles of the Jesuits, and the books in which his impassioned controversy was carried on, *Des Jesuits* (1843), *Du Prêtre, de la Femme et de Famille* (1844) profoundly stirred his countrymen. During the Napoleonic regime, without abandoning the field of political and controversial literature, to which belong *La Pologne Martyre* (1863) and *La Bible de l'Humanité* (1864), he turned aside to quiet paths in which he met no foe, and in his *L'Oiseau* (1856), *L'Insecte* (1857), *La Mer* (1861), *La Montagne* (1868) proved the versatility of his vivacious genius. His histories are written with an occasional *naïveté* like that of the early chroniclers, but they are less systematic records of events than brilliant pictures from separate epochs. He is in-

tensely democratic in his ideas, but there is nothing ignoble—nothing of the sycophant—in his admiration of the 'people.' He is haunted by the dream of a noble nation, and is merciless in his denunciation of the crimes that hindered its growth in the past. See Gabriel Monod's *J. M.* (Par. 1875).

Mich'igan, one of the northern central States of the American Union, is bounded N. by Lake Superior and St. Mary River, S. by Wisconsin, Ohio, and Indiana, W. by Lake M., and E. by Lakes Huron, St. Clair, and Erie, and by the rivers Detroit and St. Clair. Area, 56,451 sq. miles; pop. (1870) 1,334,031. M. consists of two distinct peninsulas, the smaller or more westerly extending between Lakes Superior and M., the larger separating Lake M. from Huron and Erie. The two peninsulas are very irregular in outline, and are divided from each other by the Mackinaw Straits. The former, which projects to the E., comprises about one-third of the whole area, and has a broken, mountainous surface, rich in minerals, and partly covered by dense forests. Its watershed is formed by the Porcupine Range, which reaches a height of 2000 feet, and sends to the lakes the rivers Ontonagon, Tequamenon, Escanaba, &c. The lower peninsula projects in a northerly direction, and is a rich, level region, cultivated extensively, and watered by the Cheboygan, Saginaw, Racine, Kalamazoo, St. Joseph, &c. The lake-coast of M. is over 1100 miles long, is much indented, and fringed with numerous islands, of which the chief are Isle Royale, the Beaver, Fox and Manitou, and the Drummond and Sugar Islands. The shores of the lakes, especially of Lake M., are mostly steep, water-worn bluffs. The upper peninsula is in great part covered with Eozoic formations, and the rocks are richly charged with copper ores. The lower peninsula consists wholly of the Appalachian series, the central portion being occupied by coal-measures to the extent of 7000 sq. miles. M. stands in the first rank of mining States, and the products include not only coal, iron, and copper, but salt, limestone, and gypsum, petroleum, slates, &c. In 1874 there was raised in 34 mines 21,894 tons of copper; in the 60 mines of the Marquette iron district, 935,400 tons of iron ore (value $5,058,979). The climate varies much over so wide an area; in 1875 the mean temperature was 43.06, the rainfall 28 inches, the fall of snow (which affords good protection for wheat crops) 63½ inches. The 'Burr Oak' soils on the western slopes of M. are exceedingly productive. Of the whole area, 40 per cent. is under wood; the white pine forests are the most valuable in the U.S. In 1875 the arable area was 3,500,000 acres, of which 1,250,000 were in wheat, 710,000 in Indian corn, 329,000 in oats, and 1,016,000 in hay, besides smaller areas under rye, barley, and potatoes. On 1st January 1876, M. had 361,100 cows, and 410,000 oxen and other cattle; 3,450,600 sheep, and 459,700 hogs. In 1874 the product of the mines was $16,000,000, and of the forests $45,000,000. The lumber trade is equal to that of Maine, New York, Pennsylvania, Wisconsin, and Minnesota put together. There are (1874) 3993 miles of railway in the State. The chief towns are Lansing (the capital), Detroit, Ann Arbor, Grand Rapids, East Saginaw, Jackson City, and Bay City. The name M. is a contraction of the Indian word *Mitchi Sawgyegan*, 'lake country.' The first permanent settlement was that of a French mission at the Falls of St. Mary, in 1641. After the War of Independence the territory was retained by Great Britain, but was finally ceded to the U.S. in 1796. It became a State in 1837.

Michigan, Lake, the longest, and, after Superior, the largest of the great American lakes. It is the only one of the five that lies entirely within the limits of the United States, and is confined on the N. and E. by the two parts of Michigan, on the W. by Wisconsin and Illinois, and on the S. by Illinois and Indiana. Its area is 25,600 sq. miles, its extreme length 340 miles, its breadth 70, and its mean depth 1000 feet. The chief indentation is Green Bay, in Wisconsin. M. receives many streams, is drained through Mackinaw Straits, 25 miles wide, into Lake Huron, and communicates by canal with the Mississippi. Though subject to violent storms it is a great commercial highway, especially for wheat, and has valuable white fish, large trout, and other fisheries. On its W. shore are Chicago and Milwaukee.

Mickle, William Julius, born at Langholm, Dumfriesshire, September 29, 1734, received two years' schooling at the Edinburgh High School, and having failed in business as a brewer, came to London in May 1763 to seek a livelihood by his pen. He gained the patronage of Lord Lyttelton, but was glad to accept the post of corrector in the Clarendon Press, Oxford (1765), and here it was that he wrote the *Concubine* (1767), a Spenserian poem, republished as *Syr Martyn* (1778); a translation of Camoen's *Lusiad* (1775; a new and revised edition appeared in 1877); his ballad of *Cumnor Hall*, and other poems. As secretary to Commodore Johnstone (1779) he visited Lisbon, where he was admitted a member of the Portuguese Academy, and in 1780 he became an agent of prizes. He died at Forest Hill, in Oxfordshire, October 28, 1788. There is a collected edition of his poems (3 vols. 1806), with a memoir by the Rev. J. Sim. The exquisite song, *There's nae Luck about the House*, probably written by M. prior to 1760, has been also attributed to Jean Adam, who died in the Glasgow Workhouse in 1765. See the *Athenæum*, January 27, 1877.

Mi'crocosm (Gr. 'a little world'), a name given to man by the philosophers of the Middle Ages, who fancied they traced relations between the different parts of his nature corresponding to relations between the different parts of the universe. The physical universe was in contradistinction called *Macrocosm* ('a great world').

Microles'tes, a genus of extinct *Marsupial* (q. v.) mammals which present the oldest traces of mammalia in Europe at least. The remains of *M. antiquus* occur in the Upper Trias in the Keuper strata of Würtemberg. These consist of a few teeth only, but there is no doubt that the animal was a marsupial.

Microm'eter (Gr. *mikros*, 'little,' and *metron*, 'a measure'), an optical instrument for measuring very small distances and angles. The simplest form is the *wire* M., which consists of three very fine wires set in the diaphragm at the focus of the object-glass of a telescope. The one wire is fixed centrally in the field of view, while the other two are perpendicular to it, and so adjusted with milled-head screws, &c., as to be easily moved backwards and forwards in the direction of the fixed wire. By rotation of the diaphragm, the fixed wire may be set in any required direction, so as, for example, to coincide with the line joining two stars. By moving the two cross wires from coincidence till each bisects one star, a measure of the distance between the stars is at once obtained in terms of the number of turns of the M. screws, and this is reduced by a known and previously ascertained formula to standard arcual units. Various modifications of the wire M. exist, but the above indicates sufficiently the principle of all. Fraunhofer's *suspended annular* M. consists of an accurately turned metallic ring set in a perforated plane glass plate; and the relative positions of contiguous stars are easily obtained by observations of the times at which they suffer eclipse by the substance of the ring and at which they reappear. Reticules and circular micrometers measure in the same way—by observing the lapse of time. The Heliometer (q. v.) is another and very accurate form of M. Abbé Rochon made an ingenious application of the laws of double refraction to the construction of a M. Two triangular prisms of the same doubly-refracting crystal are joined so as to form a parallelopiped, while their axes of crystallisation are at right angles to each other. If this apparatus is placed in the axes of the telescope between the object glass and eye-piece, two images of the object viewed are formed, which, however, coincide when the prism is at the focus. The distance of the one image from the other depends upon the distance of the double prism from the focus. Hence by moving the prism forwards until the images originally coincident are now made just to touch at one point, data are supplied for determining the apparent diameter of the object. See Herschell's *Outlines of Astronomy*.

Mi'croscope (Gr. *mikros*, 'little,' and *skopeō*, 'I see'), an optical instrument which enables us to view minute objects by forming magnified images of them. Its principle depends upon the laws of the refraction of light (see OPTICS). If a pencil of rays, parallel to the axis of a convex lens (see LENS), are allowed to pass through the lens, they are so refracted as to converge to a point known as the principal focus, after which they continue diverging indefinitely. If a luminous source be placed at the focus, the rays constituting that portion of its light which falls upon the lens are refracted so as to become parallel. Should the source of light be nearer to the lens than the focus, the

refracted rays are still divergent, though not to such an extent; while if the source be beyond the focus, the refracted rays are rendered convergent so as to meet at a point which is mathematically related to the distance of the luminous source from the focus. The former arrangement is that which holds in the ordinary magnifying-glass or simple M. Here the object to be viewed is placed within the focal distance of the lens, and the slightly diverging refracted rays are received by the eye held close to the other side of the lens. The distance of the object from the lens must be adjusted so that each point has its image formed at that distance from the eye at which an object is seen distinctly. Hence the lens must be adjusted for each eye; and the image is of greater dimensions than the object, and the greater the further sighted the observer is. Long-sighted persons, who cannot view near objects distinctly, use concave spectacles or glasses, which form an image at a sufficiently great distance to be viewed with ease. Such single lenses date from the 14th c., and were the sole aids with which Leeuwenhoek, Swammerdam, and Lyonnet made their famous microscopical researches. The smaller the focal distance of the lens, the greater the magnifying power.

The *compound M.* dates from the 17th c. It is a combination of two lenses, the one acting as the object-glass, the other as the eye-glass. They are fitted into a double tube, which admits of the motion of the eye-piece so as to suit all sights. The tube is usually set nearly vertical; and the object to be viewed is set beneath the object-glass at a distance a little beyond the focal distance. The rays from each point of the object collect after refraction at a focus; and the result is an inverted image of the object formed in the tube. This image is then viewed by the eye-piece, exactly as the original object was viewed by the simple M. In the best microscopes, the eye-piece is not a single lens, but a combination of two, invented by Huyghens, the magnifying power of which is greater than could conveniently be obtained, on account of spherical aberration and chromatic effects, by a single lens. Achromatic arrangements are now indispensable in a really efficient M., in the construction of which such names as Ross, Varley, Nachet, Smith, Beck, Browning, &c., are widely celebrated. The *solar M.*, first suggested by Lieberkühn in 1738, throws an image of a transparent object, upon which the sun's rays have in the first place been concentrated by a powerful lens through a series of glasses, upon a screen, where it may be viewed by a large audience. See Queckett, *On the M.* (1855); Carpenter, *The M. and its Revelations* (1862); and Beale, *How to work with the M.* (1864).

Microza'mia belongs to the remarkable family of plants named *Cycadaceæ* (q. v.), and is a subdivision of the genus *Zamia* (q. v.). Several interesting species of this genus occur in Australia, of which one with long slender leaves like palms is there used by the Roman Catholics for church decoration on Palm Sunday. The underground stem yields a gum like tragacanth.

Mi'das, a Phrygian king, son of Gordius and Cybele, who being offered by Dionysus the fulfilment of whatever he should ask, requested that everything he touched might be converted into gold. But soon M., like to die of hunger, was glad to get rid of the dangerous blessing by washing in Pactolus, which has ever since had gold among its sands. According to another legend, Apollo gave M. ass's ears, because in a musical contest between that god and Pan he had awarded the prize to the latter.

Midd'elburg, a town in the Netherlands, capital of the province of Zeeland, in the interior of the island of Walcheren, with the coast of which it is connected in three directions by about three miles of navigable canal, and in two by the Rozendaal-Vliessingen railway. M. has many fine buildings and squares, a town-house (built 1468), with a high Gothic tower, and twenty-five life-size statues of the Counts of Flanders and Zeeland, and near the centre an old abbey of Our Lady. It was formerly an important Hanse town, having extensive commerce with the E. and W. Indies and the Levant, but its trade has greatly declined. There are manufactures of leather, soap, vinegar, and lace. Pop. (1870) 14,714.

Middle Ages, a term applied to the 1000 years extending from the overthrow of the Roman Empire in the 5th c. by the barbarians to the capture of Constantinople by the Turks in 1453, and the Renaissance (q. v.) which sprang from that calamity. The first half of the M. A. are sometimes distinctively termed the 'Dark Ages,' because of the gloom that fell upon Europe with the overthrow of the Roman civilisation. But it was not the darkness of contented ignorance and dull apathy. The new races struggled onwards and upwards till a fresh social and political life had been organised. The second half of the M. A. may seem to lie in a dim twilight, but it is a twilight heralding the dawn, not passing into night: it is a dimness in which many glorious constellations are still visible—Aquinas, Bacon, Dante, Chaucer, and a host of lesser lights. Nor were these M. A. without their peculiar charms and gifts. They had their Chivalry (q. v.), Crusades (q. v.), and spirit of Romance, and in them architecture, with its handmaids, carving and glass-painting, attained a glory that has long since departed. There were night workers then who powerfully influenced succeeding generations—missionaries like Boniface and Methodius, who went forth to combat heathendom and slavery, the establishers of the hierarchic system and of feudalism, the inventors of gunpowder and the printing-press. See Hallam, *History of the M. A.* (1818); Rückert, *Geschichte des Mittelalters* (Stuttg. 1853); and Dr. L. Schmitz, *History of the M. A.* (Edinb. 1859).

Midd'lesbrough, the great centre of the iron trade in the N. of England, is situated in the N. Riding of Yorkshire, on the right bank of the Tees estuary, 6 miles from the sea, and 3½ miles E. of Stockton by the North-Eastern Railway. It owes its foundation to the formation of the Stockton and Darlington Railway, and to its advantages as a place for shipping coal. M. is the most remarkable instance of rapid growth among all the towns in England, its site being occupied by a single farmhouse in 1829. In 1831 the pop. was 383; in 1841, 5463; in 1851, 7431; in 1861, 18,992; in 1871, 46,643; and in 1874 it is estimated at over 60,000. In 1840 vast beds of iron were discovered in the Cleveland Hills, which run from the vicinity of M. to the coast at Whitby. The bed was 15 feet thick near M., and the quantity of ore raised in the Cleveland district in 1876 was 6,562,000 tons, the value being £1,162,020. Much smelting is carried on at M. and the vicinity, and the pig-iron manufactured in 1876 was 2,075,565 tons. Extensive steel works were opened in 1877. Besides pig-iron, the chief articles produced are finished iron in the shape of rails, ship-plates, iron pipes, girders, and heavy castings for bridges. Recently extensive Bessemer steel works were established by Messrs. Bolckow, Vaughan, & Co., the principal iron firm in the district, at Aston Junction, 2 miles from M., for the manufacture chiefly of steel rails from Cleveland and Spanish ores. Iron shipbuilding is an extensive industry (in 1876, there were built 11 vessels of 3897 tons), and there are large engineering and chemical works, potteries, saw-mills, tanneries, breweries, &c. In 1875 there entered the port 2051 vessels of 339,737 tons, and cleared 2988 of 536,641 tons. M. has several good buildings, a free library, a splendid new passenger station (N.E. Railway), and a public park, the Albert, of 72 acres, the gift of Mr. H. W. F. Bolckow, M.P. It was incorporated in 1853, and since 1868 has returned one member to Parliament.

Middlesex (originally the land of the Middle Saxons, those between the E. and the W. Saxons), the metropolitan county of England, lies on the N. bank of the Thames, between Essex on the E., Hertfordshire on the N., Buckinghamshire on the W., and Surrey on the S. Area, 282 sq. miles; pop. (1871) 2,539,765. Though, with the exception of Rutland, the smallest, it is next to Lancashire the most populous county in England. It has one court of general and quarter sessions, has 17 petty sessional divisions, contains 222 civil parishes, townships, and places, and returns 2 members to Parliament. It is watered by the Thames, Lea, Colne, Brent, and New River. The soil consists chiefly of London clay, and a large manufacture of bricks and tiles is carried on. Fruit and vegetables are abundantly cultivated, and cattle are reared for the supply of the London markets. The market towns, exclusive of the metropolis, are Uxbridge, Brentford, Southall, Staines, and South Mimms Barnet. Harrow and Enfield are also considerable places.

Middle Temple. See INNS OF COURT.

Midd'leton, an industrial town of Lancashire, and the terminus of a branch line of the E. Lancashire and Yorkshire Railway, 6 miles N.N.E. of Manchester. Silk weaving is the main industry, and there are large cotton mills, calico-printing

works, dye and bleaching works, iron-foundries, &c. In the vicinity are several collieries. M. has a free library and a weekly newspaper. Pop. (1871) 14,587.

Middleton, Conyers, D.D., a theologian of considerable ability, was born at Richmond, Yorkshire, December 27, 1683. He studied at Trinity College, Cambridge, of which he was elected a fellow in 1706. He first attracted notice by a series of pamphlets, in which, both on personal and public grounds, he vehemently attacked the famous scholar, Richard Bentley, then Master of Trinity College. In 1729 he published his *Letter from Rome*, denouncing the rites and ridiculing the miracles of the Romish Church. His greatest work, the *Life of Cicero*, appeared in 1741. Some of his later writings, such as *A Free Inquiry into the Miraculous Powers*, &c., and an *Essay on the Fall of Man*, were thought flagrantly unorthodox at the time. M. died July 28, 1750. His *Antiquitates Middletonianæ* (Lond. 1754) and *Miscellaneous Works* (4 vols. Lond. 1752–57) discuss points of theology and antiquities, and are not without value.

Middletown, a city in Connecticut, U.S., 24 miles N.E. of New Haven by rail, and 31 miles above the mouth of the Connecticut River. It has a fine custom-house, a Wesleyan College, an Episcopal College, ten churches, seven banks, and one daily and two weekly newspapers. Pop. (1870) 6923.

Middlewich, a market-town of Cheshire, England, in the basin of the Weaver, and on the Grand Trunk Canal, 17 miles N.W. of Stoke by rail. There are silk, cotton, and corn mills, and salt is made from several brine springs near the town. M. had its name from occupying the central position among Northwich, Nantwich, and the other salt-towns, or 'wiches,' a name applied to places producing salt, because that mineral was originally obtained by the evaporation of salt water in shallow bays (Norse, *vic*, 'bay'). Pop. of parish (1871) 4920.

Midge, a name popularly given to many *Dipterous* insects or Flies. Most of the typical midges belong to the family of the *Tipulidæ* or Crane-flies, of which the familiar 'Daddy Long-legs' is a good example. The common M. is the *Chironomus plumosus*. The larvæ are the little red worms so common in rain-water barrels, and in muddy waters. The larvæ of one species of M. (*C. oceanicus*) inhabits the sea. Two broods of these larvæ are produced in each season. Another genus of *Dipterous* insects which falls under the designation of M. is *Simulia*, of which *S.* or *Rhagio Columbaschensis* abounds in Hungary, and is known occasionally to kill cattle by its bite, and by suffocating them through gaining access in great numbers to the windpipe. *Simulia molesta*, the 'black fly' or black M., is a common pest in America. All these insects have suctorial mouths, with certain parts modified to serve as a piercing apparatus for penetrating the skin of their victims.

Midhat' Pasha', a Turkish statesman, was born in Constantinople in 1822. He entered the public service when very young, and held in succession various civil appointments. During the Crimean War he was sent to put down brigandage in Roumelia. He subsequently spent a few years in Paris, London, and other European capitals, where he imbibed a love of liberal institutions. In his first important office, governor of the vilayet of the Danube, to which he was appointed in 1864, he displayed ability and resolution, and encouraged improvements of all kinds. He afterwards became the leader of the Young Turkey party, and was appointed President of the Council of Justice. As a member of the cabinet of Mehemet Rushid he took a leading part in the deposition of the Sultans Abdul-Assiz and Murad. Early in 1876 he published a scheme of administrative reform, and on 19th December was created Grand Vizier, when he promulgated the new Turkish constitution. While advocating radical internal improvement, he was, however, vehemently opposed to foreign dictation, and was the soul of the Turkish resistance to the demands of the Constantinople Conference. M. was suddenly dismissed from his office and banished, February 5, 1877. Though he has since remained in exile, he is still the favourite statesman of the Ottoman people, and his recall to power is believed to be only a matter of time, should Turkey outlive the terrible assault now being made on her national life.

Mid'hurst ('the mid wood'), an old town of England, Sussex, on the Rother, an affluent of the Arun, 56 miles S.W. of London, and 6 W. of Petworth by rail. It is the polling-place for W. Sussex, and has a weekly market and three annual fairs. Here are the ruins of a castle of the Bohuns, where Edward VI. was entertained with great splendour. M. sends one member to parliament. Pop. (1871) 6753.

Mid'ianites were a nomadic tribe mentioned in the Bible, who seem to have dwelt principally in the desert N. of the Arabian peninsula, from the peninsula of Sinai (Exod. iii. 1) to the borders of Canaan (Numb. xxii. 4, 7; xxv. 6). The Semitic origin of the M., and their consanguinity with the Israelites is acknowledged (Gen. xxv. 1), but they proved themselves troublesome neighbours to their kinsmen till they were quieted by Gideon (Judges vi.–viii.).

Midnapore', the chief town of the district of the same name, in Bengal, British India, on the left bank of the Cossye river, and the present terminus of the High Level Canal, 68 miles W. from Calcutta. Pop. (1872) 31,491. It has manufactures of brass and copper ware, and conducts a large trade in rice.—The *district* of M., which lies on the right bank of the mouth of the Hooghly, has an area of 5082 square miles; pop. (1872) 2,540,963. Near the sea it is very low, and liable to be flooded by cyclones. Here was formerly a flourishing salt manufactory, in the tract known as Hidgili. The rice crop is peculiarly abundant. In the interior the country rises into hills covered with jungle, where the tribe of Santhals collect lac, tussur silk, and beeswax. It was severely afflicted by the famine of 1866. There are now canals both for irrigation and navigation. The exports of rice, indigo, hides, oil-seeds, brassware, native cotton goods, and silk, are valued (1876–77) at more than one million sterling a year. Owing to the energy of the European magistrate, primary education has been very widely diffused.

Mid'rash (Heb. from *darash*, to study, expound, *cf.* 2 Chron. xiii. 22, xxiv. 27, 'story'), was among the Jews the science of studying and expounding the Holy Scriptures, the origin of which was co-eval with the return from the Babylonian Captivity, which was developed under the Great Synagogue (530–220 B.C.), and carried on by the Tanaim, or teachers of traditional lore (B.C. 220–220 A.D.). M., meaning first of all expounding in the abstract, was applied next to the exposition itself (*pl.* Midrashim). It was thus the source of the Halacah (q. v.) and the Haggadah (q. v.), and of the innumerable commentaries and figurative expositions of the sacred text, which were at the same time called M., although the name was by the people reserved for the more popular Haggadah. In short M., in its widest sense, means the whole uncanonical Jewish literature, including the Talmud (q. v.), down to the 13th c., after which it ceases to be applied to Rabbinical writings. See E. Deutsch, *Lit. Remains*, Art. 'Talmud' (Lond. 1874).

Mid'shipman. According to the decision of the Board of Admiralty (January 1870), youths intended for the officering of the Royal Navy must after due examination serve two years on board a training ship as naval cadets, after which they are transferred to a sea-going ship. Those who have obtained first-class certificates are at once rated as midshipmen, but others have to serve from three to twelve months on the sea-going training ship before taking rank. Five years' service as cadet and midshipman is necessary before passing as lieutenant. A midshipman's pay is 1s. 9d. per day.

Mid'summer Day, the 24th of June, is the second of the English terms or quarter-days, on which rent falls due.

Mid'wife, Midwife'ry. Midwife (Old Eng. *mad*, 'a meed' or 'reward,' and *wif*, 'a woman'), is the name given by the English to a woman who assists other women in childbirth, and its etymology indicates that her services were not gratuitous. From this is derived the term *Midwifery*, which designates the art or practice of assisting women in childbirth. For a male practitioner in this branch of the medical art the French term *accoucheur* is also used. Instead of the familiar designations, midwife and midwifery, the Latin terms *obstetrician* and *obstetrics* are sometimes used when applied to educated physicians.

In the great majority of cases parturition takes place naturally—that is, the child presents itself in the normal position, and delivery is completed within twenty-four hours with safety to the mother and child. In all cases some assistance is necessary, although not absolutely so, and hence the practice of M. has generally been confided to women. From the Old Testament Scriptures we learn that this was the custom among the Egyp-

tians and the Hebrews, and it is equally certain that it was so also among the Greeks and the Romans. Among all nations, and in all times, until very recently, women alone practised M. But while ordinary or natural cases were conducted by women, we learn that the Greek and Roman physicians were not ignorant of M., for Hippocrates refers to the necessity of turning the child in certain cases, and gives directions for the management of the placenta; and Celsus treats of the mechanism of parturition. Aëtius and Paulus Aegineta recommended the operation of craniotomy in certain cases. Rhazes advocated the rupture of the membranes when labour was impeded on account of their toughness, and Avicenna described an instrument somewhat resembling the modern forceps to be used in cases of prolonged labour. It would appear that the ancient physicians and surgeons did not attend ordinary cases of parturition, but only such as required operative interference. At about the commencement of the 16th c. the practice of M. appears to have become more generally recognised as a distinct branch of medical practice, and a work on the subject was published by Eucharius Rhodion, which was translated from the German into Latin, French, and English, and was the first book published on the subject in England. In 1573, Ambrose Paré, the celebrated surgeon, published a work on the subject, and in the early part of the 17th c., the *sage-femme* of Marie de' Médicis published a collection of observations on M. The greatest advance in the art of M. was made by the English obstetrician Chamberlen, at about the middle of the 17th c., by the discovery and the practical application of the forceps and the vectis. The form of the instrument used and its mode of application were not made public, and the exact nature of these instruments was not known till 1815, when a collection of obstetric instruments, including a double-bladed forceps and a vectis, now in the possession of the London Medico-Chirurgical Society, was discovered in a concealed space in a house occupied about a century before by Dr. Peter Chamberlen. In 1668, Mauriceau wrote a treatise on M., which was long a standard work, and which was translated into English, in 1672, by Hugh Chamberlen, and at about this time medical men began to engage generally in the practice of M. both in England and on the Continent. During the 17th c. midwives, in certain parts of Germany, used ergot of rye to accelerate parturition, but it was not till late in the 18th c. that the drug came into general use in M. practice. In the early part of the 18th c., Chapman taught M. in London, and was probably the first lecturer on the subject; and in the middle of the century a small hospital was opened by Sir Richard Manningham for the reception of parturient women; but, although several distinguished men practised obstetrics, as Smellie, Hunter, Denman, and Bland in this country, and Astruc and Baudelocque in France, the practice of M. was generally regarded as the lowest branch of the medical profession. During the present century great advances have been made in the science and art of M., and there are professors of, or lecturers on M. in all the medical schools; and attendance on a course of lectures, and an examination on the principles and practice of M. are necessary in order to obtain a medical qualification. There were formerly bye-laws which precluded practitioners in M. from the Fellowship of the London College of Physicians, but these have been repealed. Special provisions are also made for the education of midwives, and comparatively well-educated nurses are granted diplomas certifying that they have regularly attended lectures on M., and have gained practical instruction under qualified teachers. The passing of the Act of 1876, removing the disabilities as to sex for obtaining a medical qualification, will probably induce many females to study for the medical profession and devote their attention to obstetrics.

Midwifery.—M., as a branch of medical science includes, the study of the anatomy of the female organs of generation, the process of conception, the signs, symptoms, and duration of pregnancy, parturition in all its varieties, malformations of the pelvis, and the diseases peculiar to the puerperal state. While the majority of cases of labour are natural, unnatural labour may arise from malformation or disease on the part of the mother; or from abnormal conditions of the child, rendering manual or instrumental aid advantageous, or, in some cases, absolutely necessary to render delivery at all possible. In prolonged cases of labour, depending on atony of the uterus, or on obstructions in the soft parts, delivery by the forceps may be necessary without imperilling the life of either the mother or child; but the mechanical obstruction may be so great as to render the operation of craniotomy necessary, in which case the child is necessarily destroyed; or the Cæsarean section, whereby the life of the mother is in danger. In certain cases also, when the presentation is unnatural, manual interference is necessary, and if hæmorrhage be present instrumental delivery is also essential. Skilled supervision is also frequently necessary in the removal of the placenta, and for the arrestment of post-partum hæmorrhage. In Oriental countries and among savage and uncivilised tribes there must be great loss of maternal and infantile life in consequence of the want of skilled supervision during parturition; but, as a general rule, labour appears to be accomplished with less difficulty and with fewer complications among savage and semi-civilised tribes than among the highly civilised. See Leishman's *System of Midwifery* (Lond. 1876), and Playfair's *Treatise on the Science and Practice of Midwifery* (Lond. 1876).

Mignet, François Auguste Marie, a French historian, was born at Aix, in Provence, May 8th, 1796, where he pursued his studies in company with Thiers, both being called to the bar at the same time. In 1822 he published *De la Feodalité des Institutions de Saint Louis et de la Législation de ce Prince.* At Paris, besides contributing to the *Courrier Français*, he began a course of lectures, and in 1824 published the *Histoire de la Révolution Française* (10th ed. 1868), a work which is especially distinguished for the value of its political reflections. For the share he took in the journalistic protest against the decrees of July 1830, the new government rewarded him by the Directorship of the Archives of the Foreign Office. He became a member of the Academy in 1837, and upon the death of Comte, perpetual secretary for the Academy of Sciences. M. was removed from the Foreign Office by Lamartine in 1848, and since then his life has been one of quiet devotion to historical pursuits. Besides *discours, éloges,* and *mémoires* relating peculiarly to France, M. published *Vie de Franklin* (1848), *Histoire de Marie Stuart* (1851; 3d ed. 1865); *Charles Quint* (1854; 3d ed. 1858), &c. His style is wanting in the lightness and buoyancy of the best writers; in narration he has not the rapid brilliance of several contemporaries, but he is unexcelled in the philosophical summation of the aims and tendencies of historical events.

Mignonette', a diminutive of *mignon,* 'darling,' is the name given by the French to several favourite plants. In England (where the name has been in use more than 100 years) it is limited to the sweet-scented *Reseda odorata,* one of the best-known garden annuals, a native of the N. African coast countries. If protected in winter, and properly trained, the plant may be made to last several years, forming the tree-M. of gardeners. In early Roman times it held a high position as a charm for healing wounds. The genus *Reseda* numbers about thirty species, of which two are natives of Britain.

Migra'tion of An'imals, the phrase used to denote that peculiar feature of animal life, according to which certain animals are seen to pass with greater or less exactitude and regularity from one region or country to another, in conformity with the alternation of the seasons. The manner and details of this migration present some very inexplicable features. Some animals (*e.g.*, swallows) pass from region to region in vast flocks: others singly and in a quiet, inconspicuous manner. Skylarks, according to Mr. St. John, arrive at first 'in a constant and straggling stream' on the coast of Norway, but later on, fly over in immense flocks. The male birds also usually arrive in the south, it may be days, or even weeks, before the females; whilst both sexes leave together on their southward journey. The question of the manner in which birds are enabled to find their way back to their own land, or indeed to travel unerringly between their temporary and permanent homes, is of an almost insoluble kind. Tegetmeier, says that the 'homing' faculty of the carrier pigeon depends on a knowledge of landmarks—that is, on the sense of sight and on the 'instinct' of memory. But sight alone cannot aid birds while guiding their flight over, it may be, miles of sea, or over the whole breadth of a continent. Then again, the exact return of birds to their old haunts, is among the most wonderful of the phases of M. A pair of stone curlews have been seen to return year by year to a particular nest, notwithstanding the changed character of the surroundings—a former rabbit-warren in which the nest was placed having been converted into a plantation. Not less curious is the exactitude in point of time which marks the M. of many

birds. Many sea-birds (*e.g.*, puffins) return to their haunts exact to a given day; and swifts disappear at a given time with the utmost regularity.

The *causes* of M., however, present points of the most interesting and intricate character. It would appear that the most feasible explanation that can at present be given of the M. of A. depends on the recognition of *inherited habits*, together with the presence of *physical* or *climatic change* and *geological alteration*.

Mig'uel, Dom Maria Evarist, ruler of Portugal from 1828 to 1834, third son of King João VI. and Carlota Joachima of Spain, was born at Lisbon, 26th October 1802, and in 1808 accompanied his parents to Brazil, where his education was neglected. He returned in 1821 to Portugal, where, under the direction of his ambitious mother, he placed himself at the head of the absolutist party, and in 1824 caused Marquis Loulé to be assassinated, the king at the same time being made prisoner in his palace. But, by the help of the French ambassador, Hyde-de-Neuville, the latter defeated the plot of M., who, with his mother, was forced to flee to Vienna. After the death of João VI., Dom Pedro, Emperor of Brazil, made over (2d May 1826) his right to the throne to his daughter, Donna Maria da Gloria, providing also M. should be made regent, and afterwards become her husband. M., however, on his return seized absolute power, dissolved (13th March 1828) the Constitutional Cortes, and caused himself to be proclaimed legitimate king on the 25th of June. He now gave himself up to every kind of tyranny and excess. In 1831 he had war with France, and suffered severely from the French fleet for his violence to French subjects, and soon after Dom Pedro returned to claim his daughter's rights. After three years' struggle he overcame M., who was exiled on the 29th May 1834. He went to Genoa, thence (1834) to Rome, married (1851) the Princess Adelheid of Löwenstein-Wertheim (born 1831), removed to Bavaria, and died at the castle of Bronnbach, near Wertheim in Baden, 15th November 1866. He left six daughters, of whom the eldest, Maria, married (1871) Alfonso, brother of the Spanish pretender, Don Carlos, and one son, M. (born 1853), who in 1874 announced himself as a claimant for the throne of Portugal.

Mika'nia, a large genus of *Compositæ* nearly limited to tropical America, where several species are in repute as a cure for snake-bites, and the native name of 'Guaco' has been botanically adopted for that considered most effective, namely, *M. Guaco;* but this valuable property has not yet been sufficiently authenticated by scientific experiment. Over a hundred species have been described.

Miklo'sich, Franz von, the greatest living Slavonic scholar, born at Luttenberg, in Styria, November 20, 1813, was educated at Warasdin, Marburg, and Gratz, became in 1848 member of the Austrian Diet, and in 1849 Professor of Slavonic Languages at Vienna. M. has greatly benefited philology by a series of writings on the Old Church Slavonic, chief of which are *Radices* (Leips. 1845) and *Lexicon Linguæ Palæoslovenicæ* (Vienna, 1850), and *Vergleichende Grammatik der Slawischen Sprachen* (1852-74). He has edited the texts, *Vitæ Sanctorum* (Vienna, 1841), *Vita Sancti Clementis* (*ib.* 1850), *Codex Suprasliensis* (*ib.* 1851), *Apostolus monasterii Shishatovacensis* (*ib.* 1853), *Sancti Johannis Homilia in Ramos Palmarum* (*ib.* 1854), *Monumenta Serbica* (*ib.* 1858), and *Acta et Diplomata Græca Medii Ævi* (1860-64). He has also written the important monographs, *Formenlehre* (Vienna, 1850), and *Lautlehre der Altslowenische Sprache* (*ib.* 1850), *Ueber die Sprache der ältesten Russichen Chronisten* (*ib.* 1855), *Die Sprache der Bulgaren in Siebenbürgen* (*ib.* 1856), *Die Bildung der Slawischen Personnamen* (*ib.* 1860), *Die Slawische Elemente in Rumunischen* (*ib.* 1861), *Die Bildung der Ortsnamen aus Personnamen in Slawischen* (*ib.* 1865); and formed valuable collections in his *Slawische Bibliothek* (2 vols., *ib.* 1851 and 1858), and *Chrestomathia Palæoslovenica* (*ib.* 1854 and 1861). M. has of late years mainly devoted himself to the investigation of the Gipsy dialects, the results of his researches being embodied in *Die Mundarten und die Wanderungen der Zigeuner Europas* (Vienna, 1873–77).

Milan (Ital. *Milano*, Ger. *Mailand*), one of the largest and richest cities of Italy, and capital of the modern province of the same name, is situated in the plain of Lombardy, 71 miles N.N.E. of Genoa by rail. Surnamed 'the grand,' it is the seat of an archbishop, and a great manufacturing centre, occupying a singularly advantageous position on the small but navigable river Olona. The town, following the line of its walls, ramparts, and canals, is about 7 miles in circumference. It is entered by some 12 gates, beyond which suburbs (*borghi*) have recently sprung up, taking their names from the gates. The chief of these is the Porta Venezia, at the end of the Corso Venezia, a handsome new prolongation of the principal street of M., the Corso Vittorio Emmanuele. The great commercial centre of M. is the Piazza del Duomo, formerly the heart of a net-work of wretched lanes, now entered by wide handsome streets and enclosed by a new pile of fine buildings, and by the *Duomo* of M., next to St. Peter's at Rome the grandest and largest in Italy. It is built in the shape of a Latin cross, and in Gothic style, is surmounted by a dome 220 feet high, and by a tower of 360 feet, and is ornamented externally by 18 turrets, by 2000 marble statues, and by much exquisite carving. The interior is 150 yards long by 61 broad, and the nave, 155 feet high, is supported by 52 columns. Founded in 1386 by Gian Galeazzo Visconti, it was in part finished by 1500, but the great tower was added by Napoleon in 1805, and extensions and repairs have been going on ever since. One of the oldest churches in M. is that founded by St. Ambrose in 387, and dating in its present Romanesque form from the 12th c. It is rich in old tombs and frescoes, and is interesting as the place where the Lombard kings and German emperors were crowned with the iron crown that has been preserved, since the time of Barbarossa, at Monza. Other notable churches are the Gothic S. Maria delle Grazie of the 5th c., containing Leonardo's 'Last Supper;' S. Lorenzo, the oldest in M., founded in the 4th c., and enriched with mosaics of the 6th and 7th centuries; S. Eustorgio, which was rebuilt in 1278, and contained the 'bones of the magi' prior to 1162; and S. Alessandro (1602), the most splendidly decorated church in M. The famous Brera or Palazzo delle Scienze ed Arti, formerly a Jesuits' college, comprises a very valuable picture gallery of 800 works, the library of the Academy, founded in 1170, and containing 200,000 vols., a collection of 50,000 coins, an archæological museum, and the observatory. M. is singularly affluent in art and literary treasures. The Biblioteca Ambrosiana, founded by Cardinal Borromeo in 1609, now contains 140,000 printed vols., and 20,000 MSS. and palimpsests. The Pinacoteca counts among its priceless works many rare specimens of Raphael, Leonardo, Titian, &c. Besides other public collections, M. can boast of 26 private picture galleries, while it has also 15 museums of natural history, and 14 of medals and antiquities. Perhaps the principal modern secular building is the Galleria Vittorio Emanuele, the largest and finest arcade in Europe, surmounted by a cupola 180 feet high, lighted in the evening by 2000 gas-jets, and erected (1865–67) at a cost of £320,000. Foremost among its many splendid charities, is the Ospedale Maggiore, one of the largest hospitals in the world, founded in 1457, and relieving yearly some 20,000 patients. M. holds a high rank as an educational centre, having celebrated schools of medicine, of music, of military science, in addition to its gymnasia and its many normal, technical, and conventual schools. Of the numerous places of amusement in the so-called 'Little Paris,' the chief is the theatre of La Scala (1778), after San Carlo at Naples the largest in Italy, holding 3000 persons. The old and new public gardens afford delightful promenades, and in the N.W. of the city extends the Piazza d'Armi, with an area of 783 by 748 yards. The fine new Cimitero Monumentale, outside the Porta Garibaldi, has an area of 500 acres, and cost the city, exclusive of the price of the ground, 1,000,000 francs. A Tempio di Cremazione, for the burning of dead bodies, was added to it in 1876. The manufactures of M. are silks, woollens, ribbons, porcelain, cutlery, &c., &c. Pop., with the district of Corpi Santi (1874) 199,009. M., the ancient *Mediolanum* ('middle marchland'), was the largest town of Cisalpine Gaul, when taken by the Romans in 222 B.C. Cicero and Marcus Brutus were among its governors, and for wealth and influence it almost rivalled Rome in the 3d c. Maximian, in the 4th c., made it the imperial residence. It was early Christianised, but was sacked by the Huns in 452, and by the Goths in 539. Its struggles against the empire were ended by Friedrich Barbarossa, who totally destroyed it in 1162. Subsequently it was governed by the Visconti (q. v.) and by the Sforza (q. v.), and during the supremacy of the latter (1447–1535) it rose, by its patronage of art, to the zenith of its fame. It was the residence of Bramante, of Leonardo da Vinci, and of his many illustrious disciples. After several

political viscissitudes, M. eventually fell to Austria in 1714. In 1796, Napoleon made it the capital of the Cisalpine Republic, and finally of the 'kingdom of Italy.' It was restored to Austria in 1815, but after the Franco-Austrian War of 1859, it was annexed with the rest of Lombardy to Sardinia, and once more became Italian.

Milan' IV. Obren'ovitch, Prince of Servia, born at Jassy, 22d August 1854, is the grand-nephew of Milosch Obrenovitch (q. v.), founder of the reigning dynasty. His father, only son of Prince Ephraim, was married to a Moldavian lady. Adopted by the childless Michael III., the young M. was sent for education to Paris in 1864, but was recalled by the Skuptchina to occupy the throne in 1868 on the assassination of Michael. M. was crowned at Belgrade on attaining his majority in 1872, and married Natalie Keschko in 1875. In June of the latter year Servia joined Bosnia and Herzegovina in the revolt against the Porte, but in a brief campaign the Servians, in spite of the help rendered by an organised force of Russian volunteers, were repeatedly beaten by the Turkish troops, till finally the storming of Alexinatz, on the 1st September, opened the way to Belgrade, and thus placing Servia at the mercy of her opponent, compelled M. to sue for peace. The settlement of the terms of peace directly involved the interference of Russia, and led eventually to the Conference at Constantinople. At present (October 1877) great efforts are being made by Russia to induce Servia to join the Slavic crusade against the Ottoman.

Milaz'zo, a fortified seaport of Sicily, in the province of Messina, stands on the narrow neck of the Capo de M., 20½ miles W. of Messina. It has a fine harbour, capable of admitting ships of war, and a castle, erected by Karl V., and restored in the 17th c., now converted into a prison. There are valuable tunny fisheries, and an export trade in oil, wine, linseed, dried fruits, &c. Pop. (1874) 12,060. M. (the *Mylæ* of Strabo) was founded by the Zanclæans prior to 648 B.C., surrendered to the Athenians under Laches (427 B.C.), and after the Roman conquest of Sicily enjoyed the privileges of a *fœderata colonia*. The Consul Duilius gained the first Roman naval victory in the Bay of M. (260 B.C.); and here Garibaldi with 2500 men defeated 7000 Neapolitans under General Bosco, July 20, 1860.

Mil'dew (Ger. *mehlthau*, 'meal- or flour-dew') is a name descriptive of the powdery appearance upon the leaves and the stems of plants from the growth over their surface of certain minute fungi; but at the present day the term has been extended to the dark mildew of the wheat, or even to cases in which no parasitic fungus is present. In the hop M., the rose M., the M. of peaches and of grapes, the white mealy coating represents the young state of the fungus, the perfect form being some *Erysiphe* or closely allied genus, and it may be conquered by dustings with sublimed sulphur. The wheat M., arising from a species of *Puccinia*, is at present without any known remedy. The dark spots found on linen after being folded up for a time in a damp place are attributable to M., which however may originate from impure starch used in the dressing of the goods.

Mile (Lat. *mille passuum*, 'a thousand paces'), the standard itinerary measure used in most European countries. The English statute mile was defined by an Act passed in the reign of Elizabeth as equal to 8 furlongs of 40 perches of 16½ feet each; and is, therefore, 5280 feet, or 1760 yards. The Roman pace was 5 feet, and the foot was 11·62 English inches; so that the ancient Roman mile was 1614 English yards. The value of the mile varies much in different countries, owing probably to the early confusion of the Roman measure with the Celtic league. In France the old league has been abolished, and has given place to the kilomètre (see METRIC SYSTEM). Taking the English statute mile as unity, the values of the most important European miles are as follows:—Modern Roman mile, ·925; Tuscan mile, 1·027; Spanish league, 4·151; Portugal mile, 1·278; German mile, 4·604; Danish mile, 4·681; Swedish mile, 6·648; Swiss league, 2·983. In Portugal, Spain, Germany, and Italy, the metric system has been established by law, and the adoption of the same by other countries is only a question of time.

Mile'tus, once the greatest of the thirteen cities of the Ionian League, stood on the peninsula of Grion, at the southern entrance of the Latmicus Sinus, about 25 miles S. of Ephesus. Its site has now receded 10 miles from the coast. According to tradition, M. was originally a Carian town, and was captured by the Ionians (*circa* 1043 B.C.), under whom it speedily attained a high commercial prosperity, being famed for its woollen manufactures, and planted colonies on the shores of the Euxine, Hellespont, and Ægean. It became tributary to Croesus, was sacked by Darius (494), and remained subject to Persia till the battle of Mycale (479), when it joined the Athenian Confederacy. It was stormed by Alexander the Great (334), sided with the Romans against Antiochus, was visited by St. Paul (60 A.D.), and was finally destroyed by the Turks. See Leake's *Asia Minor*, p. 239.

Mil'ford, a seaport of S. Wales, in the county of Pembroke, is situated on the N. shore of the famous haven of the same name, 7 miles S. by W. of Haverfordwest, and 6 W. by N. of Pembroke, with which it is connected by rail. It has extensive and recently-constructed harbour works, a considerable coasting-trade, chiefly in coal, and a productive oyster fishery. *M. Haven*, one of the finest natural harbours in the world, is 17 miles long and 2 broad, is about 19 fathoms deep, and is sheltered by a circle of low hills. Prior to 1814 M. was the seat of a royal dockyard and arsenal, and a station for the Irish mail-packet. Although a thriving port from the earliest times, it still remains imperfectly developed in regard to the rich mineral resources of the neighbourhood, and its splendid access by sea. In 1875 there entered the port 1262 vessels of 263,804 tons, and cleared 1173 of 228,030 tons. Pop. (1870) 2836. The village of New M., 3½ miles to the E., has taken some of the trade from the older port, and is in regular steam communication with Waterford, Bristol, Liverpool, &c.

Mil'itary Fron'tier (Ger. *Militärgrenze*), a long, narrow strip of land on the boundary of Austria with Turkey, which gradually received a military organisation for the resistance of sudden inroads by the Turks, the prevention of smuggling, and the exclusion of contagious disease. A number of families ('Grenzhäuser') were originally privileged to occupy a certain area, on condition of rendering military service when required against the Turks. After the danger of Turkish invasion had, at the end of the 17th c., practically ceased, a movement was made to put the M. F. on a civil instead of a military footing, but the attempt cost several civil envoys and commissaries their lives, and the military organisation not only remained in force, but was even extended. The proceeds from the lands assigned to a family are divided equally among its members, except that the 'Hausvater' and 'Hausmutter' each receive a double share. Besides this estate, or 'Stammgut,' which cannot be sold, the family is at liberty to acquire allodial property, or 'Ueberland.' The different 'Grenzhäuser' are classed under 'Grenzcommunionen,' from which are formed 'Compagnien' and 'Regimenter.' The inhabitants of the twelve towns called 'Militar-communitäten' undergo lighter service, and have a more restricted right to hold any portion of the M. F. In 1849 the M. F. was declared an independent crownland, and in 1850 the inhabitants were invested with the ownership of the lands which they had previously only occupied, but in the following year the Transylvanian portion of the M. F. passed under civil government. From the latter year till 1871 the M. F. was divided into two sections, governed respectively from Agram and Temesvar, the Croatian-Slavonian and the Servian-Banatic, the former comprising 10 regiments and 7 military communities, the latter 7 regiments, 1 battalion, and 5 communities. The whole district, from the Adriatic to the W. boundary of Transylvania, had an area of 2800 sq. miles, with about 1,200,000 inhabitants. Since 1871 the so-called Warasdin Frontier, consisting of two regiments, has been incorporated with Croatia and Slavonia, which it formerly separated, and the Servian-Banatic Frontier has been joined to Hungary. Thus, of the former M. F. there remains only the W. part, stretching from the Adriatic to the junction of the Drina and Save, with an area of 1320 sq. miles, and a pop., almost all of Slavonic stock, numbering (1869) 593,232, of whom 319,000 are Catholics, and 266,000 belong to the Greek church.

Military Immu'nities. A soldier in the regular army has certain civil privileges. He cannot be punished for leaving any work or employer, nor can he be summoned or arrested for a debt under £30. See MUTINY ACT.

Military Sec'retary, a confidential officer on the personal staff of a general, with whose correspondence he is intrusted.

The M. S. of a general in the field has £346, 15s. a year, but that at the Horse Guards receives £2000. A general of division may have an assistant M. S. with a salary of £173, 7s. 6d.

Militell'o, a town of Sicily, province of Catania, in the rich corn-land of the Val di Catania, 17 miles E. by N. of Caltagirone. Pop. (1874) 9875.

Mili'tia (from Lat. *miles*, 'a soldier'), an organisation apart from the regular army of a country, which may in certain cases be called out for military purposes. In England a force of this kind has existed from a very early period. Before the Norman Conquest every five hydes of land were charged with the equipment of one man, and freemen were, according to their wealth, obliged to provide arms, which could not be sold or pledged, and required to be annually exhibited. After the Norman Conquest this force, called 'the Fyrd,' was maintained in addition to the feudal army, supplied by the barons and knights in exchange for the land held by them. The scale of arms assigned to each class was revised in 1285, but the regulation as to keeping of arms was not abolished till 1604, when James I. raised his 'train bands.' No man in the M. was liable to be sent out of his county, save on great national emergencies. The command was vested in 'commissioners of array.' In the reign of Charles I., Parliament insisted on its claim to appoint commissioners, and the king refusing his consent, the civil war took place. On the Restoration the M. was reorganised, the supreme command being vested in the king, and under him in the lord-lieutenant of each county, and the inhabitants were compelled to contribute to its support. A bill to reconstruct the M. was passed in 1757. All able-bodied men from eighteen to thirty-five, with the exception of certain ranks and trades, were liable to be selected by ballot for five years' service. The enforcing of the ballot produced rioting, and has never been much resorted to, the numbers having been usually adequately supplied by voluntary enlistment. A balloted man had to serve himself, produce a substitute, or pay a fine. A supplementary force of M. was raised in 1796–1799. In 1797 a bill ordered the formation of M. in Scotland. From 1817 to 1852 the ballot was wholly suspended. Under Lord Cardwell in 1872 the control of the M. was transferred from the lord-lieutenants of counties to the war office, and a certain number of M. regiments (usually two) were under the new army organisation attached to each brigade of infantry, under command of the colonel of the military district. Barracks were erected for their monthly training at the district depots. In Mr. Gathorne Hardy's Mobilisation Scheme of 1876, the place where each regiment would be sent in case of invasion was assigned, the force having been liable since 1859 to serve in any part of Great Britain. The M. has been embodied on the following dates, 1757–1763, 1778–83, 1792–1803, 1815, 1854, and 1857. It has always been practically the feeder of the army. In one year alone (1799) 25,000 men volunteered as regulars. The battle of Talavera was won principally by drafted militiamen. Fifty regiments volunteered for foreign service during the Crimean War, and ten of these were sent to Mediterranean stations. Eighteen regiments volunteered in the same way during the Indian Mutiny. A M. reserve, not to exceed in number one-fourth of the M., was created by Act of 1867, consisting of men actually serving in the M., who receive an additional bounty of £1, and in time of war may be drafted into the army. Officers of the M. who have had two years' training may obtain commands in the regular army on passing an examination. The pay of the M. is nearly the same per day as that of the infantry of the line. The pay and allowances amounted in 1875–76 to £685,300, and the total charge for effective and non-effective services was £1,214,153. The strength of artillery and infantry was 133,952. See the *History of our Reserve Forces* (Lond. 1870).

Laws affecting the M.—By 15 and 16 Vict. c. 50, the Acts relative to the M. in England are consolidated and amended, and a M. force of 80,000 men is now immediately available, which may in an emergency be raised to 120,000. The Act provides for voluntary enlistment for five years, and authorises a bounty not exceeding £6 to be paid to each person enlisting. The period of training and of exercise are not to exceed twenty-one days in one year, unless extended by order in council. The quotas for each county are fixed by order in council, and where the quota has not been enrolled by voluntary enlistment, the Queen in council may order the deficiency to be raised by ballot. The M. may now be called out during war, or in case of national danger. By 17 and 18 Vict. c. 105, innkeepers and others are made liable to have the permanent staff of the M., when disembodied, billeted upon them. 22 and 23 Vict. c. 38, regulates the interchange of M. between England and Ireland, and the periods of service. The M. in Scotland is now regulated by the Act 17 and 18 Vict. c. 106.

Milk (Old Eng. *meolc*, Ger. *milch*, from *melken*, 'to handle;' allied to Lat. *mulgēre* 'to milk,' *mulcēre* 'to soften,' and Gr. *amelgein* 'to squeeze') is the fluid secretion with which all mammalian animals suckle their young. It is an opaque, white liquid with a slightly yellowish tinge, and seen under the microscope it consists of a congeries of minute globules of fat, to which the white colour is mainly owing, with still smaller globules of nitrogenous matter, all floating in a watery fluid. M. being the only food supplied to the young of the most highly organised creatures is found to contain all the essential ingredients of a perfect dietary, and is therefore regarded as a typical food. The fatty globules above mentioned, by virtue of their superior specific gravity, gradually rise to the surface when M. is allowed to settle, and form Cream (q. v), from which Butter (q. v.)—the fat of M.—is prepared. M. contains a second carbohydrate, in the form of lactose or milk-sugar, which gives to the substance the sweetness it possesses. By fermentation or souring, the lactose is converted into lactic acid, which causes the nitrogenous constituent of M.—casein (see CHEESE)—to coagulate, and the M. therefore thickens. In the process of making cheese, the butter and casein are removed by artificially coagulating the M., and the fluid yellow whey which remains consists of water, with the lactose or milk-sugar, the most of the salts which are present in M., and some traces of fatty and nitrogenous matter unremoved. M. forms an exceedingly valuable article of food to adults as well as infants throughout the entire world, and as the source of butter and cheese it is the basis of most important and valuable industries. The M. chiefly employed as an article of adult food is that of the cow, but goat's M. is also frequently used. Sheep's M. is consumed in the N. of Europe, and is the basis of the celebrated French Roquefort cheese; the Laplanders use reindeer's M., the Tartars consume the M. of the mare, and prepare a fermented liquor called Koumis (q. v.) therefrom; and among the Arabs camel's M. is used. Human M. contains less fat and casein, but more sugar than that of the cow. The following table exhibits the average composition of the principal varieties of M.

	Human.	Cow.	Ass.	Mare.	Goat.	Sheep.	Pig.
Water,	89·0	86·3	88·7	89·8	86·4	83·3	84·
Casein, &c.,	1·6	4·1	2·4	2·1	4·8	5·8	4·
Butter,	2·3	3·7	1·5	1·6	4·2	4·8	5·
Milk-sugar,	6·9	5·1	7·1	6·1	4·1	4·8	7·
Mineral matter,	0·2	0·8	0·3	0·4	0·5	0·8	0·

The M. of cows though remarkably constant in its constitution on the whole, varies within certain narrow limits, according to the breed, state of health, food, and age of the cow yielding it. Thus some breeds—the Alderney cattle, for example—yield only a small quantity of M. very rich in fat, while other breeds, such as the long-horns, give more M., and that proportionally richer in casein. A cow yields on an average from 20 to 25 pints of M. per day, of which about 12 per cent. is cream; but as much as 40 per cent. of cream is sometimes obtained from the M. of an Alderney cow. *Skim M.* consists of M. deprived of a large proportion of its cream by skimming, but as it still retains nearly all its casein and other constituents, it is a valuable and nutritious food. *Butter M.* is the caseinous portion of cream from which the butter has been separated by churning. Condensed M., now in extensive use, is sweet milk partially evaporated by steam heat, and thickened with sugar. The adulterations to which M. are subject consist almost exclusively in the fraudulent abstraction of cream, and in adding water to the M.

Milk Fever. When the milk is being first secreted the mammary glands are in a state of great activity; but occasionally this excitement is excessive, and a high degree of fever accompanies the newly established action. M. F. is most frequent after a first birth, and is ushered in by shivering, headache, hot skin, quick pulse, and the principal features of pyrexia, together with pain, tumefaction, and hardness of the breasts. Sometimes M. F. is followed by inflammation and abscess of the mammary glands. The best prevention of M. F. is the early

application of the infant to the breast; and, when the fever has set in, it is best subdued by emptying the breast, and by the administration of aperient and saline medicines. The patient should be kept upon a low diet for a day or two, and local inflammatory symptoms should be controlled by appropriate means.

Milk Vetch. See ASTRAGALUS.

Milk Wort. See POLYGALA.

Milky Way (*Via Lactea*), also known as the Galaxy, forms a well-marked zone of light in the night sky. Though very irregular in its outlines, it can be traced right round in a great circle, inclined to the celestial equator at an angle of about 63°, and intersecting it in the constellations Monoceros and Aquila. For nearly half its length it is composed of two branches; while as it passes through the southern cross it becomes very narrow, but at the same time very intensely luminous. Its true nature was indicated by Galileo; but most of our knowledge we obtained from the researches of Sir William Herschell—at once the pioneer and prince of star-gaugers. By means of his magnificent telescopes, he completely resolved the M. W. into its component stars. Not only so, he speculated upon the probability that the M. W. formed a gigantic cluster of stars, of which our sun was one. The section of this cluster, by a plane drawn through the sun at right angles to the plane of the M. W., would have a shape something like the letter Y with the sun about the point of bifurcation. This hypothesis explains all the leading phenomena—such as the two branches, and the comparative absence of stars on other parts of the heavens. Struve's researches led in the same direction. If the M. W. were viewed from a far distance in the line through its centre perpendicular to its plane, it would no doubt present an appearance like some of our irresolvable nebulæ. These nebulæ may then be great clusters of stars similar to our M. W., but at such an inconceivably great distance, that as a rule they are only visible as faint hazy luminosities with the strongest telescopic power at our disposal. See NEBULA.

Mill (Old Eng. *miln*, Ger. *mühle*, allied to Gr. *mylē* and Lat. *mŏla*, 'a mill,' from *mŏlere*, 'to grind'), a term applied to a machine for grinding or pulverising any substance by means of two indented or grooved surfaces, between which the substance is placed. The earliest kind of M. was that used for comminuting corn, and in its original form it resembled a rude kind of mortar. A corn-mill of this sort is still found in use among African and other degraded tribes. In process of time millstones in the form of two circular stones, placed one on the other, were substituted. The upper stone rotates on a pivot on the under or nether stone, which is fixed; the adjacent faces are grooved radially with furrows, and in the centre of the upper stone there is an aperture for the introduction of the grain, which is thrown off as flour at the edges. For the better distribution of the grain between the stones, the grinding surface of the upper one is made slightly concave around the central aperture. The upper stone was originally moved by hand, and afterwards by cattle; water-power was employed by the Romans, while in modern flour-mills steam is used. Millstones are composed of hard silicious vesicular rock, obtained in unrivalled quality at La Ferté-sous-Jouarre, in France, and are formed of segments (Fr. *moulage*), cemented and bound round the circumference with iron bands. The common diameter of a millstone is 4 feet, and the thickness 12 inches, part of which consists of concrete or plaster of Paris, and burrstone chips, by the use of which the necessary weight is secured and expense saved. The sharp edges which crush the corn are soon worn smooth, and the stones therefore require frequent redressing. Under the head DISINTEGRATOR a most useful and effective form of M. is described. Disintegrating flour-mills on the same principle, but with more cages, usually eleven, of steel bars, are extensively employed. Three or four pairs of ordinary millstones are used to grind the semolina produced in one of these disintegrating flour-mills, which, however, perform as much work as twenty-seven pairs of millstones would do; the saving of space thereby effected is therefore very great.

There are many other forms of M. with a crushing and grinding action used in industrial pursuits—as, for example, paint-mills, mortar-mills, ore-mills, &c. A revolving iron pan or trough, with two heavy vertical rollers at the extremities of an axle placed in it, is found very effective for grinding the ingredients of mortar. For working clay, a machine called a *pug-mill* is employed. It consists of a cylinder with a central shaft fitted with knives which thoroughly incorporate the clay in its passage through the machine. Various other kinds of machinery are denominated mills, and the term M. is also generally applied to places where raw materials are brought into a condition for use. Thus, there are saw-mills, powder-mills, oil-mills, mills for the manufacture of textile fabrics, wind-mills, water-mills, &c. *Millwork* is the name given to the combination of machinery for the transmission of power in a manufacturing mill or factory. For practical details, see Sir W. Fairbairn, *Mills and Millwork* (2 parts, Lond. 1861–65); R. Buchanan, *On Millwork and other Machinery* (by Tredgold and Rennie, 1841–42); T. Box, *Practical Treatise on Mill-gearing* (1869).

Law Regarding Mills.—A proprietor of an upper portion of a stream which drives a M. is not entitled to alter its course or to diminish its volume to the injury of the M. Under 24 and 25 Vic. c. 97, to destroy the dam of any millpond subjects the offender to penal servitude for a period not exceeding seven years.

Mill, James, was born at Northwater Bridge, near Montrose, in Forfarshire, 6th April 1773, educated at the parish school and at Montrose Academy till the age of eighteen, and then sent by the help of the family of Stuart of Fettercairn to the University of Edinburgh, where he became the pupil of Playfair and Dugald Stewart, and afterwards passed through a complete course of Divinity. In 1798 he was licensed to preach; but his preaching is said by Sir David Brewster to have been very bad. During this time M. acted as tutor to Miss Stuart, afterwards the mother of James David Forbes, the naturalist, and in the family of Burnet of Elick (Aberdeen). Beaten by Sir David Brewster's brother in a candidature for the parish of Craig, M. went to London in 1802, and began work for John Gifford of the *Anti-Jacobin Review*, and for the *Encyclopædia Britannica*. He also became editor of the *Literary Journal* and of the *St. James's Chronicle* newspaper. In 1805 he married Harriet Burrow, whose mother kept a private lunatic asylum at Hoxton. By her he had nine children (the eldest John Stuart), of whom four daughters survive. The next 10 years were devoted mainly to the *History of British India* in 6 vols. The history, which still remains the best work of the kind both in accuracy, clearness, and adherence to sound principle, obtained for him the post of Assistant Examiner of India Correspondence from the Court of Directors, which he held till 1832. Before his appointment he had contributed to the supplement of the 5th edition of the *Encyclopædia Britannica* his classical articles on Government, Education, Colonies, Prison Discipline, Jurisprudence, Law of Nations, Liberty of the Press, which are also published separately. To 1822 belongs his *Elements of Political Economy*, a work much more accurate than Malthus and more popular in style than Ricardo. To 1829 belongs his *Analysis of the Phenomena of the Human Mind*, which in absolute clearness of statement resembles Hobbes or Condillac, but which avoids the greater fallacies of the extreme sensational school. The careful posthumous edition of this in 1869 by his son, Prof. Bain, and Dr. Findlater is probably the best Manual of Psychology (from the mental side) in English. It proceeds entirely on the principles of association as affecting the individual, and does not allow for the inherited experiences of the race. M. supported the Ballot and other reforms in the early numbers of the *Westminster Review*. At the house of Bentham, to whom M. owed much help, he formed the school of Philosophical Radicals (Grote, Roebuck, Buller, John Stuart Mill, &c.), who may be said to have directed the important legislation of this country for the last forty years. His latest work, *Fragment on Mackintosh* (1835), is a criticism almost amusing in its grim energy of destruction on Sir James Mackintosh's wordy and superficial *Dissertation on the History of Ethical Philosophy*. M. died at Kensington, 23d June 1836. He was a man of great energy of character and acuteness of mind, striving amid much discouragement for a lofty intellectual ideal; but he was harsh and unlovable, even to his children.—**John Stuart M.**, eldest son of the preceding, was born at London, 20th May 1806. The story of his rigid education has been told in his posthumous *Autobiography*. A journey to France, where he saw J. B. Say and lived with Sir Samuel Bentham, began his lifelong familiarity with things French,

which may be distinctly traced in the lucidity, point, and balance of his style, especially in animated passages. He spent thirty-five years in the service of the East India Company, retiring in 1858 when the territories were transferred to the Crown. All this time, however, his life was full of practical and speculative interests. As a philosophical Radical he supported the cause of Reform in the *Westminster* and *London Reviews*, announcing principles which were afterwards more fully stated in such works as *Liberty* (1859), *Considerations on Representative Government* (1861), *Subjection of Women* (1869), and the more directly political portions of *Principles of Political Economy* (1848). He preached the doctrine of individualism, or free development of social units, as a necessary condition of social welfare. In the *Unsettled Questions of Political Economy* (1844), and the larger work just mentioned, he states the doctrines of capital, wages, rent, profits, international values, currency, &c., in extremely popular and yet precise language; and he discusses the limits of government interference and other political questions with extensive knowledge of previous discussions and of the actual condition and experience of foreign states. His *System of Logic* (1843) is the most important treatise on that science written by any Englishman in modern times. His chief contributions to philosophy proper were *Utilitarianism* (1862), a re-statement of Bentham's principles, with some modifications; and his trenchant *Examination of Sir William Hamilton's Philosophy* (1865). As a disciple of the Experience or Association School, he of course attacks the Hamiltonian doctrines of the Unconditioned, Free Will, Cause and Perception, but he also professes to have discovered glaring contradictions in the characteristic theory of Natural Realism. M.'s writings on general subjects have been collected in 3 vols. of *Dissertations and Discussions* (1859). M.'s ardent political convictions led him to the House of Commons, where he sat for Westminster from 1865 to 1868. His name is associated with the Women's Suffrage movement. He died at Avignon, 8th May 1873. M.'s influence on at least one generation of his fellow-countrymen was immense. His works are still studied by all classes. Democratic in politics, agnostic in religion, and opposed to intuitionalism in mental science, he represents many of the currents of thought in the latter half of the 19th c. The posthumous *Autobiography* (1873) and *Essays on Nature, The Utility of Religion and Theism* (1874), have not altered the general effect of his writings. In 1873 appeared an interesting memorial, consisting of twelve distinct sketches of M. and his work, by Fox Bourne, Herbert Spencer, J. E. Cairns, Henry Fawcett, and others.

Mill'ais, John Everett, R.A., an English artist, was born of an old Jersey family at Southampton, 8th June 1829. He entered the Academy in London at the age of eleven, and his first important picture was 'Pizarro seizing the Inca of Peru,' exhibited at the Academy in 1846. This was followed by 'The Widow's Mite,' a colossal cartoon (1847), and 'The Tribe of Benjamin seizing the Women of Shiloh' (1848). In 1849, together with W. Holman Hunt and D. G. Rossetti, he renounced the teaching of the Academy and the traditions of 'the antique,' and became one of the founders of the so-called 'Pre-Raphaelite School,' which subsequently received the enthusiastic support of Mr. Ruskin, expressed in letters to the *Times* (1852), in a pamphlet on *Pre-Raphaelitism*, and in his *Lectures on Architecture and Painting* (1853). The chief works produced by M. under this new influence were 'Isabella' (1849), 'Ferdinand cured by Ariel' (1850), 'Mariana in the Moated Grange' and the 'Woodman's Daughter' (1851), 'The Huguenot' and 'Ophelia' (1852). He became Associate in 1853, and R.A. in 1863. Among his later works are 'The Order of Release' (1853), 'The Rescue' (1855), 'A Dream of the Past' (1857), 'The Black Brunswicker' (1861), 'Joan Darc' (1865), 'A Souvenir of Velasquez' (1868), 'The Knight-Errant' (1870), 'Moses' (1871), 'New-Laid Eggs' (1873), 'A Day Dream' (1874), 'The Sound of Many Waters' (1877). Several of these pictures, especially 'Isabella' and 'The Huguenot,' are widely known through engravings. They are all more or less characterised by vivid realism, a masterly breadth, combined with affectionate minuteness, a classic simplicity of design, and pure radiant colouring.

Mill'au, or **Mil'hau**, a town of France, department of Aveyron, on the Tarn, 40 miles S.E. of Rodez, has large tanneries and manufactures of gloves, silk, and draperies, and carries on a trade in wood, wool, and 'Roquefort cheeses.' It was a stronghold of the Calvinists in the 16th c., but was dismantled by Louis XIII. (1629), and suffered greatly from the revocation of the Edict of Nantes. Pop. (1872) 13,804.

Mill'boards are strong and flexible boards, made like brown wrapping-paper from old tarred rope and coal sacks. They take their name from the fact that in the finishing process they are 'milled' under heavy rollers, to impart solidity and a smooth surface. They are made of various thicknesses and sizes for use by trunkmakers, vellum binders, and bookbinders.

Millenn'ium (Lat. 'the space of a thousand years'), is the name applied, owing to the duration generally assigned to it, to the Messianic kingdom of heaven or of God, which the first Christians expected to be established upon the earth by Christ at his second advent, and which has been looked for by many Christians down to the present time. The ideas regarding it were borrowed from the Jews. It was a prevailing belief among the latter before and at the time of the coming of Christ that the Messiah would establish a glorious and universal kingdom at Jerusalem, all nations being either reduced to subjection or destroyed, the Jews gathered from the ends of the earth, and the Temple restored. As to the duration of this kingdom, the prevalent belief was that it was to be eternal (*cf.* John xii. 34); but other opinions were that it would last 40, 70, 400 (2 Esd. vii. 28), 1000, and several thousand years. The authority adduced for the 1000 years was Is. lxiii. 4, interpreted by Ps. xc. 4 (*cf.* 2 Pet. iii. 8). The narrative of the creation of the world (Gen. i.) was also regarded as a type of its destinies, and hence it was concluded that as God had created the world in six days and then rested on the seventh, so the world would be completed in 6000 years (according to Ps. xc. 4, as above), and the seventh thousand would be a time of rest and Messianic bliss. Again, at the coming of the Messiah, there was to be a resurrection of the dead (Dan. xii. 2), and in the later Jewish theology the resurrection spoken of by Daniel became twofold; (1) of the pious at the appearing of the Messiah, to take part with him in his kingdom; (2) a general resurrection at the last day, for universal judgment.

The early Christians, finding themselves in circumstances of trial and adversity, similar to those of the Jews, and doubtless also, in the case of the Jewish Christians, from Jewish training and traditions, adopted their hopes for the future, and looked forward to the time when the true Israel of God would come triumphant out of their conflicts, and attain to the dominion of the world. This was to take place at the second coming of Christ, which in many passages of the New Testament is represented as near at hand (*cf.* Matt. x. 23, xvi. 27, 28, xxiv., xxv.; Mark xiii.; Luke xxi.; Rom. xiii. 11, 12; 1 Cor. vii. 29, xv. 51, 52; 1 Thess. iv. 13–18; Heb. x. 25, 37; 1 Peter iv. 7; 2 Peter iii. 8–14; Rev. i. 3, 7, iii. 11, &c.). As a natural consequence of interpreting such passages literally, Millenarianism (Gr. Chiliasm, from *chilioi*, 1000) became the general belief of the time, except among the Gnostics. At the same time there are hints in the New Testament itself of an uneasiness respecting the tardy fulfilment of the Messianic hope, and a suspicion that the time appointed for the advent had passed, in the numerous exhortations to patience in waiting for it (*cf.* 1 Thess. i. 10; 2 Thess. iii. 5; James v. 7, 8). As time passed on these suspicions seem to have ripened into open unbelief (*cf.* 2 Peter iii. 4; Jude 17–21). To meet this difficulty the time of Christ's advent was put back from time to time, *e.g.*, in the Epistle of Barnabas it is put at the Jewish period—the end of 6000 years of the world's age. But the opposition to the belief now assumed a new form. The idea spread from the Alexandrian divines that the passages in the Bible which seemed to teach the doctrine of a M. were to be interpreted spiritually or allegorically. The first to put forth this idea were Caius at Rome and Origen at Alexandria. Origen's teaching was more effectually followed up by his pupil Dionysius, bishop of Alexandria (248–265), and Millenarianism being farther brought into disrepute as part of the creed of the Montanists (q. v.), the doctrine ceased to be part of the orthodox faith of the Church.

The distinctive feature of Millenarianism has always been the twofold resurrection, so that a modern term for the doctrine is the *Pre-millennial* theory of the Advent of Christ. 1. At the coming of Christ, which is to be personal and glorious, the martyrs, or all who sleep in Jesus, shall be raised from the dead, in order to participate with the saints alive at the time, who are

to be 'changed' (1 Cor. xv. 51, 52; 1 Thess. iv. 13–17), in the kingdom he is to establish at Jerusalem. This is the First Resurrection of Rev. xx. 6. 2. The Jews are to be converted, restored to their own land, invested with special honours and prerogatives, and made the instruments of the conversion of the world. 3. This kingdom is to be one of great splendour, prosperity, and blessedness, and is to last a thousand years. 4. At the end of the M. the second or general resurrection of the dead and the end of the world are to take place. What has been the orthodox doctrine of the Church since the 3d c. is 'that the conversion of the world, the restoration of the Jews, and the destruction of Antichrist are to precede the second coming of Christ, which event will be attended by the general resurrection of the dead, the final judgment, the end of the world, and the consummation of the Church.' See Hodge's *Syst. Theol.* (Edinb. 1873), Gieseler's *Lehrbuch d. Kirchengesch.* (Eng. trans. 1855), Brown's *Christ's Second Coming* (1853), Seiss's *The Last Times and the Great Consummation* (Lond. 1866).

Mill'epede (Lat. 'having a thousand feet'), a name given to animals belonging to the class *Myriapoda*. They form the various genera of arthropodous representatives of the division *Chilognatha*, in which a great number of legs exist; each segment, except the anterior ones, being formed of two united segments, and thus the M. appears to have two pairs of limbs. The antennæ consist of 6 or 7 joints. Two pairs of mandibles are developed. The generative organs open anteriorly. The Common M. (*Iulus terrestris*) is found among damp moss, and in like situations. It is sometimes named the 'Hairy Worm,' and coils itself into a spiral form when irritated. Other genera often named Millepedes are *Polydesmus* and *Glomeris*.

Mill'er, Hugh, son of a seaman, was born at Cromarty in Scotland, October 10, 1802; became an orphan in his fifth year, was educated at the grammar-school of his native place, and left it to work as a stone-mason. The publication of *Poems written in the Leisure Hours of a Journeyman Mason* (1829) secured for him the clerkship in a local bank, which gave him leisure to develop more freely his ardent passion for geological pursuits and reading in English literature. Contributions to the *Inverness Courier*, and *Scenes and Legends of the North of Scotland* (1835), were the first fruits of this leisure. Meanwhile M. was being deeply stirred by the great ecclesiastical controversy then beginning to rage over Scotland. His *Letter to Lord Brougham* on the 'Auchterarder Case' hurried him into the arena of public gladiators, and in 1840 he was summoned to Edinburgh to conduct the *Witness*, the organ of the Non-Intrusion party. In its columns appeared *The Old Red Sandstone*, a series of geological articles which set forth the results of original and valuable research in picturesque and pellucid English. M. was the first of the physicists who, without diminution of their scientific merits, have sought to rival litterateurs in the graces of language. Lyell, Murchison, and Buckland quickly recognised the advent of a fresh and powerful mind. During the struggle ending in the Disruption of the Church of Scotland in 1843, M. gave up all the strength and energy of his rugged soul to the service of the section that afterwards formed the Free Church, and the nobler exercise of his genius was for a while suspended. Yet his *First Impressions of England and its People* (1847), and his *Footprints of the Creator* (1849), called forth by the *Vestiges of Creation*, proved that the vigour and beauty of his diction had suffered no abatement, while his patient pursuit of geological science was shown in the *Testimony of the Rocks* (1857), *Cruise of the Betsy* (1858), and the *Sketch Book of Popular Geology*, edited by Mrs. Miller (1869). But overwhelmed by the quantity of work which pressed upon him through the calls of journalism, literature, and science, on the 23d December 1856, in a fit of insanity, he shot himself at Portobello. M. was a man of great power, of noble, serious, and intense character, with a truly Scottish perseverance and a vast capacity for work. Considering his meagre outfit of culture, and the narrow range of his early associations, his achievements and his accomplishments are incontestable evidence of the native richness of his mind. He has left an indelible mark in the history of geology, and will long be affectionately remembered by all classes of his countrymen. See *My Schools and Schoolmasters* for a record of his earlier career; also P. Bayne's *Life of Hugh Miller* (2 vols. Lond. 1871).

Miller's Thumb. See BULLHEAD.

Mill'et is the name of numerous grasses of varied habit, of wide geographical range, and of great value in an economic point of view, forming indeed in many countries the staple food crops of the people. The genera *Panicum*, *Setaria*, and *Sorghum* furnish the chief supply. Of the first, *P. miliaceum* is largely cultivated in India, producing ovate, smooth, shining, various-coloured seeds, about an eighth of an inch in length. Besides furnishing a palatable and nutritious table food, it is one of the best of all grasses grown for poultry use. In the common kind the grain is yellow; in other varieties white, gray, or black. *P. frumentaceum* and *P. miliare* are also frequently cultivated in India, yielding a seed largely used for food both by men and cattle. *P. spectabile* is grown in Brazil. Of *Setaria*, the seed of *S. Italica* is largely used in Italy in the preparation of a kind of flour which is made into bread, or, when finely pulverised, into pastry, and a light food for invalids. In India it is cultivated on light dry soils, yielding two crops in the course of the season. Under the name of German M. a variety of the above (*Germanica*) is grown in Moravia, S. Hungary, and Lombardy. It is known as 'Moliar' by the Germans, and the seeds are used for making bread, as well as for boiling in soup and in milk, and they are also used for feeding domestic animals. In the genus *Sorghum*, the most important is *S. vulgare*, some of its varieties growing to a height of 7 feet. The seeds are large, nearly oval, and very variable in colour in the different varieties, some being white, others yellow, and others again reddish or black. In one or other of these forms the species is largely cultivated in Italy, Spain, and other parts of Southern Europe; in Egypt, Asia Minor, Arabia, and India (where it is called 'Dhurra'); and in W. and Central Africa. *S. saccharatum* is generally known under the name of sugar M. In America a good deal of attention has been paid to this plant, and to the manufacture of sugar from its stalks. Under the name of 'Gero,' the round grains of *Penicillaria spicata* are in daily household use by the natives on the rivers Niger and Gambia. This M. is eaten raw, or cooked in a variety of ways, and is further used for making several kinds of beverages.

Mill'rind, Mili'rine, or **Fer de Mouline,** in Heraldry, is the iron fixed to the centre of a millstone. It is a species of *cross moline*, and has its extremities in the form of a W.

Mil'man, Henry Hart, D.D., son of Sir Francis M., physician to George III., was born at London, February 10, 1791. Educated at Eton, he proceeded to Brazenose College, Oxford, of which, after taking the degrees of B.A. and M.A., he became Fellow. In 1812 he obtained the Newdigate poetry prize; and three years after he produced *Fazio*, a tragedy, put on the stage at Covent Garden. In 1817 he was appointed vicar of St. Mary's, Reading. In 1818 he published *Samor, Lord of the Bright City*, in 1820 *The Fall of Jerusalem* (perhaps his best poem); in 1821 he was elected Professor of Poetry at Oxford, and published *The Martyr of Antioch*, *Belshazzar*, *Anne Boleyn*, in 1827 a series of Bampton Lectures, in 1829 *History of the Jews* (3 vols. new ed. 1863), in 1840 *History of Christianity, from the Birth of Christ to the Abolition of Paganism in the Roman Empire* (3 vols.), together with a collected edition of his *Poetical Works*. In 1849 he was made dean of St. Paul's, and in 1854 appeared the *History of Latin Christianity, including that of the Popes to the Pontificate of Nicholas V.* (3 vols). The last of these is M.'s masterpiece, and has given him a distinguished place among historians. It is written with ample knowledge, philosophic acumen, and spiritual insight. The poet and the priest are finely blended in the work. To the first we owe, *e.g.*, the picture of England in the days of Piers the Plowman; to the second, the picture of St. Francis of Assisi. M. lacks the majestic genius and the rich resources of Gibbon (whom he has edited), but he has the nobler merits of Christian faith and human sympathy. He died 24th September 1868. His *History of St. Paul's*, and *Savonarola, Erasmus, and other Essays*, were published posthumously.

Milne-Edwards, Henri, a distinguished French naturalist, the son of an Englishman, was born at Bruges in 1800, and studied medicine in Belgium and Paris, taking the degree of M.D. in 1823. He published his *Manuel de Matière Medicale* in 1825, *Manuel d'Anatomie Chirurgicale* in 1826, *Recherches pour servir à l'Histoire Naturelle* (1832–34), and his great work, *Histoire Naturelle des Crustaces* (3 vols. 1834–41). He was elected Member of the Academy of Sciences in 1838, Professor of En-

tomology at the Jardin des Plantes in 1841, Professor of Zoology in the Faculty of Sciences in 1844, and subsequently President of the Faculty. His *Elements de Zoologie* appeared in 1834–37 (2d edition in 4 vols., with 600 engravings, 1840–43). In 1841 he issued a *Cours Élémentaire de Zoologie*, and a work on the compound Ascidian Mollusca, beautifully illustrated, and full of fresh and interesting discovery. His *Leçons sur la Physiologie et l'Anatomie comparée de l'Homme et des Animaux*, appeared in 1857. He received the honorary degree of M.D. from the University of Leyden in 1875.

Mil'ner, Joseph, born near Leeds, January 2, 1744, graduated at Cambridge in 1766, became soon after headmaster of Hull Grammar School, where he died 15th November 1797. In 1794 he published three volumes of a *History of the Church of Christ*, once popular, but very narrow-minded, and now almost forgotten. A fourth volume, added by his brother **Isaac M.** (born January 1, 1751, died April 1, 1820), Dean of Carlisle, brought the work down to the Reformation.

Milnes, Monckton. See HOUGHTON.

Mil'on, of Croton in Magna Græcia, a famous athlete of the 6th c. B.C., who was six times victor in wrestling at the Olympic and the Pythian games. Many stories were told of his extraordinary powers, as that he carried a four-year-old heifer on his shoulders through the stadium at Olympia, and afterwards ate it all in one day. He had half succeeded in rending the trunk of a great tree with his hands, when the wood closed on them, and held him fast till he was devoured by wolves.

Milosch' Obren'ovitch, Prince of Servia, was born in 1784 in the village of Dobrinja, in the Servian circle of Uschica. He was the son of a day-labourer, and along with his half-brother Milan joined Czerny Georg (see CZERNY) in his struggle with the Turks. Milan died in 1810, but M. soon came to the front as one of the bravest and most successful warriors of the Servians. In 1813 his splendid defence of the village of Rawanj threw into the shade even the achievements of Czerny Georg himself. On the great uprising of the Servians, on the Palm Sunday of 1815, he placed himself at their head, and after long and chequered fighting finally secured the freedom of his country. At the peace of 1816 he was recognised by the Sultan as Woiwode of Servia, and in 1817 he was chosen by the nobles and clergy hereditary Prince of Servia. He ruled not without skill but very despotically till 1839, when he was compelled to resign his authority and was banished. He was succeeded by his son, **Milan M. O.,** who died twelve days after he had assumed the government, and in turn was succeeded by M.'s second son **Michael** (born 16th September 1823), who in 1842 was forced to make way for Karadgordgevitch, son of Czerny Georg. On the fall of the latter in 1858, the Servian Skuptschina recalled the grey-haired exile M., who died 26th September 1860.

Milreis' (a thousand *reis*), the standard coin of Portugal. Its average exchange value is 4s. 4½d., or about 4½ M. to £1 sterling. The Brazilian M. is valued at 2s. 3d.

Milti'ades, a 'tyrant' of the Chersonnesus, of Athenian descent, who having incurred the enmity of Darius by his conquest of Lemnos and Imbros (494 B.C.), repaired to Athens, and on the second Persian invasion of Greece (490) was chosen one of the ten generals of the Athenian and Platæan forces. To his foresight and valour the great victory of Marathon (q. v.) was wholly due—hence Byron calls him 'freedom's best and bravest friend;' yet having failed in an attack with seventy ships on the island of Paros, he was impeached by Xanthippus on his return to Athens, and thrown into prison, where he shortly after died.

Mil'ton, John, was born in Bread Street, London, 9th December 1608. His father was a scrivener, of Puritan leanings yet liberal tastes, and especially skilled in music. M.'s first teacher was Thomas Young, a Scotchman and a Puritan, from whose care he passed to St. Paul's School. Here his habits of study were formed. Aubrey states that he commonly sat till past midnight, and mentions a turn for composing verses even then noticeable. Of these verses two specimens remain in the English Paraphrases of Psalms cxiv. and cxxxvi., rendered when he was fifteen. He entered as a pensioner at Christ's College, Cambridge, 12th February 1625, being committed to the charge of a Mr. Chappell, afterwards Bishop of Cork and Ross. With this tutor he had differences which led him to retire from the university during part of his third year of residence; but he returned, and under the guidance of the Rev. Nathaniel Tovey completed his course, taking the degree of B.A. in January 1629, and that of M.A. in July 1632. He left the University with high reputation as a scholar, but nicknamed 'the Lady,' as he himself confesses with a candour not unmingled with pride, because of his delicate appearance and reserved manners. The following of his extant writings are what, according to Masson, by this time lay in MS.: In Latin—the first four of the *Familiar Epistles*, and seven college themes afterwards published with these as *Prolusiones quædam Oratoriæ;* the first seven pieces in the *Elegiarum Liber;* and the first six in *Sylvarum Liber*. In English—*On the Death of a Fair Infant Dying of a Cough*, 1626; part of a *Vacation Exercise at College*, 1628; the *Hymn on the Nativity*, 1629; *On the Passion*, 1630; *On Time*, 1630; *On the Circumcision*, 1630; *At a Solemn Musick*, 1630; *Song on May Morning*, 1630; *On Shakspeare*, 1630; *On the University-Carrier; Another on the same; An Epitaph on the Marchioness of Winchester*, 1631; *Sonnet* on his twenty-third birthday, 1631. The deep-toned verses on Shakspeare, written in his twenty-fourth year, were prefixed anonymously to the second folio of Shakspeare—how proud a homage silently rendered by genius to kindred genius!

For five years after leaving Cambridge M. resided with his father at Horton, giving up thoughts once entertained of the Church, and applying himself to the study of modern literature, besides mathematics and music. Characteristically he chose the most solemn instruments to play upon, the organ and the bass viol. With the spirit of classical antiquity his mind was richly imbued; its air was native to him: and his meditations moved to the stately step of its sages. A long list of projected dramas and other poems was written at this time, and still exists. What he did accomplish during these five years placed him high in the first rank of the world's poets. We have: three of the *Familiar Epistles;* the *Sonnet to the Nightingale;* *L'Allegro*, and *Il Penseroso*,—the one musical with the sound of rural joys, breathing the breath of summer, every word a drop of honey,—the other gentle and serious, with the nightingale's song to the wandering moon, the sullen clang of the curfew, and the winds rocking the trees; *Arcades*, part of an entertainment before the Countess of Derby at Harefield, 1633; *Comus*, presented at Ludlow Castle before Lord Bridgewater in 1634,—the most exquisite dramatic poem the imagination of man ever conceived; *Lycidas*, 1637, an elegy on the death of a college companion, Edward King, containing passages of the tenderest pathos, here and there disclosing already the author's hostility to the spirit of the times.

On the death of his mother in 1637 M. went abroad, travelled for fifteen months in France and Italy, and returned by Geneva,—somewhat hurriedly because of the civil disturbances in England. He did not again take up residence with his father, but opened a school in London, first in St. Bride's Churchyard, afterwards in Aldersgate Street. The ensuing period of his life connects itself intimately with his country's struggles for freedom. He began soldiering with a sturdy attack on prelacy, entitled *Of Reformation, touching Church Discipline in England*, backed by other two pamphlets, *Of Prelatical Episcopacy*, and *The Reason of Church Government urged against Prelacy*. A knot of M.'s associates, under the name of Smectymnuus (formed by their initials), took up the cudgels; they were attacked by Bishop Hall; M. thereupon wound up the controversy for the time with *Animadversions upon the Remonstrant's Defence*, and finally with an *Apology against a Pamphlet called 'A Modest Confutation of the Animadversions upon the Remonstrant against Smectymnuus.'* In 1643 he married Mary, daughter of a Royalist called Powell in Oxfordshire; but the ignorant country girl quickly tired of a student for her husband, and ran home to her father's house, whence no entreaties could for a time recall her. At once making his private misfortune a matter of general principle, perhaps somewhat satisfied to have opportunity for broaching his matured though startling views, he printed four tracts on divorce: *The Doctrine and Discipline of Divorce restored to the good of both sexes from the bondage of Canon Law* (1644); *The Judgment of Martin Bucer touching Divorce* (translated extracts—1644); *Tetrachordon, or Expositions upon the four chief places in Scripture which treat of Marriage or Nullities in Marriage* (1645); and *Colasterion, a Reply to a Nameless*

Answer against the Doctrine and Discipline of Divorce (1645). In these he advocated moral incompatibility as ground for divorce. However, towards the close of 1645 his wife made peace with him. In 1644 he likewise wrote *On Education*, and his trumpet-toned *Areopagitica, or Speech for the Liberty of Unlicensed Printing*. In 1649 he defended the regicide of Charles I. in *The Tenure of Kings and Magistrates*, one of the ablest arguments ever penned in favour of the *jus populi;* upon the appearance of which and another tract—*Observations on Articles of Peace between the Earl of Ormond and the Irish Rebels*—he was appointed foreign secretary to the Council. He then removed to an official residence in Scotland Yard. There exist forty of his official Latin letters of this period. *Ikon Basilike* M. bitterly answered with *Ikonoklastes* (1649); and he silenced the *Defensio Regia pro Carolo Primo ad Carolum Secundum* of Salmasius with the crushing *Pro Populo Anglicano Defensio* (1651). In 1653 he became totally blind with gutta serena; and about the same time his wife died. Still he continued his duties as secretary under Cromwell, his dictated letters of this period numbering about eighty. In answer to strictures on his former Defence he produced *Defensio Secunda pro Populo Anglicano* (1654), followed by *Authoris pro se Defensio contra Alexandrum Morum, Ecclesiasten* (1655), and *Authoris ad Alexandri Mori Supplementum Responsio* (1655). The strictures were supposed to come from Alexander More, but Pierre Dumoulins really penned them. M.'s replies cannot be cleared from the charge of scurrility, but their effect was prodigious; they were translated into many languages, and became the talk of Europe. M. was married again in 1656 to Catherine, daughter of Captain Woodcock of Hackney; but in less than a year she died in childbirth. His writings of this period close with letters written for Richard Cromwell and the Parliament, and a few more tracts,—*A Treatise of Civil Power in Ecclesiastical Causes, Considerations touching the likeliest means to remove Hirelings out of the Church* (distinctly enunciating the Voluntary principle), *A Letter to a Friend concerning the Ruptures of the Commonwealth, The Ready and Easy Way to establish a Free Commonwealth, The Present Means and Brief Delineation of a Free Commonwealth*, and *Brief Notes upon a Late Sermon titled 'The Fear of God and the King.'* Thus for twenty years M. had produced nothing but polemics: seldom has a pen as mighty been so long devoted to strife; seldom have its triumphs at once been so immediate and so permanent. Stern and even fierce in his zeal for freedom, M., less a poet, might have proved a Cromwell.

In May 1660 Charles took the throne. M. remained in concealment till the passing of the Oblivion Act; and the cat's-paw parliament publicly burned his *Defence* and *Ikonoklastes*—the only honour these works had not yet attained. After his release he resided in Artillery Walk, and the unnatural conduct of his daughter induced him to marry Elizabeth, daughter of Mr. Minshull of Cheshire (February 1664). About the same time he published, or left in print, a school primer entitled *Accidence Commenc't Grammar, The History of Britain* (much of it written long before), *Artis Logicæ Plenior Institutio, Of True Religion, Epistolarum Familiarum Liber Unus, A Brief History of Moscovia and of other less-known Countries lying Eastward of Russia, Literæ Senatus Anglicani, Johannis Miltonis Angli de Doctrina Christiana ex Sacris duntaxat Libris petita Disquisitionum Libri Duo*. To these we have to add *Paradise Lost* (1667), *Paradise Regained* (1671), and *Samson Agonistes* (1671). *Paradise Lost* was sold on the 27th of April 1667, to Simmons the bookseller for £5, and a contingent payment of two other equal sums on the sale of 2600 copies—£15 in all, no doubt an extraordinary price for an epic then. At the end of two years 1300 copies had been sold. It cannot therefore be supposed that the intelligence of the age failed to appreciate what will stand for ever as its monument, 'the noblest work,' says Voltaire, surely no partial judge, 'which human imagination has ever attempted.' Of *Paradise Regained* (the plan of which was suggested to M. by his secretary, Ellwood the quaker), and *Samson Agonistes* it may truly be affirmed that, were there no *Paradise Lost*, they would stand unrivalled in modern literature for wealth of fancy and depth of inspiration.

Old, blind, gouty, M. was now 'much more admired abroad than at home.' His habitual gravity and austerity had become latterness; he held himself aloof from the profligate rabble around him: even by the learned was 'visited much more than he did desire.' It is not, perhaps, singular that he attended no church, but it is certainly strange that so devout a spirit observed no private worship in his house. The apology of Johnson that M.'s life was a perpetual act of worship is at once magnanimous and true. M. died November 8, 1674, and was buried in St. Giles' Church, Cripplegate. To make the list of his works complete, it should be mentioned that he edited two MSS. of Raleigh—*The Cabinet Council* (1658), and *Aphorisms of State* (1661). His treatise *De Doctrina Christiana* was discovered in the State Paper Office in 1823, and edited by Bishop Sumner two years later. A *Commonplace Book and a Latin Essay and Latin Verses, presumed* (on almost conclusive proofs) *to be by M.* were edited for the Camden Society from MSS. in the possession of Sir F. U. Graham, Bart., by Alfred J. Horwood (1876). There have been more than 150 editions of M. published. Concordances to his works have been prepared by Pendergrast (Madras, 1857–59) and Cleveland (Lond. 1867). See Masson's *Life of M.* (Macmillan, vols. i. ii. iii. 1858,–71,–73, vols. iv. and v. in the press, 1877), his accurate edition of M.'s Poetical Works (1874), and the highly interesting and thoroughly German work—*M. und seine Zeit*, by Stern (Leipzig, 1877, vols. i. and ii.—to be completed). *Paradise Lost* is published in facsimile of the original edition by Elliot Stock (1877).

Milwau'kee, the chief commercial city of Wisconsin, U.S., and a port of entry on the W. shore of Lake Michigan, 85 miles N. of Chicago by rail. It lies at the mouth of the river M., which is navigable 3 miles up for the largest lake vessels, and flows into M. Bay, a beautiful and sheltered inlet. M. is one of the largest primary wheat markets in the world, and the centre of 12 railways. In 1875, 340 vessels of 64,933 tons were enrolled at this port, and the elevators have a capacity of 3,800,000 bushels. In 1874 the direct exports to foreign countries of flour, grain, and provisions, amounted to $2,165,163. The total quantity of wheat despatched was 22,255,380 bushels; of corn, 556,563; of oats, 726,035; of barley, 464,837; of rye, 79,870; of flour, 2,217,579 barrels; of wool 3,165,125 lbs.; of tobacco, 6,100,410 lbs.; of butter, 4,102,836; of cheese, 2,631,175; of hops, 10,786 bales; and of iron, 6986 tons. M. has 18 iron works, employing 2280 men, 10 large flour mills, 15 tanneries, extensive breweries, &c. Another great industry is pork-packing, the live and dressed hogs packed in 1874–75 numbering 248,197. The city, which was a mere village of the Pottawattomie when visited by the first white settler in 1825, is now one of the most prosperous and elegant in the N.W. It has 28 newspapers, 10 of which are dailies. Pop. in 1840, 1750; in 1850, 20,000; in 1860, 45,286; in 1870, 71,499, and in 1875 (State census), 100,775.

Mime (Gr. *mimos*), a form of drama common to the Greeks and Romans, consisting of comic representations of life, often in extempore dialogue. The Greek M. appears first in Magna Græcia and Sicily, where it received its highest development from Sophron of Syracuse about 420 B.C. The Roman *Mimus* was of native growth, and, though consisting chiefly of mimic acting and low buffoonery, was more in favour than the regular drama. In the later period of the republic Mimes were introduced into the theatres, where they delighted Sulla and Julius Cæsar. Decius Laberius and Publius Syrus were then their most popular writers.

Mim'icry, the name applied to that condition whereby certain animals or plants exhibit a marvellous resemblance in form or colour to other animals or plants, or to inorganic substances As is well known, many animals (*e.g.*, flounders, partridges, woodcocks) closely approximate in colour to their surroundings. But we find more typical examples of M. in such cases as the Leaf Insects (q. v.), or stick insects (*Phasmidæ*), where the wings and bodies respectively exhibit the closest M. of leaves and dried twigs. Certain inodorous butterflies of S. America so closely resemble their strong-smelling neighbours of a widely different kind, that the most careful examination is required for the detection and separation of the two forms. Among plants many curious examples of M. occur. The Euphorbias of Africa and the Cactaceæ of S. America—two groups widely separated from each other—so closely resemble each other, type by type, that the practised botanist alone can detect the difference between them.

Mimo'sæ, a sub-order of the natural order *Leguminosæ*, numbering about 1000 species, chiefly belonging to the genera *Mimosa* and *Acacia* (q. v.). The true M. are almost all tropical. The greater number are American, a few extending southwards beyond the tropics; some species are natives of Africa and E. India, but they do not appear in Australia, where the *Acacia* is so abundant. Only a small number are in cultivation, and these principally for the curious sensitive property of their leaves. The pods of another genus called *Prosepis* supply a large quantity of tannin, and the fruit having been found highly serviceable in America for cattle feeding, has been officially recommended (1877) for cultivation in Australia and S. Africa for like purposes. See MEZQUITE and SENSITIVE PLANT.



Mimosa pudica.

Mim'ulus, a genus of herbaceous plants belonging to *Scrophulariaceæ*, numbering about 30 species, mostly American, with a few Australian and New Zealand. *M. luteus*—the monkey flower—a native of N. America, has now become naturalised in several parts of Britain. Many varieties of it have been raised, which have become garden favourites. The musk, so commonly grown as a window plant, is *M. moschatus*, a native of N.W. America. In the genus M. the stigma is bilabiate and irritable, the two lips collapsing together when touched with a sharp point.

Min'a, Lat. form of Gr. **Mna** (Heb. *maneh; cf.* Lat. *moneta*, and Eng. *money*), a Greek weight of 100 drachmæ, or 15 oz. 83·75 grs. It also meant a sum of money equal to 100 drachmæ, or £4, 1s. 3d.

Mina or **Mino Bird** (*Gracula musica*), a species of Indian conirostral *Insessores*, famous for its talking powers, and for its general vivacity and intelligence. It attains the size of a thrush, and is of a deep velvety black, with white wing-quills. Two bright yellow wattles spring from the back of the head. The bill is conical, and the upper mandible slightly curved.

Min'aret, or **Minar**, the tall, narrow turret, characteristic of Saracenic architecture. It is divided into stories by balconies, and contains a staircase inside. From the top the Mohammedan priests summon the faithful to prayer by the voice. Minarets are properly accompaniments of the mosque, one at each of the four corners of the main building; but in India are sometimes erected apart as pillars of victory—*e.g.*, the Kutub Minar at Delhi.

Minch, a channel off the W. coast of Scotland, some 30 miles in average breadth, separating the island of Lewes from the county of Ross and Cromarty. The Little M. is the channel, 15 miles broad, between the islands of N. Uist and Skye.

Min'cio, the *Mincius* of the Romans, a river of N. Italy, issues from the S. end of Lake Garda, flows S. and then S.E., till after a course of 38 miles it falls into the Po, 8 miles below Mantua, to which city it is navigable for barges.

Mind. The most popular and at the same time the most accurate and truly scientific definition of M. is—'not-matter.' This is altogether apart from any metaphysical questions as to whether either M. or matter is a substance existing by itself; or whether M. is something different from mental states; or whether M. is ultimately dependent on material conditions from which it differs in kind; or whether the destruction of M. is conceivable, and, if inconceivable, whether it may be safely denied. On any of these assumptions, there is a great class of conscious states which all agree in calling M. Such are pleasures, pains, volitions, thoughts; the whole internal subjective non-extended world as distinct from the extended objective world of matter presented in perception. In one sense, of course, matter is also M., because assuredly, whatever may be our theory as to the connection between the two, matter is known only as a mental modification. But the tendency of modern scientific thought is to regard subject and object as rather two sides or aspects of one inscrutable reality; and, of these, M. is the subjective or spiritual side; it may be only the psychical function of nervous organisation, or it may be a parallel and independent stream in pre-established harmony with the other. M. has been often divided into numerous faculties and powers, which represented the more or less hasty conclusions of thinkers with regard to what seemed ultimate and undecomposable mental facts. Such divisions (*e.g.*, that of Reid, into intellectual and active, sinking out of view, at least in name, the element of feeling) tend to conceal the fact that not only are complex operations of, *e.g.*, the intellect proper, the product of few and simple laws of intellectual changes, but they are also in their growth inextricably intertwined with the constant play of the other fundamental powers of the M., viz., feeling and will. The human M. must always be considered (at least in its higher processes) as one, and not many separate powers, though for the purposes of analysis it is necessary to distinguish and trace the separate action of the powers.

Mindana'o, the most southerly, and after Luzon the largest of the Philippine Islands. Area, 30,000 sq. miles. It is hilly and woody, of volcanic origin, and produces rice, cotton, spices, coal, gold, &c. Only parts stretching along the E. and N.E. coasts are occupied by the Spaniards, who number 74,000. The rest is in the possession of independent and savage tribes, greatly addicted to piracy.

Min'den, a strongly-fortified town in Prussia, province of Westphalia, on the left bank of the Weser, 40½ miles W. by S. of Hanover by rail. It has a stone bridge (1518) over the Weser 640 feet long, and a railway bridge of 6606 feet, 7 churches, among which the Domkirche (1072–1290) is the most conspicuous. There is considerable river traffic, and tobacco, leather, soap, and beet-sugar, are manufactured. At Todtenhausen, 3 miles N., Duke Ferdinand of Brunswick defeated the French under Contades, 1st August 1750. Pop. (1875) 17,088.

Mineral'ogy (Fr. *minéralogie*, from *minéral*, 'what is got by mining,' from *miner*, 'to mine,' and that from Lat. *minari*, 'to drive or toss about'), is that branch of geology which treats of the formation, composition, and classification of minerals. A mineral is generally defined as a substance not possessing organic vitality, but having a definite chemical composition, and usually a geometric form. Rocks are a collection of minerals, and hence upon a good knowledge of M. must a really true knowledge of geology depend. According to the above definition, minerals include not merely the numerous varieties of quartz, felspar, and the metallic ores, but also the metals and elements which are found native, and even water, naphtha, petroleum, &c., for these chemically compound liquids differ from the solids only in having different temperatures at which their physical changes of state occur. If our globe were a few degrees colder, we would have water in a solid condition, very much resembling in appearance ordinary rock salt. Minerals are distinguished from each other by (1) their physical properties, and (2) their chemical properties. The most important in the physical properties is the form in which a given mineral crystallises (see CRYSTALLOGRAPHY). Minerals are of course frequently found not crystallised; but even in their amorphous state they can often be readily distinguished by other physical tests—such, for instance, as their fusibility, and their behaviour under the blow-pipe. Their position in the scale of hardness (see HARDNESS) is another important test. Little aid in determining a mineral can, as a rule, be got from the colour, which depends much upon the presence of foreign substances. This should always be noted, however, as well as the lustre, streak, form of fracture, &c.; for they are very useful as auxiliaries to other and better tests. Chemistry supplies several valuable methods by which minerals may be distinguished from each other. The acid test, for instance, can at once settle the question as to whether a mineral is a carbonate or not, since the carbonates as a rule effervesce under the action of a strong acid. Blow-pipe analysis has now assumed a first

position in the determination of minerals, and the microscope has become an absolute necessity to the mineralogist. See Dana's *System of M.* (1837, new ed. 1868), and *Manual of M.* (1857, new ed. 1873).

Mineral Tallow or **Hatchettine** (in honour of the eminent chemist Hatchett), a rare native hydrocarbon (approximately carbon 85.5, hydrogen 14.5), resembling beeswax or spermaceti. It occurs in Wales, near Merthyr-Tydvil, near Loch Fyne in Scotland, and also in Moravia.

Mineral Waters, a term usually applied to all spring waters which contain an excess of mineral ingredients above what is usually found in ordinary drinking water. They have been used from the earliest times as remedial agents, both for internal use and for bathing, thermal waters being used in all countries, and even by savage races for the latter purpose. The Greek and Roman physicians had great faith in their curative virtues, and the temples erected to Æsculapius were usually in close proximity to mineral springs. To the Romans we are indebted for the discovery of the mineral thermic springs in Italy, and some of the most important in other parts of Europe. M. W. have been variously classified as to their chemical composition; but the classification adopted by Dr. Althaus is perhaps the most convenient:—(1) Alkaline Waters, (2) Bitter Waters, (3) Muriated Waters, (4) Earthy Waters, (5) Indifferent Thermal Waters, (6) Chalybeates, (7) Sulphurous Waters.

1. The Alkaline Waters are divisible into (*a*) *simple alkaline acidulous waters*, the chief ingredients being carbonic acid and bicarbonate of soda. The principal waters of this class are the thermal springs of Vichy and the cold springs of Fachingen, Geilnau, and Bilin, and they are used in cases of indigestion, biliary and renal calculi, gravel, gout, chronic bronchitis, and abdominal plethora. (*b*) *Muriated alkaline acidulous waters*, which contain a considerable quantity of chloride of sodium, such as the thermal springs of Ems and the cold springs of Selters, Luhatschovitz, and Salzbrunn. They are used in chronic catarrhal affections, and the Ems water has a reputation in chronic diseases of the uterus. (*c*) *Alkaline saline waters*, whose chief contents are sulphate and bicarbonate of soda, such as the warm springs of Karlsbad and the cold springs of Marienbad, useful in cases of abdominal plethora depending upon habitual constipation from sedentary occupations, and congestion of the liver.

2. The Bitter Waters contain the sulphates of magnesia and soda, and the most celebrated are those of Püllna, Saidschütz, Sedlitz, Friedrichshall, and Kissingen. They are useful as purgatives and diuretics when it is advisable to excite the action both of the bowels and kidneys. In England the bitter waters of Cherry Rock, in Gloucestershire, and of the Purton Spa, in Wiltshire, are used for similar purposes.

3. The Muriated Waters are divisible into: (*a*) *simple muriated waters*, containing a small quantity of chloride of sodium or common salt, such as the hot springs of Wiesbaden and Baden-Baden, the tepid springs of Soden in Nassau; of Mondorf at Luxemburg; and of Kanstatt near Stuttgart; and the cold springs of Kissingen, Homburg, and Cheltenham, useful in gout, rheumatism, scrofula, and abdominal plethora. (*b*) *Muriated lithic waters*, containing chlorides of sodium and lithia, such as Baden-Baden, Karlsbad, Franzensbad, Kissingen, and Weilbach, useful in gout and periodic headache. (*c*) *Brines*, containing a large amount of chloride of sodium, such as Rehme and Mannheim, useful for bathing. (*a*) *Iodo-bromated muriated waters*, containing chloride of sodium and the iodides and bromides of sodium and magnesium, useful in cases of scrofulous infiltrations of the glands, scrofulous ulcers, chronic inflammation of the uterus, ovaries, &c., and in cases of bronchocele or goitre. The waters of this class are very numerous, but Kreuznach is the most celebrated.

4. Earthy Waters contain the sulphate and carbonate of lime, the most important being those of Wildungen, Leuk, Bath, Lucca, and Pisa, useful in chronic skin diseases, scrofula, gout, rheumatism, chronic catarrh of the bladder, dysuria, prostatic disease, &c. The first of these (Wildungen) is largely exported, and is said to be an excellent diuretic, promoting the elimination of gravel and renal calculi.

5. Indifferent Thermal Waters, containing a small amount of saline constituents, such as Gastein, Töplitz, Willbad, Plombières, Warmbrunn, Clifton and Buxton, useful for stimulating the skin and exciting the nervous system.

6. Chalybeate Waters, divisible into (*a*) *simple acidulous chalybeates*, containing carbonic acid and bicarbonate of protoxide of iron; and (*b*) saline acidulous chalybeates, containing sulphate of soda and bicarbonate of protoxide of iron. The waters of this class are very numerous, and are useful in cases of debility, and anæmia, chlorosis, &c. Among others may be mentioned Alexandersbad, Auteuil, Bocklet, Kössen, Kronthol, Lippspringe, Soden, &c.

7. Sulphurous Waters, which contain sulphuretted hydrogen, or metallic sulphides, or both, useful in chronic diseases of the skin, gout, and rheumatism. The sulphurous waters are employed externally and internally. The principal thermal springs are those of Aix-la-Chapelle, Borcette, Baden, Baréges, Eaux-Chaudes, and Bagnères de Luchon; and the cold are Labassère, Nenndorf, Eilsen, &c. See *Spas of Europe* (Lond. 1862), by Dr. Althaus; *Dictionnaire Général des Eaux Minérales et d'Hydrologie Médicale*, by MM. Durand-Fardel, Le Bret, and Lefort.

Miner'va (Etruscan *Menrfa*, from the same root as *mens*, 'mind'), a virgin deity, worshipped by the Etruscans and Sabines, but especially at Rome, where she had ancient temples on the Capitoline, Aventine, and Cælian Hills. She was partly the goddess of courage and success in war, partly the impersonation of all intelligence and invention, and the tutelary deity of all handicrafts, arts, and sciences. Tarquin, son of Demaratus, joined her worship to that of Juno and Jupiter her father in a common temple, and she was said to have sometimes wielded the thunderbolts of Jove. The festival of M. lasted five days (from 19th to 23d March), and was called 'Quinquatrus.' Her image was preserved in the inmost recess of the temple of Vesta, and was believed to be one of the chief safeguards of Rome. Latterly M. was identified by the Romans with the Greek Athena. See Hartung, *Religion der Römer*.

Athênâ (in the Vedas, *Ahana* is the 'Dawn'), or *Pallas, Athênê*, called by Homer a daughter of Zeus, and in later traditions said to have sprung in full armour from the head of Zeus, was one of the chief divinities of the Greeks, and the tutelary deity of Athens. She was regarded as the protectress of the state and of all arts and inventions that were of avail for its defence and prosperity. Athena invented the plough, the rake, the trumpet, the chariot, navigation, numbers, created the olive-tree, taught men to use fire, oxen, horses, and all instruments of tillage. Her powerful intellect and wise counsel gave her a place on the right hand of Zeus. Athena maintained law and order, and instituted the Areiopagus; was warlike, not for the sake of war, but when prudence demanded it, and was the especial protectress of heroes. She was worshipped throughout Hellas. Athens early derived her cult from the ancient towns on Lake Copais. Her sacrifices consisted of bulls, rams, and cows. Her great festivals at Athens were the *Panathenæa* (q. v.) and the *Arrephoria*. In the latter two maidens in their 7th year carried the splendidly embroidered *peplos* of Athena in solemn procession. The three great statues of Athena by Phidias were held perfect. The first, of gold and ivory, and of colossal size, stood on the Acropolis; the second, of bronze, was made out of the spoils of Marathon; the third was called the 'Lemnian' or 'Beautiful Athena.' In the numerous representations of Athena she wears a figured helmet, an ægis, a sleeveless tunic partly covered with the *peplos* or cloak, and bears a round Argolic shield on which is the head of the Gorgon Medusa.

Minervi'no, a town of S. Italy, province of Bari, on a height overlooking an affluent of the Ofanto, 24 miles S.W. of Barletta. It has a considerable trade, and on account of its extensive views is called the 'balcony' of Apulia. Pop. (1874) 13,844.

Mines, Military, are subterranean passages used in modern warfare for depositing quantities of gunpowder for subsequent explosion. They were originally employed merely to furnish secret access to a fortified place, or to afford the means of undermining the walls. The besieged were not slow to follow the same device, and were often successful, not only in averting threatened danger to their walls, but also in damaging the battering-rams and war-engines of their foes. When the mines of hostile parties met, fierce subterranean encounters resulted. About two centuries after its discovery, gunpowder was first used in mining tactics by a Genoese engineer, who in 1487 unsuccessfully attempted to open a breach in the citadel of Sassano in Tuscany. Subsequent

attempts by Pedro Navarro, a Spanish captain, were more successful; and in the beginning of the 16th c. the excavation and firing of mines became general. The besieged were ultimately forced to run out *countermines*, from which a practised ear could readily tell the direction in which the enemy was working his mine, and could take measures to meet the threatened attack. The vertical portion of a mine is called a *shaft*, and the horizontal portion a *gallery*. The sides of a gallery must be lined—ordinarily with wooden frames or cases—to prevent the loose earth from falling in and filling up the passage. In driving a long gallery, means for ventilation must be carefully looked to; and the possibility of the powder becoming moist when deposited in the *chamber* must be guarded against. The powder may be fired by a safety fuse, a powder hose, or more preferably by an electric current. To prevent the explosion from spending its energy otherwise than is desired, the gallery leading from the chamber must be filled up from a certain distance with solid material. This operation is called tamping; and the most convenient materials for tamping are sand-bags, or bags containing loose earth or sand, which can be readily deposited or removed. The commotion caused by the explosion extends of course in all directions, and the distances at which the disturbance is felt are called the radii of rupture. The surface of the ground directly over the position of the exploded charge forms a more or less circular opening, called the crater; and the relation of the diameter of the centre to the vertical line from the chamber to the surface is a measure of the force of the explosion.

Minghetti, Cavaliere Marco, an Italian statesman, born at Bologna, September 8, 1818, educated in his native city, travelled in Italy, France, England, and Germany, and in 1846 founded a newspaper, *Il Felsineo*, advocating economic and political reform. In 1848 M. acted at Rome as Minister of Public Works, but in the same year entered the military service of the King of Sardinia, displaying great bravery in the unfortunate campaign which cost Charles Albert his crown. Under Cavour he served as Foreign Minister, in 1860 became Minister of the Interior; in 1863 President of the Council, and in 1868 ambassador in England. He was Prime Minister of the kingdom of Italy from 1873 to 1876. His chief works are *Della Economia Pubblica* (1859), and *Opusculi Letterari* (1872).

Min'ho (Sp. *Miño*), a river that rises in the N.E. of Galicia, Spain, flows in a S.W. direction, forms part of the N. boundary of Portugal, and enters the Atlantic at Caminha after a course of 130 miles, 20 of which are navigable. M. is the ancient Minius.

Min'iature Painting is a branch of fine art, embracing the production chiefly of portraits on a very small scale. The paintings were done in early times on vellum, but subsequently ivory was very extensively used. The term *miniature* is derived from the Latin *minium*, red lead, the connection being found in the fact that the art of M. P. developed from the practice of illuminating initial and other leading letters in ancient and mediæval MSS. with red lead and vermilion. The small figures introduced into such illuminations were by the Italians called *miniatura*, and hence when the practice of separately painting minute portraits arose, they were known by the same name. The development of the art of photography, and the perfection attained in the production of portraits by that means, have dealt a fatal blow to M. P. as a professional pursuit, and the art is now practised by very few. Many artists, *e.g.*, Holbein, Hilliard, the two Olivers, Cooper, and Hoskins, attained great eminence as miniature painters. The term miniature is now applied to any painting, drawing, or other object executed on a scale very much reduced from its ordinary proportions.

Minié Rifle. See RIFLED ARMS.

Mini'm (Fr. *minime*, Lat. *minimus*, 'the least') is the name of a small note in music equal to two crotchets.

Min'ims (*Fratres Minimi*, 'the *least* of all friars'), a religious order founded (1435) by St. Francis of Paula (q. v.), under the title 'Eremites of St. Francis,' and confirmed (1474) by Sixtus IV., and (1492) by Alexander VI., who changed its name to M. It spread into France in 1482, into Germany under Maximilian I., and under Ferdinand the Catholic into Spain, and in these three countries the M. were respectively known as *Bon-hommes*, *Pauliner*, and *Fratres de Victoria* (the conquest of Malaga being ascribed to their prayers). In Spain the first convent of nuns of the order was founded in 1495; in France, in 1621. The rule is based on that of the Franciscans, of whom the M. are regarded as a branch; but to the three vows of poverty, chastity, and obedience is added a fourth of perpetual fast (*vita quadragesimalis*). The superior is styled *Corrector*, and the habit consists of a tawny cassock, with hood, scapular, and leathern girdle.

Mi'ning is the method by which the wealth of the mineral kingdom is reached and secured for human use. All excavations made by man within the bowels of the earth, whether carried on with the view of obtaining mineral treasures or not, are called M., and in siege operations of war, military M. occupies a prominent place. (See MINES, MILITARY.) The industrial operations of M. are most largely concerned in obtaining the ores of metals and coal; but saline deposits, sulphur ores, precious and ornamental stones, and various non-metallic minerals are also of great importance in the range of M. pursuits. Quarrying may be regarded as a subdivision of M. concerned with obtaining stone for building and other purposes, entirely by means of open excavation. As the rock-masses that form the earth are divided into stratified and unstratified deposits, so also the mineral wealth they inclose is found arranged either in regular beds or strata, and in lodes or veins, irregular masses, and nodules, &c. As these distinctions of stratified and unstratified deposits give rise to two quite distinct classes of M. operations, they will be here separately noticed. From stratified rocks are principally obtained the varieties of coal, bituminous and alum-inous shale, and several of the most important iron ores. In veins, &c., are found the metallic minerals other than these iron ores, and the veins are chiefly disseminated in igneous and metamorphic, or so-called primitive rocks. Although in Great Britain especially, and generally also in other countries, the old reformations are richest in mineral wealth, neither carboniferous nor metallic minerals are confined to any particular series of rocks, but are found in the deposits of all periods, from the palæozoic to the most recent.

Coal M.—From the fact that coal is disposed in regular beds or layers in stratified rocks, its working is more simple and easy than is the case with irregular veins of metalliferous ores. The presence, position, and thickness of coal-seams in any field are first ascertained by means of borings. The first consideration in the winning of the coal is whether the seam is at such a depth as renders it practicable to drain the pit to be formed by means of a 'day level or gallery running from the lowest part of the pit into an open valley or watercourse at a height above the sea level. When this is impossible, as is now frequently the case, pumping machinery has to be provided sufficient to carry all the water which accumulates in the 'sump,' or lowest part of the pit to the height at which it can run freely away. Every coal pit must contain at least two shafts or openings to the surface of the earth, and these, when the seams are disposed in a nearly horizontal manner and at a considerable depth under the surface, are cut in a vertical direction through the superincumbent strata. But when the seams crop out to the surface, and dip downward in a basin-shaped field, the dip may be followed by one of the shafts, and the coal is sometimes pulled up the inclined plane of the strata. Through the main or engine shaft the coal is raised, and the colliers ascend and descend the pit, and in that shaft is also arranged the pumping machinery when such is required. The object of the second or bye shaft is to provide a means of egress to the miners should the main shaft be accidentally blocked, an occurrence which has sometimes caused enormous loss of life, and the bye shaft is also taken advantage of for ventilating the pit. The two shafts having been sunk to the seam to be worked, they are connected by a gallery or leading cut through the seam. The 'dip head level' is then run from each side of the bottom or engine shaft, it being a gallery cut in a perfectly horizontal or level direction along the seam, and forming the main line of communication from all parts of the workings to the engine shaft. The dip head level is the lowest part of the workings, the coal being worked from it upwards towards the outcrop or surface of the ground.

There are two principal methods by which the coal is worked, the one being known as the 'pillar and stall' or 'post and stall' plan, and the other is called the 'long wall' system. The pillar and stall system, which is that most commonly adopted, is shown

in plan in the accompanying figure (1), in which D is the main shaft, A B the dip head level, U the bye or ventilating shaft, and F a furnace for causing an inward draught of air through the shaft. The course of the current of air along the stalls or heads is indicated by arrows, and it will be observed that the direction of the current is controlled by doors placed across the passages.

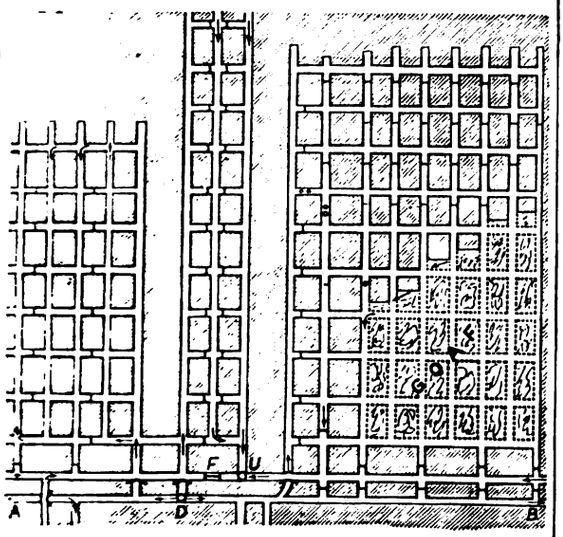


Fig. 1.

The dark shaded portion indicates the pillars of coal left to support the roof, and a portion of one panel is completely worked out. As the coal is removed from this portion, called the goaf, all supports are withdrawn by the colliers who work backward in the direction of the shaft, and the roof falls in as the work proceeds. In excavating by the long wall system, the whole of the coal is worked away at once, access to the face of the wall or working place being preserved by artificial supports of debris, coal, or wood. In some cases roadways are driven through the solid coal seam in different directions to the extremities of the workings, from which the miners work back-

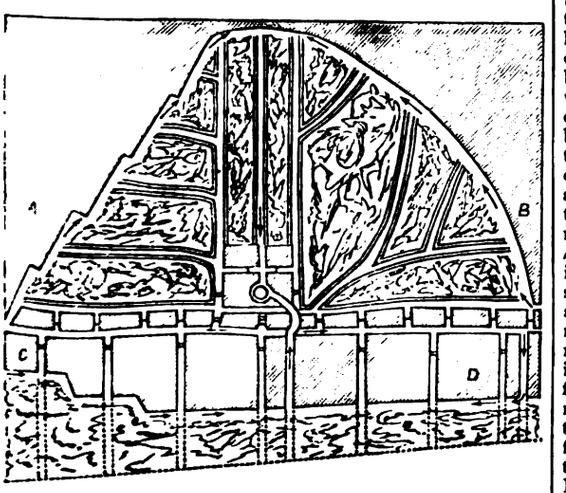


Fig. 2.

ward to the shaft, leaving nothing but goaf behind them. The long wall system is much more simple and economical than the pillar and stall, as almost every fragment of coal can by it be worked out. It is on that account coming gradually into favour with mining engineers, and is now adopted in many localities where pillar and stall working formerly prevailed. The diagram (fig. 2) illustrates the varieties of long-wall working, showing at A advancing stalls or tooth work by which the face of the coal is taken; at B the coal is worked on its end, and at C D the workings are carried in a straight line without regard to the cleat or grain of the coal.

The work of the collier has generally to be performed under unfavourable circumstances, and in a very constrained position. With his pick he undercuts the seam to a depth of two or three feet, working either in the coal itself or in the under clay. The mass is then detached either by driving wedges into the upper part of the seam, or, in pits free from fire-damp, by blasting. Machinery for cutting coal has been successfully introduced in recent years, one of the most successful devices being the Gartsherrie coal-cutting machine, worked by Messrs. W. Baird & Co. in their pits. The coal is loaded into small waggons or tubs, drawn to the main or engine shaft, and there raised to the pit head. In the prosecution of his arduous work the collier is subject to many serious risks, and the yearly average of fatal injuries in British coal mines alone exceeds one thousand. The most prolific causes of death are accidents from the fall of roof, from explosions of fire-damp, from breakages of rope and overwinding in the shaft, and from irruptions of water. The utmost precautions are taken for the prevention of such accidents by stringent regulations laid down by Act of Parliament and enforced by Government inspection, but nevertheless accidents involving great loss of life are still of frequent occurrence.

The deepest coal-pit in Great Britain is that at Dunkinfield in Cheshire, where coal is brought from a depth of 2504 feet below the surface, the engine shaft sinking vertically 2034 feet. The shaft of Sacree Madame Pit, near Charleroi in Belgium, is 2400 feet in depth. The expense of sinking some of the deeper shafts and of the engineering work of tubbing for keeping water out of the pits is often very great, from £80,000 to £100,000 having sometimes been expended before it became possible to commence the practical working out of the coal.

Metalliferous Mines.—The M. of clay band and black band iron ores which occur interstratified with coal in carboniferous deposits, is conducted under circumstances analogous to ordinary coal M. But ordinary metalliferous deposits which occur in veins or lodes are secured by a somewhat different series of processes. As the ore is in these disposed in all directions from horizontal to vertical, sometimes dwindling away into thin sheets, and sometimes expanding into huge masses, it cannot be attacked on any one plane. A main shaft is first sunk from the surface till it reaches the lode; from the shaft a series of horizontal galleries at regular distances from each other are run out, and between these galleries communication is established by means of minor shafts called winzes. In this manner the workings are carried out from the main shaft as far as it is deemed proper to go, and the direction and richness of the lodes being thus explored, the miner works back towards the centre, taking the rectangular blocks into which the mine has been divided in regular succession. These he may attack either from above or below, excavating in successive stages or steps, so that the work in progress has a stepped or stair-like aspect. In metalliferous mines a device called a 'man engine' (Ger. *fahrkunst*), is employed for taking the miners to or from the workings. It consists either of one or two rods extending from the surface to the bottom of the shaft, on which at regular intervals are fixed a staging or platform on which a man can stand. The rods have a reciprocating motion, and in the case of a two rod machine, supposing one rod is raised say 12 feet while the other is depressed a corresponding distance, by alternately stepping from the platform of the one to the other the miner can either raise or lower himself the distance of 12 feet at each stroke of the apparatus. With single rod machines acting through a definite distance, at which intervals a fixed staging is attached to the shafting, the same raising or lowering can be accomplished. For details regarding this important pursuit there may be consulted Smyth's *Coal and Coal M.* (Lond. 1867); *Cornwall, its Mines and Miners* (Lond. 1855); Simomin's *Underground Life*, trans. by Bristow; and the article M. in *Ure's Dictionary* (7th ed. Lond. 1875).

Law Regarding Mines.—The general rule of law is that the owner of the surface of land is the owner of all below it, but gold and silver mines belong to the Crown, and when these metals are found mixed with others, then the Crown may take them at a valuation, in accordance with a statute. When land is let for agricultural purposes, the tenant is not entitled to open a mine, unless there be a stipulation to that effect. So, when land is taken to make a railway over it, the owner may retain and work a mine, but by common law he must not work it so as to endanger the railway. In Scotland, by the statute of 1424, gold mines are declared to belong to the Crown, without limitation; and silver mines also when the value of three half-pence of silver can be extracted from the pound of lead.

Min'ister Plenipotentiary. See MINISTRY.

Min'istry in the political sense includes the chief officers of the Crown, who are selected from both Houses of Parliament, in order to carry on the executive government of the country. It was not until the Revolution of 1688 that the word began to take its present significance. 'Up to that time,' writes Mr. Freeman, 'the servants of the Crown had been servants of the Crown, each man in the personal discharge of his own office. The holder of each office owed faithful service to the Crown, and he was withal responsible to the law; but he stood in no official fellowship towards the holder of any other office. But William III. felt the necessity of having a committee harmoniously working together, the individual members of which should stand by each other, support the same measures, and work with unity of purpose. To these was gradually transferred the deliberations of all important questions relating to foreign and domestic policy before they were submitted to Parliament. The written law knows nothing of the Cabinet or Prime Minister; it knows them as members of one or the other House of Parliament, as privy councillors, as holders, each man in his own person, of certain offices; but as a collective body bound together by a common responsibility, the law never heard of them. But in the eye of the unwritten constitution the Prime Minister and the Cabinet of which he is the head, form the main features of our government.' It is, however, from the Privy Council that proclamations and warrants are signed and sent forth. A M. is formed by the sovereign calling upon a statesman, who has held office, to surround himself with colleagues whose ideas of policy accord with his own. It is dissolved by the House of Commons declining to pass a measure upon which the M. may have determined to stake their official existence. Neither can the sovereign keep a minister in office against the wishes of the House, nor remove him if he has their approval. It was not until the period of the Hanoverian dynasty that the king ceased to take a share in the deliberations of the Cabinet. A M. includes, besides the First Lord of the Treasury, who forms it, the Lord Chancellor, the Chancellor of the Exchequer, four Secretaries of State, the Secretary of War, the President of the Council, who are always members of the Cabinet, and the First Lord of the Admiralty, the Chief Secretary for Ireland, the Presidents of the Board of Trade and the Poor-Law Board, the Chancellor of the Duchy of Lancaster, who are not necessarily members but may be so. Other ministers are the Lord-Lieutenant of Ireland, the Attorneys-General and Solicitors-General for England and Ireland, the Lord-Advocate and Solicitor-General for Scotland, the Vice-Presidents of the Board of Trade and the Education Committee, the Commander-in-Chief, the Lord Chamberlain, the Masters of the Horse and Buckhounds, the Steward and Comptroller of the Household. In diplomacy there are three orders of ministers, the highest being ambassadors, who completely represent their sovereign in the countries to which they are accredited. Ministers plenipotentiary, though they guard the interests of their countrymen, have a smaller representative power, and the third class, including the *chargés d'affaires*, though they discharge similar duties with the second, are not entitled to the same amount of ceremonial. See Macaulay's *History* (vol. iv.), and Freeman's *Growth of the English Constitution* (1872).

Min'ium. See LEAD.

Mink. See WEASEL.

Minneap'olis, a city of Minnesota, U.S., on both sides of the Mississippi, at the Falls of St. Anthony, 8 miles N.W. of St. Paul by rail, and 3 from the celebrated Falls of Minnehaha ('laughing water'). It is the seat of M. University and of Hamline University, now (1876) being erected by the Methodists, and has 48 churches, 18 large saw-mills, 18 flour-mills, extensive machine shops, &c. Settled in 1849, it was joined with the city of St. Anthony, on the E. bank, in 1872. Pop. (1876) 32,000.

Minn'esinger, or **Minn'esänger**, the name by which 160 German lyric poets of the 12th and 13th centuries are known. Soon after their first appearance in Upper Austria, the character of their poetry seems much modified by a French influence then diffused over the Rhine-lands. As they chiefly sang of love (*minne*), the whole literature took the name of *Minnegesang*. Its later form originated in the district around the Maas, where chivalry was at its greatest height. The French influence was especially marked in the structure of the verse. The three chief forms were: (1) 'Lieder,' series of tripartite strophes, sung to the same melody, and sometimes accompanied with dancing, their subjects being either erotic, sacred, or eulogistic of lords and princes; (2) 'Leiche,' bipartite strophes of various melody, usually accompanied with dancing, except when the subjects were religious; (3) 'Sprüche,' in verses often of irregular form, whose usual subject was 'Gottes-und-Herrendienst,' and which were only meant for recitation. The 'Tagweise' or 'Tagliet' celebrated the sad parting of two lovers at the dawn of day. In richness of form, and glow of passion, the 'Minnegesang' stands very high. It demanded great artistic culture, and was chiefly cultivated by the sons of the lower nobility, who were taught music and poetry by the clergy. It was not, however, till its latest period that the art of the M. became an accomplishment; from a 'Meister' was expected originality of thought and form. The poems were sung by the poet himself to his harp; from him wandering minstrels learnt them; these were the first to write down and collect them; the older poets, *e.g.*, Wolfram v. Eschenbach, could not even write. In the 13th c. the number of M. immensely increased; they flourished especially in Swabia and Thuringia, but were found at all German courts. The greatest names of the greatest period were Heinrich v. Veldecke, Reinmar v. Hagenau, Walther v. d. Vogelweide, Hartmann v. Aue, Gottfried v. Strassburg, Wolfram v. Eschenbach, and Ulrich v. Liechtenstein. Reinmar v. Zweter, a Rhinelander, from 1230 to 1260, treated subjects chiefly of a personal and public character, but his prosaic tendency shows the spirit of decline. Konrad v. Würtzburg holds a higher place, especially for his narrative poems, and Reidhart (1210–40) introduced a fresh humour into his pictures of popular life. About the close of the 13th c. the spirit of chivalry grew ruder, and gradually the *minne* poetry lost itself in the mechanical spiritlessness of the Meistersinger (q. v.). See Von der Hagen, *Minnesänger* (4 vols. 1838); Lachmann and Haupt, *Des Minnesangs Frühling* (1857); Taylor, *Lays of the M.* (Lond. 1825); A. E. Kroeger, *The M. of Germany* (Lond. 1873).

Minneso'ta, one of the N.W. states of the American Union, is bounded N. by the Dominion of Canada, S. by Iowa, E. by Wisconsin and Lake Superior, and W. by Dakota, from which it is partly separated by the Red River. Area, 85,531 sq. miles; pop. (1875) 609,777, including 12,370 tribal Indians. M. is 380 miles long from N. to S., and its greatest breadth is 337 miles. It is traversed in the N. by a range of flat drift-hills (the 'divide' between rivers flowing to Hudson's Bay and the Gulf of Mexico), 1680 feet above the sea, but nowhere more than 100 feet above the surrounding country, which to the extent of three-fourths is rolling prairie, interspersed with oak-openings and belts of hardwood timber, and dotted with numberless small lakes, covering $\frac{1}{15}$th of the whole area. The chief rivers are the Mississippi and its affluent the M. (from which the state is named), the Red River of the N. and the St. Louis. The first of these is navigable within the state for 540 miles. Towards Lake Superior there is a rich mineral tract, especially plentiful in iron and copper, while in the Red River Valley, and at Belle Plaine on M. River, the manufacture of salt has attained great success. Other products are gold and silver (in moderately paying quantities), lime, slate, tripoli, building-stone, peat, &c. The prevailing metamorphic and volcanic rocks are in great part covered by a fertile alluvium, which is admirably adapted in the N. to wheat-culture and grazing. About one-third of the entire surface is under dense forests of oak, beech, elm, maple, pine, spruce, &c. The vast encroachments of the lumber trade have been

compensated by the planting already of some 20,000,000 forest-trees on the prairies. The climate is remarkably healthy and bracing, the mean summer temperature being 70·50°, while that of winter is 16·10°. M. is one of the great wheat-growing States, and has now an area of 2,622,324 acres in grain crops alone. In 1875 the yield of wheat was 31,475,000 bushels; of oats, 15,775,000; of corn, 9,500,000; of barley, 1,585,000; of rye, 70,000; and of buckwheat, 31,500. The growth of potatoes was 3,250,000 bushels, of flax, 1,227,547 lbs., and of tobacco, 28,324. In 1875, M. had 167,313 horses, 467,578 cattle, 5257 mules and asses, 162,807 sheep, and 141,810 hogs. Five million bushels of the wheat are made into flour by the mills of the State, and M. flour retains the first rank. Besides flour-milling the other great industry is lumbering, the lumber produced in 1874 being 421,000,000 feet, value $5,500,000. In 1875 there were in M. 2227 miles of railway. St. Paul is the capital, and other towns are Minneapolis and Winona. The French missionaries found their way hither in 1680. The real work of settlement did not begin till 1805, and M. was only organised as a Territory in 1849. Its subsequent development was singularly rapid, and it was made a State in 1858.—**M. River** rises in Big Stone Lake, on the E. boundary of Dakota, flows first S.E., and then N.E. through the 'Big Woods' in the State to which it gives name, joining the Mississippi 5 miles above St. Paul, after a course of 470 miles, of which 300 miles are navigable during high water.

Minn'ow (*Leuciscus phoxinus*), a small species of Teleostean fishes belonging to the *Cyprinidæ* or Carp family, and allied to the Dace (q. v.), Chub (q. v.), and other fishes. It inhabits streams and rivers, and is usually found in clear water. The M. may attain a length of 3 inches, but is usually much smaller. The upper surface is of a dirty grey or olive colour, the under parts being silvery white. The M. is a favourite bait for pike and perch.

Mi'nor, in Law. See AGE.

Minor (Music). See INTERVAL, MODE, SCALE.

Minor'ca, the second largest of the Balearic Isles, lies 25 miles N.E. of Majorca, in the Mediterranean. Area 335 sq. miles; pop. 39,005. Its coast is much indented, especially in the N., and the surface is hilly, rising in El Toro to a height of 4793 feet. Less fertile than Majorca, it produces oil, wine, hemp, zilla, wheat, barley, and fruits. The main industry is the making of boots and shoes for Cuba. Coals are imported directly from Great Britain for a cotton-factory and the steamship company, but in 1875 only three vessels entered the ports, with cargoes worth £1352. Mahon (q. v.) is the capital, and another chief port is Ciudadela. In recent years a large number of the inhabitants have emigrated to Algeria to avoid conscription and the oppressive taxes.

Min'orites. See FRANCISCANS, ORDER OF.

Mi'nos, a mythical king of Crete, son of Zeus and Europa, brother of Rhadamanthus and Sarpedon, and father of Ariadne (q. v.), who after death was made, with Æacus and Rhadamanthus, judge of the lower world. Legends later than Homer and Hesiod speak of another M., his grandson, and the husband of Pasiphae, who was killed by King Cocalus in Sicily, whither he had pursued Dædalus (q. v.). He was the lawgiver of Crete, and the first Greek who established a considerable naval power.

Min'otaur (Gr. 'bull of Minos'), in Greek mythology the monstrous offspring of Pasiphae, wife of Minos, and a bull, with a passion for which Aphrodite had inspired her. The M. was half man half bull, and was inclosed by Minos in the famous Labyrinth (q. v.) at Cnossus, where he fed on the youths and maidens yearly sent as a tribute by the Athenians, till slain by Theseus with the help of Ariadne (q. v.).

Minsk, a government of W. Russia, is bounded N. by Vitebsk and Vilna, S. by Volynien, W. by Grodno, and E. by Mohilev. Area, 35,254 sq. miles; pop. (1870) 1,135,588, of whom 185,000 are Poles, 97,000 Jews, and 3000 Tartars. M. is watered by the Pripet and Beresina, affluents of the Dnieper, and is to the extent of three-eighths under forest and one-third pasture and meadow. Swamps, mostly in the S., cover 2204 sq. miles, and give rise to various diseases, including Plica Polonica.—**M.**, the capital, lies on the Swislocz, a branch of the Beresina, and on the Warsaw and Moscow Railway. It is the seat of a Greek archbishop and of a Roman bishop, and has 14 churches, a theatre, and a large corn trade. Pop. (1870) 35,563.

Min'ster (the Old Eng. form of the Low Lat. *monasterium*) properly denotes the church of a monastery, but is sometimes applied to a cathedral, *e.g.*, to that of Canterbury by Robert of Gloucester. 'York Minster' is a familiar instance in the present day. Similarly, in Southern Germany, the *münster* of Strassburg, Basel, and Bern correspond to the *domkirchen* of Erfurt and Brunswick.

Mint (Old Eng. *minte*, Dut. *munte*, Lat. *mentha*, Gr. *mintha*), a genus of strong-scented perennial herbs, with creeping underground rootstocks, belonging to the natural order *Labiatæ*, and chiefly natives of N. temperate regions, though some are Australian. The species are very difficult to determine, and vary in number from 30 to 100, according to the discriminative power of the describer. Some are common in Britain, *e.g.*, *M. aquatica* and *M. arvensis*, and among those of rarer occurrence are three of the most important as regards their uses, namely, Peppermint (*M. Piperita*), Penny-royal (*M. pulegium*), and Spearmint (*M. viridis*), but it is doubtful whether this last is really a native. Peppermint is extensively cultivated for the sake of its volatile oil, which is procured by distilling the leaves. The oil and the preparations made from it are largely used as aromatics, carminatives, and stimulants, and are especially useful in the alleviation of nausea, griping pains, and flatulence. Owing to its powerful taste, peppermint in some shape or other is frequently used to conceal the nauseous taste of medicine. A kind of liqueur is also prepared from it. The taste of *M. pulegium* is very peculiar, and to most people objectionable; its properties are similar to those of other mints, but in former times the plant had special virtues assigned to it, hence it is still employed as a domestic remedy in female complaints. *M. viridis* is the plant used for culinary purposes under the name of M. It possesses the properties of peppermint, but in a less degree.

Mint (Old Eng. *mynet*, from Lat. *monēta*, a surname of Juno, in whose temple at Rome money was coined), the place where coining or the processes employed in the manufacture of money is conducted. A coin may be defined as a piece of precious metal, impressed with a State device or mark, as a guarantee of its value and weight. British silver and bronze monies are merely tokens having a nominal value, and are issued simply for convenience in conducting petty business transactions. The early history of the coinage, and of the constitution of the M. in Britain is involved in obscurity. The Old English had silver and copper coins, but after the Norman Conquest the latter fell into disuse. There was no national gold coinage till the reign of Edward III., and the money then made consisted only of silver pieces of low value. Many foreign gold coins were, however, in circulation. In exchanging large sums it was customary to reckon by *weight* of bullion, while small sums were exchanged by means of the silver currency. Subsequently, and before the time of Henry VIII., gold and silver coins of different denominations were gradually introduced, and by the period of the Restoration coins of gold and silver were very numerous, those of the latter metal being made of much higher value than formerly. Since then the varieties of coins have numerically decreased, and gold has been established by law as the only standard.

It would appear that in Old English times, the *myneteras* ('minters' or 'moneyers') formed part of the retinue of the king, and journeyed with him, striking money, when required, at his command. Gradually, however, as the amount of work increased, permanent mints were established in the chief towns. In Stephen's reign certain bishops, barons, and monasteries were privileged to coin money. Malpractices among the moneyers in issuing debased coinage were frequent, and were visited with exemplary punishment. Relative to these frauds, an official, named the *gerêfa* (later *reeve*), is alluded to in Old English laws, and it is supposed that he was the responsible head of the M. at the time. Ruding observes that the London M. did not receive its full constitution of superior officers till the eighteenth year of the reign of Edward II., when a comptroller was appointed as a check upon the warden and master. The moneyers were always a privileged class, enjoying exemption from certain taxes and public duties.

The Royal M., where the current coins of the United Kingdom and several of the colonies are struck, is situated at Tower Hill, London. At present (1877) its removal to the Thames Embankment is contemplated. In 1837, a Parliamentary Select Committee took evidence on the manner of conducting the business of the M., and in consequence of their report several important changes were made in its constitution. In 1851 the Royal M. became a governmental department, subject to the Treasury, and the practice of allowing contractors, or moneyers, to conduct the coinage was abolished. The remunerative office of Master of the M., of late years occupied by men of high scientific attainments, was abolished on the death of the late Master in 1869, and the nominal Master and Worker is now the Chancellor of the Exchequer. By Act 33 Vict., any person or importer may, under specified conditions, have gold bullion coined free of charge at the M., but since the Bank of England is bound by Act 7 and 8 Vict. to purchase bullion, previously weighed and assayed, at the rate of £3, 17s. 9d. per oz. of standard gold, it practically is the only importer. After coining, the Bank of England receives the gold at the M. price of £3, 17s. 10½d. per oz., whereby the Bank makes a profit of about £2000 on each million. The M. purchases silver for itself at the lowest market price. Act 56 Geo. III., ratified by Act 33 Vict., provides that the pound weight troy of standard gold contains 22 carats fine gold and 2 carats of alloy (copper), and that standard silver be of the fineness of 11 oz. 2 pennyweights of fine silver and 18 pennyweights of alloy in every pound weight troy; and it is further enacted that 20 pounds weight troy of standard gold be coined into 934·5 sovereigns, and that 66 shillings be coined out of every pound troy of standard silver. While gold coin is thus issued at nearly the market value of bullion, a profit or *seigniorage* accrues to the M. from the silver coinage, for a shilling is intrinsically only worth about 10¾d. This profit enables the M. to issue new silver coins for worn and light ones. All fees and profits of the M. are paid into the Exchequer.

Coining.—The processes pursued in coining silver and bronze, as compared with gold, differ so very slightly in detail, that it is only necessary here to trace the course of the latter. At stated times the Bank of England sends 'importations' of gold in the form of ingots, each of 180 oz. weight, and previously assayed, to the M. The ingots are there weighed and assayed, and the proportion of copper alloy or fine gold required to bring them to the fineness of standard gold determined. The ingots, with the ascertained alloy, are then melted and cast into bars. The plumbago crucibles, or melting-pots hold each a charge of 1200 oz., which fills four moulds. The bars formed in the moulds are removed and quenched with water, and from each bar two pieces are cut off for assay. If the assay prove satisfactory, the sovereign bars, measuring 24 inches long, 1·375 inches wide, and 1 inch thick, pass, after being weighed, to the *rolling-mill*, which reduces them to fillets 6 or 8 feet long. After the hollow ends are cut off, each fillet is formed into lengths of 18 inches, which are annealed in copper tubes, and then plunged into cold water. The fillets are further reduced in thickness by rolling, and on issuing from the *gauging-mill* they measure 1·829 inches wide and ·053 inches thick. At this stage a blank is now and again punched out of a fillet for comparison with a standard weight, a variation of half a grain only being allowed. Two inches of one end of each fillet are next pressed thinner, to the extent of one-third, in a *flatting-mill*, and after the whole length has been re-passed through the rolling-mill, the *flatted* end is introduced between two fixed cylinders in the *draw-bench*. The flatted part is there seized hold of by a 'dog,' which travels with an endless chain, and draws the whole fillet through the cylinders, to reduce it to a uniform thickness. The fillets are previously smeared with oil to prevent the excessive heat, developed by friction, destroying the surface of the fillet. On leaving the draw-bench the fillets are divided into four lengths, and from each a test-blank is stamped and weighed. The fillets, freed from oil, are then taken to the screw-cutting presses to be cut into blanks. The perforated metal is called *scissel* (Lat. *scindo*, 'I cut'), and returns to the melting-pot. The blanks then pass on to the weighing-room, where they are separated into 'heavy,' 'light,' and 'medium,' by marvellous automaton weighing-machines invented by Mr. Cotton and improved by Mr. Pilcher of the Royal M. These machines weigh at the rate of 23 blanks a minute, and indicate variations of $\frac{1}{1000}$th of a grain. As already mentioned, the law demands that 934½ sovereigns be taken out of 20 pounds troy weight of gold, which gives the weight of a sovereign as 123·2744 grains. Notwithstanding that the fillets are rolled and cut with mathematical exactness, the blanks are found to differ in weight. The law recognises the fact, and allows a *remedy* (from Lat. *ad remedium*) which is fixed by the Coinage Act of 1870 at two-tenths of a grain for the sovereign, and one-tenth of a grain for the half-sovereign over or under the standard weight. The medium blanks alone reach the coining-press, the others are re-melted. In a *marking-machine* or *edge-compresser*, the edges of the blanks are thickened by reducing the diameter. The raised edge affords a protection to the image and superscription to be afterwards added. After *annealing*, and *blanching* or brightening in boiling dilute sulphuric acid, the blanks are converted into coins in the screw *coining-press*. The obverse and reverse devices on the coins are obtained from the upper and lower dies (see DIE-SINKING), together with the *crenated* or *milled* edge from the collar, at one descent of the press. The perfect coins are put up into bags containing 701 sovereigns (180 oz.), and the weight and assays of several coins being tested, the Bank of England in due course receives the coinage.

English gold coins are legal tender to any amount, silver to 40s., and bronze to 1s. Bronze money (composed of copper 95, tin 4, and zinc 1, in 100 parts) is very much depreciated in value, and is struck principally at Birmingham, by Messrs. Heaton, under contract with the M. At a weight of 122·50 grains, or ·774 grain below the theoretical standard, current sovereigns reach the limit of 20s. value, and half-sovereigns cease to be legal tender for 10s. below 61·125 grains. On the return of worn gold coins to the M. a deduction is made for loss of weight below the legalised limits.

The coinage of the Royal M. for five years ending 1875 was as follows:—

	Gold.	Silver.	Bronze.
1871	£9,919,656	£701,514	£7,616
1872	15,261,442	1,243,836	47,413
1873	3,384,568	1,081,674	46,218
1874	1,461,565	890,604	65,632
1875	243,264	594,000	69,813

See Ruding, *Annals of the Coinage of Great Britain* (Lond. 1840), and G. F. Ansell, *The Royal M.* (3d ed. 1875).

Min'uet (Fr. *menuet*, from Lat. *minor*), the name of a slow, graceful dance. It is named from the *short* steps used in the dance. Properly, M. is the name of the music or air.

Min'ute, in Horology, is the 60th part of an hour; and in angular measurement is the 60th part of a degree. In architecture, it is the 60th part of the shaft of the column.

Minute is the name given to a draft of the procedure of any meeting, and is so called from its having been taken down *briefly*, with a view to its afterwards being *engrossed* or enlarged. In Scotch law a M. is a memorandum or record of some act of a court, or of contending parties.

Mi'ocene (Gr. 'less recent') is the name given in geology by Lyell to the Middle Tertiary formations, coming between the Eocene and Pliocene. About 25 per cent. of its fossils are represented in living species. In Britain the M. is very poorly developed, and only in limited localities, Dartmoor in Devon, and Mull, off the W. of Scotland. On the Continent, all over Central Europe, there is an enormous development. It is divided into three well-marked subdivisions—the *Lower*, *Middle*, and *Upper*. The *Lower* is entirely a freshwater deposit, and consists of coarse conglomerates and sandstone. It is well developed in Switzerland (Molasse deposits), Croatia, Fontainebleau, Auvergne, and all through Germany; and its flora presents distinct subtropical characteristics. The *Middle* is somewhat marine, but has the same land-plants as the lower. It is very typical in Touraine, and also occurs in Switzerland, Madeira, Canary Islands, and the United States. The *Upper* consists of thin laminated marine marls and limestones, rich in fossil remains. 500 plants and 840 insects have been described by Heer from the Upper Molasse deposits of Switzerland. Its

flora strongly resembles the American types; and fishes and reptiles abound. The first fossil fox is here found, with remains of the Dinotherium and Mastodon. The sub-tropical climatic conditions, which the M. deposits imply, seem to have extended up to the 70th latitude, embracing the Faroe Islands, Iceland, and Greenland.

Mir'abeau is the name of a family that during the 13th c. emigrated to France from Florence, and subsequently obtained the marquisate of M. in Provençe. The one who has given it an undying interest is the great revolutionary orator, **Gabriel Honoré de Riquetti, Comte de M.**, son of Victor Riquetti, Marquis de M., who was born at Bignon, near Nemours, March 9, 1749, and came into the world a prodigy of size and ugliness. At the age of three his ugliness was increased by smallpox. The child was impish in habits as well as looks, exhibiting such terrific activity in mind and body that his father—rather heedlessly, for he was corresponding with the uncle—likens him to 'a nephew of the devil.' No child had probably a worse upbringing. Victor Riquetti was a domestic tyrant of the maddest kind, who wrote philanthropic and economic pamphlets, and called himself *L'Ami des Hommes*, but who treated his wife and children with unspeakable cruelty. In the course of his life he caused to be issued against them no fewer than fifty-four *lêtres de cachet*. M. was placed under a succession of tutors who could not manage him; he was then entered in the Bern regiment of the Marquis de Lambert, and henceforth his career till the outbreak of the Revolution is a miserable record of vicious indulgence, varied by imprisonment, attacks of disease, and the production of literary essays. Most of these are necessarily valueless, for M. was not in any sense a scholar or a student; but his *Traité de la Mythologie*, *Traité de la Langue Française*, *Essai de la Littérature Ancienne et Moderne*, may still possess an interest as the work of a man whose name cannot be forgotten in the history of France. His *La Monarchie Prussienne sous le Frédéric le Grand* (1788), and *Histoire Secrète de la Cour de Berlin* (1789), are the result of a temporary refuge in Prussia. But it was not till 1789 that the passionate and powerful genius of M. found fit expression. Rejected by the nobles of Provençe as their representative, he suddenly denounced the order as 'in all countries and in all ages the enemies of the people,' and threatened them with the vengeance of another Marius. Elected by the Third Estate as *deputé* for Aix and Marseille, the moment he appeared in the Assembly he took the foremost place by the fire and thunder of his eloquence. On the memorable 23d of June, when De Brézé entered the Assembly with the king's orders for them to depart, M. bellowed through the tempest of voices: 'Go, tell those who sent you that we are here by the will of the nation, and that nothing but the force of bayonets can drive us hence!' Yet he detested the mere anarchy of mobs, and to prevent insurrection instituted (8th July 1789) the National Guard. Gradually the Court drew towards him in its feebleness and despair, and the brief remainder of his life was spent in an effort, hopeless indeed, but carried on with dauntless resolution and indomitable will, to restrain the ever-increasing madness of the Revolution, and to force upon the nation some form of constitutional life and some wreck of royalty. It is a striking tribute to the greatness of his character and the splendour of his eloquence, that, without allies and without followers, he ruled imperiously the fiercest and most lawless Assembly that has ever met in the history of mankind. On the 1st of February 1791 he took his place as President of Assembly; but the excesses of passion had consumed him; for a few weeks he struggled on, his spirit aflame, his body a mass of corruption, till the 27th March, when, after speaking five times, he left the Assembly for ever. He died on the 2d of April. His numerous works are most completely collected in the edition of 1825–27, 9 vols. The best book upon M. is Dumont's *Souvenirs sur M.* (Par. 1832). See also *Mémoires Biographiques*, &c., edited by Lucas de Montigny (8 vols. Par. 1834); Vermorel's *M., sa Vie, ses Opinions, ses Discours* (5 vols. Par. 1864); and Reynaud's *M. et la Constituente* (Par. 1872).

Mir'acle (Lat. 'something wonderful') is a name which has been used in a very loose sense for 'anything wonderful, anything for which the proximate cause could not be discovered, and anything in which divine agency was specially indicated.' More strictly it is defined as 'an event in the external world brought about by the immediate efficiency or simple volition of God.' According to Christian teaching generally, a miracle is 'an incident accomplished in opposition to the laws of nature, in the name and by the interposition of the Deity, who thus manifests his will to humanity, and particularly for the purpose of establishing the truth of a doctrine' (*cf.* Matt. ix. 2–8; John xi. 15, 42, 45). The principal question connected with miracles is their value as a proof of a divine revelation. It has been maintained, on the one hand, that miracles are the only satisfactory evidence of a divine revelation; on the other, that they are neither necessary nor available, because, 'as faith must be founded on the truth as truth, it is impossible that any amount of external evidence can produce faith, or enable us to see that to be true which we could not so apprehend without it.' The view held by the more moderate theologians is that the evidence of miracles is important and decisive, but at the same time subordinate and inferior to that of the truth itself; in other words, that 'the point which miracles are designed to prove is not so much the truth of the doctrine taught as the divine mission of the teacher.' (1) It is held to be a sufficient proof of the validity and importance of miracles as seals of a divine mission, that as a fact God has confirmed his revelations by them. (2) The sacred writers appealed to miracles as proofs that their message was from God. Thus, in the Acts of the Apostles it is stated that the testimony of the apostles was confirmed by divers wonders and miraculous gifts, and that Christ himself was approved by miracles, and wonders, and signs (Acts ii. 22, 43, &c.). (3) Christ constantly appealed to his miracles as a proof of his divine mission (*cf.* John v. 20, 36; x. 25, &c.).

The objections which have been urged against miracles are legion. 1. It is objected that they, as generally defined, 'involve a suspension, or alteration, or violation of the laws of nature,' which laws are absolutely immutable, so that miracles are impossible. 2. With others the objection goes farther back, and the possibility of miracles is denied by (1) Pantheists, who affirm that there is no distinction between natural and supernatural events; (2) by those who hold that miracles, as supposing separate individual acts of the divine will, are inconsistent with the nature of an absolute Being; and (3) by those who hold that 'if God interfere in the natural order of events which are produced by causes which he has ordained, it can only be on account of the imperfection of his work.' 3. Again it is objected that it is impossible to know when an event is miraculous or when it is due to natural causes, since we have not a perfect knowledge of the power of such causes, and more especially as according to the Bible 'lying wonders have been wrought by evil spirits, through the medium of magicians and false prophets' (Exod. vii. 11, 12, 22, viii. 7; Deut. xiii. 1, 2; Matt. xxiv. 24), which are real miracles in the sense of not being due to natural causes. 4. One of the most formidable objections is Hume's famous one, that no human evidence is sufficient to establish the occurrence of a miracle, since, according to our twofold experience, it is more probable that the witnesses should be mistaken than that the course of nature should have been violated.

An important question connected with the belief in miracles is the time when miraculous powers ceased to be granted to men. According to the Acts of the Apostles, after our Lord's ascension, they were poured out on the Apostles. The continuance of those powers in the primitive church is alleged by divines of all churches as a proof of the divinity of the Christian doctrines. The most prevailing opinion among Protestant writers is that they ceased at the beginning of the 4th c., being withdrawn, as no longer needed, when Christianity was established in the Roman Empire (325). According to other writers, who give copious 'proof' of their statements, they were continued to the 5th c., to the 6th c., and to the Reformation. That they have been continued to the present day is maintained and believed to be proved by the most respectable testimony in the Roman Catholic Church. See Middleton's *Inquiry into the Miraculous Powers, &c.* (Works, 1755), Babbage's *Bridgewater Treatise* (1838), *Essays and Reviews* (Lond. 1861), Mozley's *Bampton Lectures* (1865), Hodge's *Syst. Theol.* (Edinb. 1873).

Miracle Plays. See MYSTERIES, MIRACLE PLAYS AND MORALITIES.

Mirage' (Fr., 'something seen as *in a mirror*') is a peculiar optical phenomenon, occasioned by certain atmos-

pheric conditions. It is very often seen by travellers in the heated sand plains of Lower Egypt, and by mariners in high latitudes. In the former cases the air close to the strongly heated ground is rarefied so as to become less dense than the higher strata. The great tranquillity of the atmosphere permits this state of things to continue for some time, and consequently rays of light in passing down through the lower strata of air, which are becoming less and less dense the nearer they are to the ground, are suffering continual refraction, so that they travel in curved lines, which tend ultimately to turn up. Now the direction in which any object is seen is the direction in which the rays from the object enter the eye, and hence, under certain conditions like those above indicated, a cloud at a considerable altitude in the sky may really be seen projected on the ground like a lake. The corresponding marine phenomenon, commonly called *looming*, is similarly explained, though the conditions are reversed. Here the density of the air increases as we approach the chilly surface of the sea, and hence the light-rays travel in arches whose vertices point upwards. A vessel below the visible horizon of the spectator is thus frequently seen projected on the sky at a considerable elevation. As a rule there are more images than one visible, which are alternately reversed and erect, and this is fully explained by the consideration that the gradual variation in density, and therefore in refractive index of the vertical column, may render possible several distinct trajectories of rays terminating at the points. The Fata Morgana (q. v.) of the Straits of Messina is explained upon the same principles.

Miramichi', a river in the province of New Brunswick, Dominion of Canada, flows in a N.E. direction, and, after a course of 200 miles, discharges itself by a wide estuary into the Gulf of St. Lawrence. It is navigable for large ships to Newcastle, and has a large export trade in timber. The salmon and cod fisheries at its mouth are valuable.

Mir'amon, Miguel, born in the city of Mexico, September 29, 1832, entered the military academy of Chapultepec (1846), and received his commission (1852). He opposed the revolution of 1855, defeated Juarez at Salamanca (1858), and was appointed president *ad interim* in the room of Zuloaga (1859). He failed in an attack on Vera Cruz, and, execrated for his share in the 'massacre of Tacubaya,' was forced (1860) to take refuge in Europe, where he visited the French, Spanish, and Italian courts. On the accession of Maximilian (q. v.) to the throne of Mexico, M. was made grand-marshal (1863) and ambassador to Berlin (1864); but in 1866, on the withdrawal of the French troops, he hastened back to Mexico, and undertook the defence of Queretaro, which was captured May 15, 1867. Along with Maximilian and Tomas Mejia, M. was tried by court-martial, sentenced, and shot on the Cerro de las Campanas, June 19, 1867.

Miran'dola, a town of N. Italy, province of Modena, in a flat, rice-growing district, 45 miles N.N.W. of Bologna. It has a fine cathedral, and an old palace of the dukes of M. and Concordia, who belonged to the famous Pico family. Francesco Maria sold the duchy of M. to Modena in 1710. Pop. (1874) 13,170.

Mire'court, a town in the N.E. of France, department of Vosges, 17 miles N.W. of Epinal. It is the centre of a lace manufacture which extends 12 miles in every direction. There are also manufactures of musical instruments, leather, hosiery, and embroidered articles. Pop. (1872) 5089.

Mirr'or (Fr. *miroir*, from Lat. *miror*, 'I wonder, I admire'), a looking-glass, or an instrument with a highly polished surface capable of reflecting the image of objects presented to it. Hand mirrors of polished metal have been in use from the earliest times. The Egyptians made them from copper, the Romans, during the empire, from silver chiefly, and a kind of white metal is still used in the East. Golden mirrors are mentioned by ancient writers, but Beckmann (*History of Inventions*) gives it as his opinion that this precious metal was only used for the M.-frame. Ancient mirrors of obsidian and other stones are believed by the same author to have been made rather for ornament than utility. Pliny states that glass mirrors backed with leaf-metal were made at Sidon; metal mirrors were not, however, superseded by glass in Europe till the 13th c. Polished plate-glass (see GLASS) silvered on the reverse surface is now exclusively employed for mirrors. An amalgam of tin was used in 'silvering' down to 1840. Drayton, an English chemist, then devised a method of coating the glass with a thin layer of silver precipitated from an ammoniacal solution of nitrate of silver by means of highly oxydisable essential oils. Tartaric acid has since been substituted for the latter. The glass is well cleaned and heated, and in an hour and a quarter after the solutions of silver and tartaric acid have been poured on the glass, the silvering is effected. The process is completed by washing the glass with water, and after drying, applying varnish to protect the silver from friction. M. Lenoir has recently discovered that by sprinkling a dilute solution of the double cyanide of mercury and potassium over the silver after washing, that an amalgam, whiter than pure silver, more adhesive to the glass, with less affinity for sulphur vapours, is instantly produced.

Mir'za, a contraction of the Persian 'Mir-zadeh,' *i.e.*, son of a prince. Appended to the surname it is the title of a prince; prefixed, it is a common style of honour.

Mirzapore' ('Prince-town'), the chief town of the district of the same name, in the N.W. Provinces, British India, on the left bank of the Ganges, and a station on the railway, 448 miles N.W. from Calcutta, and 53 E. from Allahabad: pop. (1872) 67,274. It is a town of modern date, with numerous mosques, temples, and *ghauts*, or bathing-places. It was formerly the cotton emporium of Central India, before the days of railways; and still conducts a large trade both by river and rail. In the year 1876–77 the principal exports were thus returned: Raw cotton, £45,000; oil-seeds, £80,000; stone, £16,000; sugar, £26,000. The import of European piece-goods was valued at £148,000. The exports down stream during the first six months of 1876 were valued at £32,000, chiefly stone and cotton. There are manufactures of carpets, cottons, and silk. The military cantonments are 3 miles N.E.—The *district* of M. lies between the native states of Bundelcund, the Behar district of Shahabad, and the Ganges: area, 5217 sq. miles; pop. (1872) 1,015,826. The crops are wheat, barley, millets, sugar-cane, and cotton. The sandstone of Chunar is extensively quarried. Other products are *kunkur* limestone, saltpetre, iron, and slate.

Misdemean'our (from *mis*, 'wrongly' or 'astray,' and *demeanour*, from Fr. *démener*, 'to lead' or 'drive'). The term is generally used in law in contradistinction to Felony (q. v.), and comprehends all offences which do not amount to felony. Every infringement of a public statute is a M., though no penalty for infringement be stated.

Misere're (Lat. 'Have mercy upon me'), the familiar name in Catholic usage of the 51st Psalm (50th in the *Vulgate*). It is one of the 'Penitential Psalms,' and occurs very often in the services of the Catholic Church, nowhere so impressively as in the office of the *Tenebræ* in Holy Week.

Miserere (in Fr. *miséricorde*, or *patience*), in mediæval choir-stalls, was a projecting bracket, often elaborately carved, affixed to the under side of the seat, which, the seat turning on hinges, was designed to form a rest for the occupant of the stall during the standing portions of the service.

Misfea'sance (Fr. 'a wrong-doing') is a law term denoting the doing of a wrong. *Nonfeasance* is the omitting to do that which should have been done.

Mise'no, Capo di, a promontory on the W. coast of Italy, 91 miles W.S.W. of Naples. Here stood the ancient *Misenum*, whose harbour was, under Augustus, made the station for the Tyrrhenian fleet.

Mish'mi Bitter is a stomachic and tonic much used in Bengal, and is derived from the golden-yellow, woody root of *Coptis Teeta*, a small, stemless plant, found in the Mishmi Mountains, E. of Assam. The bitter rhizomes of an American species are also used for a like purpose. See COPTIS.

Mish'na (Heb. 'learning,' from *shanah*, to learn, to repeat, although by the Christian fathers it was translated *deuterôsis*, as if from *sheni*, second [*sc.* law]) had its origin in traditional glosses upon the Law. It was the work of the 'Scribes' of the Great Synagogue (B.C. 530–220) to preserve the text, to explain its precepts in accordance with collateral tradition, and to in-

struct the people in the synagogues and the schools. For the better keeping of the old precepts they erected also certain 'Fences,' or new injunctions. Next came the Scribes of the Sanhedrim (B.C. 220–220 A.D.), and at the end of eight hundred years, the ordinances, injunctions, prohibitions, precepts—old and new, traditional, derived, and enacted—had grown to such bulk that they could no longer be mastered in their scattered and chiefly unwritten form. The reduction of the whole unwritten law into a code was accomplished about 220 A.D. by the combined efforts of all the schools, under the superintendence of Rabbi Jehuda the Holy. See E. Deutsch's *Lit. Remains;* art. 'Talmud' (Lond. 1874).

Miskolcz, a town of Hungary, county of Borsod, in the rich wheat-growing valley of Sajo, 95 miles E.N.E. of Pesth by rail. It has a handsome Protestant Church and a theatre, and a large trade in wine, melons, &c. Pop. (1869) 21,199.

Mismo'mer means in law the misnaming of a person. Formerly, in a criminal indictment, an error in the name of a defendant was fatal to it. But when this occurs the Court is now by statute required to amend the indictment, and the case proceeds accordingly.

Mispri'sion and Contempt' are terms in law denoting those offences next under the degree of treason or felony. M. of felony is the concealing of it without assenting to it.

Misrepresenta'tion is in law the kind of falsehood which the law punishes or gives redress for. See LIE; PERJURY; TRADE MARKS, FRAUDS IN; INSURANCE; DIRECTOR.

Miss'al is a book containing all that is required for the celebration of the Mass (Lat. *Missa*), that is, the fixed 'ordinary' and 'canon,' with the changeable Introits, Collects, Gospels, Epistles, &c. With the object of introducing uniformity in place of the almost endless variations which had been in use up to the Reformation, by a decree of the Council of Trent and a bull of Pope Pius V., the Roman M. was in 1570 prescribed for use in all churches, except those which had had one of their own for two centuries. The M. is a development of the ancient Sacramentaries.

Mis'sions are expeditions sent into infidel countries for the propagation of religion. Such expeditions, in one form or another, have been sent out in connection with all religions possessing any degree of vitality, *e.g.*, the Buddhist and Mohammedan. The present article deals solely with the M. of the Christian Church.

I. *Early M. of the Church.*—The first missionaries were of course the apostles, and their successors laboured unremittingly till the Christian religion was established as the state religion of the Roman empire (325). After that event the Church was in a position to direct her efforts farther afield. In 348 a converted Goth of the name of Ulfilas was consecrated a bishop, and sent to convert his countrymen, a work in which he was very successful, part of the fruit of his labours being a Gothic version of the Scriptures. Christianity is said to have been introduced into Ireland in 431 by St. Palladius, who was followed by St. Patrick in 440. From the Church which was founded in Ireland M. were sent to Alban (afterwards part of Scotland) (see ST. COLUMBA), and to the tribes of Germany and the N. of Europe. Christianity was unquestionably introduced into Britain during the time it was held by the Romans, but was extinguished by the invasion and conquest of the heathen Germans, except in Wales. A mission was sent to the country by Pope Gregory the Great, 597. Augustine, the leader of it, was consecrated Bishop of the English, and then Archbishop of Canterbury, and the Christian religion was speedily re-established in the country. About the same time Columbanus,' an Irish monk, introduced Christianity into Burgundy, and after he was banished from the country continued his labours among the Alps and Apennines. After his death (615) St. Gall and St. Kilian continued the work in Switzerland, Suabia, and Franconia. Christianity was introduced into N. Germany early in the 7th c. by Amandus, and into Holland by St. Eloy, and the English bishops Wilfrith (677) and Willebrod (692). The great missionary of this time was St. Boniface (q. v.), who laboured in Germany for forty years (715–755). A Frankish mission was sent to Denmark about 825 under Ebbo, Archbishop of Rheims, and another soon after under Ansgar (q. v.), the 'Apostle of the North,' who also went to Sweden (about 830). The Christianity of these northern countries, which had become almost extinct, was revived in the 10th c. and 11th c. by English missionaries, who also went to Norway and Iceland. A country which seems to have attracted M. to it at a very early period is India, whither Christianity is said to have been first carried by St. Thomas. M. are said to have been sent to it from Alexandria about the end of the 2d c. and the beginning of the 4th c., and one seems to have been sent from England in the reign of Alfred.

II. *Modern M.*—After the 11th c. missionary effort slumbered till the great awakening of the Reformation. Since then it has been increasingly active. We may note (1) *Roman Catholic M.*—The discovery of America opened up a new field for missionary enterprise, and the Church everywhere followed up the conquest of the country by the Spaniards. At this time also the great missionary organisation of the Jesuits (q. v.) was formed. Francis Xavier (q. v.), one of Loyola's associates, went to India in 1542, where he produced a reformation among the European settlers, and baptized the natives by tens of thousands, repeating the work in Ceylon, whither he went in 1547. He then went to Japan, where he laboured for three years, and founded a mission which produced extraordinary fruits. Although Xavier did not succeed in penetrating into China, the Jesuits afterwards accomplished it, and met with great success. For the more systematic working of M. a congregation of cardinals was appointed at Rome in 1622—the Congregation de Propaganda Fide—which is the most perfect missionary organisation in the world. (2) *Protestant M.*—Missionary effort in the Church of England was revived in the 16th c., as in the case of Spain, in connection with voyages of discovery and the foundation of colonies. It was a principle of the time 'that the Church should be planted on all ground which was taken possession of in the name of the Crown.' The Church was accordingly established in the North American colonies, and a society for the promotion of Christianity among the Indians was incorporated in 1649. The Society for the Propagation of the Gospel in Foreign Parts, which was founded in 1698, was incorporated in 1701 under the name of the Society for Promoting Christian Knowledge, and in the beginning of the 19th c. the Church Missionary Society was originated. Other societies are the Baptist Society (founded 1792), the London Missionary Society (1795), which, at first supported by English Protestants generally, has now been left in great measure to the Independents. The Wesleyan Methodist Missionary Society was formally established in 1818. The Churches in Scotland—Established, Free, United Presbyterian, &c.—have all their missionary societies. The great American society, although by no means the only one, is the American Board of Commissioners for Foreign M., which was established in 1810. But the Church which perhaps deserves the title of missionary above all others is the Moravian, which established M. to the Hottentots (1736), on the coast of Guinea (1737), in S. Carolina and Algiers (1739), in Ceylon, Amsterdam, &c. Within the last fifty years missionary work has made a great advance, and its present position is briefly as follows:—*Africa.*—The northern coast is practically untouched, being wholly Mohammedan. M. begin at Senegal, and along the W. coast are many M. more or less prosperous, founded by the Wesleyan, Church of England, American Presbyterian, United Presbyterian (Scotland), the Basel, and the Baptist Societies. In South Africa, where the greatest conquests have been made, there are about 450 missionaries, and 90 native labourers. In Egypt the most prosperous M. belong to the American United Presbyterian Church. In Madagascar, where Christianity is now the established religion, there are M. belonging to the London, the Propagation, and the Norwegian Societies, as well as that of the Society of Friends. In the Island of Mauritius the M. belong to the Church of England. *Asia.*—In Turkey, Syria, and Persia, there are M. belonging to the Church Missionary Society, the American Presbyterian Board, the American United Presbyterian Church, &c. In India and Ceylon M. were carried on in 1872 by 35 Missionary Societies, besides local agencies, with 551 ordained missionaries, besides native labourers. In China there are about 30 agencies at work, with about 200 ordained missionaries, half of whom come from the United States. In the Indian Archipelago and the Straits the M. belong principally to the Dutch, Rhenish, Gossner's, and Propagation Societies. In Polynesia M. have been very successful. Within the last fifty years more than 300 islands have cast off idolatry. *America.*—The great mission fields here are

Mexico, S. America, and the W. India Islands. Several societies, British and Canadian, especially the Wesleyan and Church of England societies, are at work among the Indians in the British Possessions.

In 1871, according to Dr. W. Butler, there were throughout the world 2165 Protestant missionaries, 2078 female missionaries, and 9886 native preachers and catechists. In 1874 the receipts of the various missions in Great Britain amounted to £872,906, in Continental Europe to £110,965, in America to £472,508. See Dr. Maclear's *History of Christian Missions During the Middle Ages* (Lond. 1874), and Hassell's *From Pole to Pole* (Lond. 1874); also article BIBLE SOCIETY.

Mississipp'i (Ind. *Missi Sepe*, 'great river'), the principal river of N. America, and after the Amazon, and perhaps the Congo, the mightiest in the world, rises in Lake Itaska, on the densely-wooded plateau of Minnesota, to the W. of Lake Superior, and at an elevation of 1680 feet above the sea. Its course is southerly, and its length in a straight line is 1164 miles, but with its windings 2800. It has a drainage area of 1,244,000 sq. miles, an extreme depth of 120 feet, and a mean velocity of 3·39 feet per second. The M. enters the Gulf of Mexico, after pushing forward a long tongue of land, by three main 'passes,' respectively 1677, 1440, and 900 feet wide. Till it reaches the Missouri (q. v.) it flows through a broken picturesque country of heath and pine forest, its narrow course in parts confined on either side by carboniferous bluffs 200 feet high, and impeded by numerous rapids, of which the chief are the Falls of St. Anthony (18 feet), the Des Moines Rapids (24), and Rock Island Rapids (22). Below the Missouri, or 1300 miles from its mouth, its basin entirely changes character. Here the enormous stream rolls through a rich, level, alluvial bed, mostly covered with forests on the E. bank, and stretching away to the W. in boundless prairies. The M. is subject to most destructive annual floods, to guard against which vast levees have been constructed at the cost of the valley States. Louisiana alone has erected, on its 780 miles of river-front, 75,000,000 cubic yards of earthworks. The new levees (1873) are 22 feet high, 142 at the base, and have a cross section of 1672 sq. feet. An appeal is now (1877) being made to the United States Congress to take over the entire care and cost of the works, and a recent estimate by United States engineers gives the cost of a complete system at $36,000,000, and of the yearly repairs at $2,000,000. The maximum rise of the river at Natchez, Vicksburg, and Cairo, respectively 370, 480, and 1097 miles distant from the mouth, is 52 feet. The delta, formed by sediment brought down chiefly by the Missouri, is much larger than that of any other river, having an estimated area of 38,600 sq. miles. Besides the Missouri, the M. receives the Red River, Yazoo, Arkansas, Ohio, and an immense number of other navigable streams. It passes New Orleans, Natchez, Vicksburg, Memphis, St. Louis, &c., and is navigable for great river-steamers as far as St. Anthony, 2037 miles.

Mississippi, a southern state of the American Union, bounded W. by the rivers M. and Pearl, E. by Alabama, N. by Tennessee, and S. by Louisiana and the Gulf of Mexico. Area, 47,156 sq. miles; pop. (1870) 827,922, of whom 445,026 are coloured. The country, entered in the N.E. by the limestone spurs of the Appalachians, has a general slope W. and S., and is roughly divided into three districts. (1) The great cotton-zone in the N.W., comprising some 4,000,000 acres; (2) a fertile prairie region in the W., yielding rich crops of corn and cotton; and (3) the southern and sparsely inhabited portion stretching to the Gulf, with its inferior soil, its fine pasturage, and its vast 'pine barrens,' from which are drawn immense supplies of timber and turpentine. The principal rivers are the great western boundary stream, its affluents the Homochitto, Big Black, Yazoo, Sunflower, and Tallahatchie, and the Pearl and Pascagoula, flowing directly to the Gulf. M. has a coast-line of 88 miles, and includes a group of islands, of which the chief are Horn, Deer, and Ship, the last possessing the only good coast harbour of the state. The prevailing rocks are limestones and clays belonging to the Devonian, Cretaceous, and Tertiary formations; the minerals are few and of comparatively little value. The climate is singularly healthy, except in the low bank river-bottoms. In 1873 observations at Vicksburg gave a mean temperature of 64·67°, and a rainfall of 48·4 inches. A great part of the surface is still covered with primeval forests of oak, black walnut, hickory, beech, sycamore, cottonwood, pine, &c., and like the other Gulf States M. is prodigal in rare fruits and beautiful flowers. About one-seventh of the entire area has been brought under cultivation, and only some two-fifths were included in farms in 1870. Cotton, of which it produces more than any other state, was almost the exclusive staple for many years, but latterly much attention has been paid to other crops. In 1873 the amount of cotton raised was 600,000 bales (value $28,500,000); of Indian corn, 18,543,000 bushels (value $15,761,550); of wheat, 189,000 bushels; of oats, 492,000; of Irish potatoes, 206,000; of tobacco, 85,000 lbs. (value $14,450); and of hay, 13,000 tons. Minor crops are sugar, rice, and sweet potatoes. In 1874 M. had 88,300 horses, 99,100 mules and asses, 180,100 milch cows, 329,800 oxen and other cattle, 153,600 sheep, and 819,100 swine—value, $29,000,000. The industries are very slight, there being only (1873) 156 timber saw-mills, 45 flour-mills, and 11 cotton factories. In 1875 the railways extended 1141 miles. Jackson is the capital, but the chief towns are Vicksburg, Natchez, and Columbus. First visited by Fernando de Soto in 1539, the country was partly explored by Marquette and Joliet in 1673. A colony of 200 French immigrants was founded on the Bay of Biloxi in 1699. The territory was acquired in 1718 by the projectors of the M. Scheme (q. v.). Admitted to the Union in 1819, it was one of the first Southern States to secede in 1861, and during the Civil War it was the scene of many destructive raids and battles. The siege and capture of Vicksburg in 1863 by General Grant was one of the great events of the struggle. Since the war there has been a great decrease in the value of property, and the average price of farm-land is still only some two-fifths of what it was before 1860.

Mississippi Scheme, the name of a great financial 'bubble,' projected in Paris in 1719 by John Law (q. v.), in conjunction with the regent and officers of the State. Its ostensible object was to develop the resources of Louisiana province, the basin of the Mississippi, but its real purpose was to relieve the exchequer from the debts incurred by the wars of Louis XIV. Already director-general of the royal bank, Law was placed at the head of the so-called 'Company of the West,' which received a grant of Louisiana, and issued 200,000 shares at 500 livres each. Paper currency was accepted, although then depreciated to 70 per cent. below par. Subsequently the company acquired a monopoly of almost the entire foreign trade of France, and the power of collecting national revenue and taxes. The shares were increased to 624,000, and meanwhile the bank issued its notes freely till the paper currency amounted to 2,700,000,000 livres. The whole nation was in a frenzy. Crowds from all parts rushed to Paris. Here the streets were thronged by excited mobs, and trade for the time was increased enormously. The climax was reached when at the end of 1719 the shares were sold for 10,000 livres each, and money was so plentiful that the bank loaned at 2 per cent. Soon after this came the crash. Attempts to restrict the issue of gold led to a rush upon the bank. Vast but ineffectual efforts were made to restore confidence. The company was even amalgamated with the royal bank. But the bubble was finally burst by an edict of 21st May 1720, announcing a reduction of one-half in the value of shares and bank-notes. In July 1720 the bank stopped payment, and the inevitable result was universal distress and bankruptcy. The leaders in the scheme are charitably allowed to have been themselves deluded by the notion that the prosperity of a nation can be secured by a mere increase of its money circulation, and that the stability of paper money may be guaranteed without respect to its convertibility.

Miss'ive, in Law, is a letter or memorandum. In mercantile affairs a M. may have the effect of a legally executed document.

Missolong'hi, a fortified seaport of Greece, in the nomarchy of Acarnania and Ætolia, stands on a promontory in the shallow Gulf of Procopanista, 12 miles N.W. of Patras. The fisheries, its principal industry, employ 300 men, and are let by the Government at an annual rental of £53,000. The anchorage for larger ships is at San Sosti, 6 miles distant. In 1873 there entered the port, 1212 vessels of 59,568 tons; and cleared, 1184, of 59,285 tons. The value of exports (currants, valonia, wool, tobacco, &c.), was £17,857; and of imports (coffee, sugar, wheat, iron, &c.), £28,571. Pop. (1870) 5714. M. is famous for the part it played in the Greek War of Independence, when Maurokordatos successfully defended it from November 5, 1821, till January 6, 1823, and again for fifty-nine days in the close of the

latter year. But on April 22, 1826, it was taken by Reshid and Ibráhim Pashas, with a force of 20,000 Turks and 14,000 Egyptians, after a twelve months' gallant defence by Notos Bozzaris and his garrison of 4000 men. A mausoleum enshrines the heart of Byron, who died here, April 19, 1824. See Tabre, *Histoire du Siège de M.* (Par. 1826).

Missou'ri ('mud-river'), a river of N. America, which rises in the Rocky Mountains, hardly ¼ mile from the source of the Columbia. It is formed from three rivers, the Jefferson, the Madison, and the Gallatin, runs first N., and after several considerable falls, turns E., then flows S.E. till below St. Louis it reaches the Mississippi, after a course of 3047 miles. The chief affluents of the M. from the right are theYellowstone, Little M., White River, Nebraska, and Kansas; from the left, Jacques, Big Sioux, and Little Sioux. It is navigable for steamers as far as the falls, near the Rocky Mountains. The basin of the M. is about 557,918 sq. miles.

Missouri, a central state of the N.-American Union, bounded N. by Iowa, W. by Nebraska, Kansas, and the Indian Territory, S. by Arkansas, and E. (470 miles) by the Mississippi, which separates it from Illinois, Kentucky, and Tennessee. Area, 65,350 sq. miles; pop. (1870) 1,721,295, of whom 118,071 are coloured and 75 Indians. The state is crossed from W. to E. by the M. River (q. v.), which is also for 200 miles its N.W. boundary. The S.E. is swampy, the S.W. chiefly covered by the Ozark Mountains and their offshoots to the river Osage. Most of the rest is rolling prairie, with here and there forests, which in the M. valley are especially luxuriant. Coal measures extend over 23,100 sq. miles of the W., N.W., and N.; adjoining these, and in the S.W. and N.E. of M. are found Devonian rocks; E. of the latter is a Silurian tract 200 miles broad; and the S.E. is chiefly alluvium and drift deposits. M. is particularly rich in iron ores. Lead and zinc (in the S.) are plentiful, and copper, nickel, and cobalt, are also worked. The soil is generally fertile, though less so in the S.W. and S. The wild animals of M. are very numerous, including the bear, panther, wolf, racoon, and opossum; deer, rabbits, hares, squirrels; the eagle, vulture, and other birds of prey. The climate is one of extremes, ranging at St. Louis from 7° to 100° F., and the average rainfall amounts yearly to 37·83 inches. In 1873 the produce of Indian corn was 70,846,000 bushels, valued at $26,921,480; of wheat, 11,927,000; rye, 446,000; oats, 15,670,000; barley, 266,000; buck-wheat, 26,000; Irish potatoes, 1,839,000; tobacco, 13,200,000 lbs.; hay, 101,000 tons (worth $5,709,500). The live-stock of M. consisted in 1874 of 543,000 horses, 89,200 mules, 421,400 milch-cows, 806,300 oxen and other cattle, 1,408,500 sheep, 2,603,300 swine—total value, $67,306,342. In 1870 the value of flour produced in M. was $28,332,160; packed meats, $13,933,195; liquors, $8,371,440; lumber, $6,685,462; tobacco and cigars, $10,415,604. The value of all industrial products was $206,213,429. The lead produced in 1873 was 27,676,320 lbs.; zinc, 11,582,440 lbs.; the iron in 1872, 509,200 tons. The value of the total annual product of the mines of M. is estimated at $14,000,000. In 1875 there were 2600 miles of railway. M. publishes 280 newspapers. St. Louis is the largest town, Jefferson the state capital. Other cities and towns are Kansas, St. Joseph, Hannibal, St. Charles, Springfield, Ledalia, and Lexington. Though as early as 1864 there was a small French colony at Fort St. Louis, the colonisation of M. properly began only with the 18th c. M. belonged to Louisiana, came under Spain in 1763, and in 1803 under the Union. In 1812 it was constituted a territory, in 1821 was received as a state. Slavery, though never extensive in M., contributed to retard its progress. In the struggle for Kansas the slave-owners seized a large part of M., and at the beginning of the Civil War sought to attach it to the South. Since the abolition of slavery, progress of every kind has been very great. The state sends thirteen members to the House of Representatives.

Mistake, in Law. See ERROR IN ESSENTIALS; CONSENT; CONTRACT.

Mis'tletoe (Old Eng. *mistelté*, Ger. *mistel*, Icel. *mistelteinn*, of uncertain derivation) is the name of a genus of parasitic plants designated botanically *Viscum*, and to most European nations familiarly represented by the common M. or *V. album*. The natural order to which it belongs is *Loranthaceæ*, consisting of about 450 evergreen parasitic shrubs, chiefly tropical in their distribution, but many found in temperate regions. The above-named *V. album* is the only species of the genus possessed of any considerable interest, and about it only a few points of the scientific, historic, or legendary literature can here be noticed. It roots firmly, grows slowly, gradually kills, and so ultimately dies itself upon the tree-branch that supports it. The stem when full grown is an inch or more in thickness, and divides and subdivides in a regular forked manner; the leaves are opposite, oblong, leathery, and of a yellowish-green colour; the separate male and female flowers are inconspicuous, and the fruit forms a small white berry with viscid contents. It has a marked preference in the selection of the tree it grows upon, the apple being most commonly affected, then poplars, hawthorn, limes, maples, mountain-ash; it is rarely found on the oak (less than ten authentic instances are recorded in Britain); and on the larch, pear, &c., is very exceptional. Its range of distribution is Europe and W. Asia, and in Britain is only prevalent in the S. half of England; it is not a native of Scotland or Ireland, but is there propagated as a curiosity. To the ancient Britons it was a special object of veneration, many important Druid rites being performed in connection with it, and a lingering record of this we perhaps see at the present day in the use of the plant for Christmas decorations. It was long extolled for its medicinal virtues, but these have unfortunately not survived to the present time. See Dr. Harley in *Trans. of Linnean Soc.*, vol. xxiv., and Dr. Bull in *Journal of Botany*, vol. ii.; also the writings of Edwin Lees of Worcester.

Mis'tral (a Provençal word, formerly *maestral*, Ital. *maestrale*, from Lat. *magistralis*, 'the masterful' wind), a N.W. wind that blows in winter over the western part of the Mediterranean, especially on the S. coast of France. It is dry and cold, sudden in its approach, and terrible in its effects both by land and sea. The M. is the *Caurus* or *Corus* of the Romans.

Mistrett'a, a town of Sicily, province of Messina, about 4 miles from the sea, and 18 miles E.S.E. of Cefalu. It has a brisk trade, especially in manna. Pop. (1874) 11,003.

Mitau', or **Jelga'va**, a town in Russia, government of Courland, in a sandy district on the Aa, 27 miles S.W. of Riga by rail. It has six churches, three synagogues, and the old castle and burial vault of the former dukes of Courland. M. manufactures japanned articles, and has considerable trade in corn, flax, and hemp. Pop. (1870) 22,185. The place takes its name from Mita, a Slavic deity.

Mite, a name given to members of the order *Acarina*, of the class *Arachnida* (q. v.). Of the acarina—which are small in size, have eight legs, a mouth fitted for biting, and a body usually covered with bristles—the common or domestic M. (*Acarus domesticus*) is a good example. The *A. destructor* is a terrible pest in museums, where it gnaws the fur of stuffed animals, and destroys the feathers of birds. The Sugar M. (*A. saccharrhinus*) inhabits sugar. The Itch M. causes the disease of that name. Many species are parasitic on beetles and other insects, and thus aid in preserving the balance of power in nature, by preventing the increase of these insects. The name M. is often erroneously extended to certain true insects, such as those belonging to the order *Mallophaga*, which infest the plumage of birds.

Mit'ford, John, an elegant English scholar, was born at Richmond, Surrey, 13th August 1781. After leaving Oriel College, Oxford, he obtained the living of Benhall, Suffolk, in 1810. In 1815 he was presented to the rectory of Weston St. Peter's, and in 1817 to that of Stratford St. Andrew, also in Suffolk. M. edited the *Gentleman's Magazine* from 1834 to 1850, and with fine critical acumen and ripe scholarship annotated many of the English poets in the Aldine edition. He died at Benhall, 27th April 1856.

Mitford, Mary Russel, daughter of a dissolute physician, was born at Alresford, Hampshire, 16th December 1787. Before she was twenty she had published three volumes of verse, receiving for the same a severe word from the *Quarterly Review*. Her first and greatest success was *Our Village*, a series of papers contributed to the *Lady's Magazine*, published in five volumes between 1824–32. She likewise wrote *Atherton* (a novel, 1824), *Belford Regis*, *Stories of Country Life* (1850). Of her tragedies, the best are *Julian* (1823), *Foscari* (1826), *Rienzi* (1828). She brought out in 1854 her dramatic works (2 vols.), which included

Otho of Wittelsbach, *Inez di Castro*, and *Gaston de Blondeville*. M. wrote simply and feelingly; but the secret of her fame rests much in the private friendships she formed with many distinguished literary men and women of her day. Her filial generosity to a reckless and reprobate parent reveals a quality of character finer than anything she has written. In 1852 she published *Recollections of a Literary Life; or Books, Places, and People*. She died at Swallowfield Cottage, near Reading, January 10, 1855. M.'s letters were patched up into a *Life* by L'Estrange (Lond. Bentley, 1869); and Henry Chorley edited a second series in 1872.

Mitford, William, was born at London, 10th February 1744. He left Queen's College, Oxford, without a degree, and read law in the Middle Temple; but the death of his father in 1761 gave him ample means and leisure for study. In 1769 he became captain in the South Hampshire militia, of which Gibbon was major, and it is supposed that intercourse with this historian determined M. in his choice of literary work. After publishing in 1774 an *Inquiry into the Principles of Harmony in Language, and of the Mechanism of Verse, Modern and Ancient*, and *A Treatise on the Military Force*, he began to write his once famous *History of Greece*, vol i. of which appeared in 1784, vol. ii. in 1790, vol. iii. in 1797, vol. iv. in 1808, and vol. v. in 1818. Though now entirely superseded by the works of Thirlwall, Grote, &c., it will always be remembered as one of the first genuine attempts at a Greek history founded upon original research, and enlivened by a pungent and vivid criticism. M. sat in Parliament from 1785 to 1815, and the political partisan is audible in his shrill strictures on Athenian democracy. M. likewise wrote *Observations on Christianity*, and *Principles of Design in Architecture*. He died on the 8th February 1827. His brother, Lord Redesdale, prefixed a biographical notice to the 1829 edition of the History.

Mith'ras was the sun-god of the Persians, called the Invincible. He is commonly represented as a youth kneeling on a bull, whose throat he is cutting, and which is at the same time attacked by a dog, a serpent, and a scorpion, while a flying arrow is directed against the breast of the animal. These are astronomical symbols regarding the sun in Taurus, in which sign the vernal equinox occurred in ancient times. See Hyde's *Veterum Persarum et Medorum Religionis Historia*.

Mithrida'tes, or **Mithrada'tes** ('sun-given,' from Pers. *mithra*, 'the sun,' and the root *da*, 'give'), a name borne by several kings of Armenia, Commagene, Media, Parthia, Pergamus, and Pontus, of whom the most famous was **M. VI.,** King of Pontus, surnamed **Eupator** and **Dionysus,** commonly called **The Great.** Succeeding his father, **M. V.,** about 120 B.C., while under 13 years of age, M. began a career of unscrupulous ambition with the murder of his mother and brother. In a short time he subdued Colchis, Lesser Armenia, and the Tauric Chersonese, and, on the death of Parisades, he acquired the kingdom of Bosporus. Nicomedes, king of Bithynia, having invaded Pontus, M. drove him (88) from Bithynia and Ariobarzanes from Cappadocia, seized Phrygia, Galatia, and Roman Asia, and caused the massacre of 80,000 Roman citizens. He also sent armies into Europe to help the Greeks in their rebellion, but in 86 Sulla twice defeated M.'s general Archelaus, near Chæronea and Orchomenos in Bœotia, and at the same time M. was himself overpowered in Asia by Fimbria. This, the *First Mithridatic War*, ended (84) with M. consenting to pay 2000 talents, and yield 70 ships to the Romans. In 83 Murena attacked M., but was defeated at the river Halys (82), and retreated, closing the *Second Mithridatic War*. In 74 M. began the *Third Mithridatic War* by taking the field with 120,000 foot and 16,000 horse, besides barbarian auxiliaries. He overran Bithynia, worsted the consul Cotta at Chalcedon, and besieged Cyzicus, but the other consul, Lucullus, forced him to retreat (73) with great loss to Pontus, whence, after a severe reverse in 72, he fled to his son-in-law Tigranes, King of Armenia. Lucullus defeated both kings near Tigranocerta in 69, and near Artaxata in 68. Disaffection among his soldiers now obliged Lucullus to retire, and before the end of 67 M. had regained the greater part of Pontus. In 66, however, he was so hard pressed by Pompeius that he was forced to take refuge in the Cimmerian Bosporus, where he established himself at the capital, Panticapæum, and resolved to pass round the Euxine, through the Sarmatæ and Getæ, to invade Italy itself. But his army mutinied, and made his son Pharnaces king, and in despair M. committed suicide (63). He was buried with royal honours by Pompeius at Sinope, his native town. This ambitious despot, Cicero confesses, was the greatest opponent the Roman arms had yet met. He had great skill in war, and extraordinary vigour of both mind and body; he could speak twenty-five languages or dialects, and his Greek education at Sinope had taught him to be a patron of the arts. For a graphic picture of his career and character, see Mommsen's *Römische Geschichte* (Eng. trans. vol. iii. Lond. 1863).

Mit'railleuse, a gun composed of several barrels, from which a number of shots may be fired simultaneously or in rapid succession. As early as the 14th c. such forms of ordnance were constructed; but experience proved the single-barrelled gun to be more effective. In the Franco-Prussian war, however, the French introduced an improved form, a small cannon revolver, capable of firing from 300 to 400 shots in a minute. The Gatling gun (see GATLING), first tried in 1862, is of the same nature, and has been adopted by the United States' army, and by several European powers. An English M. containing 50 cartridges was approved after trial at Woolwich, 18th January 1872.

Mi'tre (Lat. *mitra*) is the official head-dress in the Western Church of bishops, archbishops, some abbots and provosts, and, in a particular form, of the Pope. A kind of linen turban was the distinctive head-dress of the Jewish priests, and, with a gold plate in front, of the high priest. Now in the East a crown of this nature was the symbol of power and authority. The crown worn by the kings of Assyria was a high M., formed of bands of linen or silk. The head-dress of the kings of Egypt on state occasions was a *double* M. of the same kind. And a kind of regal power was vested in the Jewish high priest, who was the supreme head of the state, in fact the vicegerent of Jehovah (*cf.* Deut. xvii. 12; Josh. xiv. 1, xvii. 4). It was this turban or holy crown of the Jewish high priest (*cf.* Ex. xxviii. 36) which was adopted by the bishop of Rome, and by him granted to other bishops. The horns of the M. are supposed to represent the cloven tongues of Pentecost (Acts ii. 3). More probably they represent a twofold power, as the double crown of the Egyptian kings represented the sovereignty of Upper and Lower Egypt. On the same principle the Papal tiara has been formed by the addition of three crowns to the common M., indicating three accessions of power: the first added by Pope Alexander III., 1159, the second by Boniface VIII., 1303, and the third by Urban V., 1362.

Mitre, in Architecture, is the line of junction of mouldings or other surfaces which meet at an angle.

Mitsch'erlich, Eilhard, a celebrated German chemist, was born at Neuende, near Jever, 7th January 1794, studied at Heidelberg, Paris, and Göttingen, went to Berlin in 1818, and threw himself eagerly into the study of chemistry. His discovery of the law of Isomorphism procured him the acquaintance of Berzelius, who invited him to Stockholm, where he remained from 1819 to 1821, when he was appointed Professor at Berlin on the death of Klaproth. Here he continued to labour till his death, 28th August 1863. His discoveries of Isomorphism and Dimorphism are what will permanently preserve his name; but his memoirs on Benzine and the Formation of Ether are also of the greatest value. M.'s chief work is his *Lehrbuch der Chemie* (1829–41). See Rose's *Gedächtnissrede* (Berl. 1864).

Mitt'imus is, in English law, a writ for transferring a record from one court to another.

Mittwei'da, an industrial town in the kingdom of Saxony, near the Zchopau, 35 miles S. E. of Leipsic by rail. It has large engineering works, cotton mills, dye-works, bleach-fields, and a trade in peat and building stones. Pop. (1875) 9093.

Mityle'ne. See LESBOS.

Mixed Marriages. The question whether in a marriage between two relatives who are both perfectly healthy, live under healthy conditions, and whose families are perfectly healthy, the children born will probably be unhealthy, is one little discussed, but of vital importance to society. Such marriages have been alleged to produce sterility, malformations, insanity, and special diseases of the senses, scrofula, albinoism, phthisis, and cretinism. But in 1871 the House of Commons refused to make this the subject of inquiry in the census. The modern prohibitions

of marriage have descended from earlier social institutions, strengthened by Christian asceticism. But in ancient Egypt, Persia, and Arabia, there was little if any restriction on what is now called incest; and even among the Jews, Greeks, and Romans, marriages of very near kin were common, especially in the earlier and less corrupt times. The matured civil law permitted marriages in the fourth degree, or between first cousins: the canon law only outside the fourth or seventh degree, that is, third cousins are forbidden to marry. Hence the singular prejudice in England that, though first cousins may marry, second cousins may not. It would appear from the minute prohibitions in Liber Poen. de Incest, in Thorpe's *Early Institutions*, that there was little restriction among the Old English. In fact, there does not seem to be any innate horror of marriage between near kin implanted in mankind. In savage nations we find the conflicting customs of exogamy and endogamy: the one probably based on the scarcity of women caused by female infanticide, or on the traditional honour of capturing a wife, and constantly supported by inter-tribal hostilities: the other on pride of race, which disdains alliance with foreign and therefore inferior women. Where these institutions have passed away, they still survive in the practice of many savage tribes in prohibiting marriage between certain relatives, and of others preferring marriage between near kin. But while exogamy may account for prohibitions of marriage between relatives of the third degree and beyond it, it hardly accounts for prohibitions among direct ascendants and descendants which occur in endogamous tribes, and have become part of the general law in modern times. These prohibitions are most universal where the parties are in the course of nature of an unsuitable age: against whose union, therefore, many obvious objections, not connected with kinship, may be urged; and they are not so strong in the case where the younger of the couple is a female, because females have less control over their marriages than males. It is certainly not true that intermarriage of kinsfolk has ever been prohibited on the ground that its effects on the offspring have been observed to be injurious. No such effects have been observed. In those isolated communities, which have continually intermarried among themselves, such as the Cagots, the Vaqueros, the Chuetas, &c., no special rates of mortality, and no special percentage of disease, have been observed. The statistics collected by the Parasyngeneasts are open to the fatal objection that there are no means of estimating the proportion of consanguineous to non-consanguineous marriages. Wherever such statistics have been collected with approximate safety, they suggest conclusions rather in favour of in-and-in breeding. The diseases attributed to consanguineous marriage are in truth the result of inheritance, which, of course, operates with increased power in producing disease or accumulating idiosyncrasy when organisations having similar faults are brought together. On the other hand, while judicious selection in crossing may remove inherited disease, the general tendency of crossing is to produce mediocrity, or reversion to an unimproved type—*e.g.*, Anglo-Indian, Dutch Singhales, Portuguese-Malays, the various half-breeds of America, &c. If a cross is *per se* beneficial, the more distant the relation the more beneficial ought to be the cross. But the generality of half-breeds are worse than their parent, and incapable of continuous reproduction. 'God made white men, and also black men, but the devil made half-castes'—(Livingstone, *Zambesi*, 50). It is very desirable that the efforts of Lubbock in England, Uytterhoeven in Belgium, and Mantregazza in Italy, may at last secure some authoritative public inquiry into this grave social question.

Mix'tures are officinal, medicinal preparations, used as vehicles for more active medicines, or for their own intrinsic value. The following are the M. of the British Pharmacopœia with their doses:—M. ammoniaci, ½ to 1 oz.; M. amygdalæ, M. cressoti, M. cretæ, M. ferri aromatica, M. ferri composita, 1 to 2 oz.; M. gentianæ, ½ to 1 oz.; M. guaiaci, M. scammonii, ½ to 2 oz.; M. sennæ composita, 1 to 1½ oz.; M. spiritus vini Gallici, 1 to 2 oz.

Mizen, or **Miz'en** (Fr. *misaine*, 'foresail,' Ital. *mezzana*, 'lateen sail,' from *mezzano*, Lat. *medius*, 'middle'), a large triangular sail formerly attached to the stern-most mast of a three-master, so named from its running fore and aft, and thus keeping the *middle* line of the ship. M. is the name now given to the *mast*.

Mnemon'ics (Gr.), the art of refreshing the Memory (q. v.) by artificial aids, as by tying a knot in one's pocket-handkerchief; by associating the heads of a discourse with the various parts of a building, a system ascribed by Cicero and Quintilian to the Greek poet Simonides (500 B.C.); or by the substitution for figures of letters which may be formed into articulate sounds. Thus *a*, the first vowel, and *b*, the first consonant, may stand for 1, and *e* and *c* for 2, when *ac* or *be*, *eb* or *ca*, will respectively stand for 12 and 21. Of this last method, introduced in the 14th c., various modifications and improved systems have from time to time appeared, the best known being those by Richard Grey (1730), Gregor von Fainaigle (1812), Aimé Paris (1833), and Karl Otto (1840). See Hermann Kothe, *Lehrbuch der Mnemonik* (Hamb. 1852); Stokes, *On Memory* (51st ed. Lond. 1875); and T. A. Sayer, *Aids to Memory* (Lond. 1875).

Mnemosyne (Gr. 'memory'), daughter of Uranus, the mother by Zeus of the nine Muses.

Mo'a, the name given by the Maories to a gigantic struthious bird belonging to the genus *Dinornis*, whose remains are abundantly found in New Zealand. Its existence was first ascertained by the Rev. Richard Taylor in 1839. In the article DINORNIS the M. is said to be wholly extinct, but in the *Greymouth Weekly Argus*, a New Zealand paper, there appeared a letter in 1876, signed R. K. M. Smythe, Browning's Pass, Otago, describing the capture of two living moas, 'a female 8 feet high, and a young one 3 feet shorter.' See *Chambers's Journal* (September 1877).

Mo'ab was the name of a Semitic tribe which occupied the highlands to the E. of the Dead Sea and the mouth of the Jordan (mod. Arab. *Belka* and *Kerrak*). M. was a powerful nation when the Israelites arrived on the borders of Canaan, and escaping the disasters which overtook the latter, was still a 'very great nation' in the time of Josephus. The extraordinary number of ruins discovered in the country by travellers are a sure indication of the former wealth of the nation. See *The Land of M.*, by Dr. H. B. Tristram (Lond. 1873).

Mo'abite Stone is a remarkable inscribed stone which was discovered (August 19, 1868) by Mr. Klein, an English clergyman, near the ruins of Dibân (anc. Dibon), in the ancient land of Moab (q. v.). According to the best authorities it is 'the very oldest Semitic lapidary record of importance as yet discovered.' Unfortunately, although in 'a perfect state of preservation' when shown to Mr. Klein in 1868, it was afterwards broken to pieces by the Arabs, whose jealousy was aroused by the negotiations of European scholars to get hold of it, and only very fragmentary and imperfect copies of the inscription have been obtained. But even from what has been preserved 'the gain to palæography and Semitic science is enormous.' It also illustrates in a high degree the history of our own writing, exhibiting nearly the whole of the Greek alphabet in the identical Phœnician shape. This remarkable stone is 'the monument of a Moabite king, Mesha (*cf.* 2 Kings iii.), who, after a brief record of himself and his father, tells of certain deeds of war from which he issued victorious. Further, the names of Israel, Omri, Chamos, and a number of well-known Moabite cities occur up and down.' M. Ganneau has 'restored' the stone, filling up the lacunæ in the inscription to the best of his ability, and the Palestine Exploration Society has published a photograph of it from a cast presented by the Louvre authorities. See Ginsburg's *M. S.* (1871); Tristram's *Land of Moab* (1873); *Underground Jerusalem*, by Captain Warren (Lond. 1877).

Moat (? Fr. *motte*, Ital. *mote*, 'a mud or turf hillock') is the name now given to a wet or dry ditch drawn round the ramparts of a fortress, at least 12 feet deep and twice as many wide. When reveted with masonry, the interior slope of the M., nearest the parapet, is called the *scarp*, the exterior slope the *counterscarp*.

Mobile', a thriving city and port of entry in Alabama, U.S., on the river M., near its entrance into M. Bay, 30 miles above the Gulf of Mexico, and 140 E. of New Orleans by rail. It is situated on a sandy plain, girt by several beautiful hills, and has a fine climate, though subject to occasional ravages of yellow fever. Its harbour is shallow, but is being dredged (1877) at the cost of Congress, so as to secure a passage for vessels drawing 13 feet. Meantime large vessels have to remain 25 miles off in the bay. There is a large export trade in cotton, naval stores, lumber, rosin, and turpentine, and the staple import is coffee. On an average 50 vessels enter yearly from foreign ports

and 130 from American ports. M. has many handsome buildings, a city hospital, the Alabama Medical College, 30 churches, 2 daily and several weekly newspapers, &c. Pop. (1870) 32,034. M. was settled by Lémoyne de Bienville in 1702, and was the capital of Louisiana till 1723.—**M. Bay**, an inlet of the Gulf of Mexico, is 30 miles long from N. to S., and 10 miles broad, and is protected by Forts Morgan and Gaines, the latter standing on Dauphin Island at the entrance. The depth is about 12 feet, but near the outlet it increases to 21, and here the 'cotton fleet' is loaded by lighters from M. with the rich produce of Alabama. The M. river is one of the branches by which the Alabama river enters the bay.

Mobil'ier, Crédit, a French bank, originated in November 1852, for the purpose of lending money upon the security afforded by movable property. By its original charter the bank was permitted the privilege of paying up the calls made upon it by companies in which its money was invested, in its own notes or obligations. But when they proposed, after declaring a dividend of 40 per cent. in 1855, to make a paper issue of 240,000,000 francs, the public alarm compelled government to interfere. Many of the transactions of the C. M. have been upon the most enormous scale, and the industries of France owe to it much of their rapid development, as its funds flow largely into railway and other public schemes. Within recent years, however, its dividends have been on the decline, and the shares, which are 500 francs, were quoted on the Paris Bourse (October 3, 1877) at 155 francs.

Mobilisa'tion, the placing of an army on a war footing, consists in filling up the field troops to their full strength, and in the formation of dépôt and garrison troops, as well as in the preparation for instant service of transport and commissariat supplies. See ARMIES.

Moch'a, a town in S.W. Arabia, province of Yemen, in a desert tract on the Red Sea, 80 miles W.N.W. of Aden. It has a good and well-fortified harbour. M. exports annually over 10,000 tons of the finest coffee, besides dates, gum, &c. Pop. about 7000.

Mocha Stone, a white translucent variety of agate exhibiting dendritic filaments, or moss-like markings of a dark colour, produced by the infiltration of oxide of iron or manganese. It is found at Cambay, in India, and in Arabia, Mocha being the place to which the stones were conveyed for the purposes of trade, whence the name. It also exists in Wicklow. The *dendrachates* of Pliny and M. S. are identical.

Mock'ing-Bird (*Mimus polyglottus*), a species of *Merulidæ* or Thrushes, found in N. America. The fourth and fifth quills are the longest; the bill has short bristles at the base, and the nostrils are oval. The tarsi have broad scales in front. This bird is of a dull brown colour, the quills of the wings having white bases. The two central tail-feathers are blackish, and the under parts are brown tinged with grey. The male has the white colour of the wings and the back line of the body more plainly impressed than the female. The average length is 9 inches. The eggs number four or five, and are of a greenish-blue spotted with brown. The M. is wary and active, and wages war against other birds who attempt to encroach on its domain; while the black snake of America—a determined enemy both to birds and their eggs—is jealously watched and repulsed. The M., however, has acquired its celebrity from its extensive powers of vocal imitation. Any and every sound which the bird hears it is apparently able to imitate, often in the most exact manner. The cries of animals, the notes of other birds, and even tunes whistled in its vicinity, are correctly repeated by it. The natural song of the M. is bold and clear, but the bird so frequently and fully introduces the note of other birds and imitations of sounds into its vocal efforts, that its own notes are rather difficult of determination. The M. may breed twice or thrice annually.



Mocking Bird.

Mode (*mus.*). The arrangement of the scale of the octave into major or minor keys is called the major or minor M. Formerly the term had reference to time. See also GREGORIAN CHANT.

Mod'elling, the art of constructing an object in clay either as a model to be executed in marble, or to be cast in plaster or other material. The fine plastic clay employed is kept uniformly moist, and is manipulated in great part with the fingers, assisted where necessary by tools of bone, wood, or metal, having curved ends. Suitable supports must be given as the work progresses. M. in wax is pursued by medallists, goldsmiths, and other decorative metal workers, who employ ivory tools for the purpose. M. is also of great importance in the preparation of moulds from which enrichments in plaster-of-Paris, &c., for internal decoration, are cast.

Mo'dena, the capital of the province of M., N. Italy, situated in a fertile and healthy plain, 25 miles N.W. of Bologna, and between the Secchia and Panaro, with which rivers it is connected by canals. Intersected by the Via Æmilia, the city is one of stately buildings, broad streets, and spacious arcades, girt by ramparts commanding beautiful views of the Apennines and Æmilian plains. Its *duomo*, begun in Romanesque style in 1099, and consecrated in 1184, has a superstructure of later date. The campanile (*La Ghirlandina*) 335 feet high, erected 1224–1319, is one of the finest in N. Italy. The Palazzo Reale, formerly Ducale, is a magnificent turreted building, begun in 1634, and now containing the Bibliotheca Estense, with 90,000 vols. and 3000 MSS.; a picture-gallery, including works of Titian, Correggio, Tintoretto, Salvator Rosa, &c.; a museum of 26,000 medals; the Este archives, &c. M. has in all some twenty-seven churches, besides many educational and benevolent institutions, and a fine theatre. Its university was suppressed in 1821, but it still has good schools of law, medicine, theology, &c. There is a slight industry in linens, woollens, silks, hats, leather, glass, and paper. Pop. (1874) 30,854. M. the ancient *Mutina*, was made a Roman colony in B.C. 183, and is spoken of by Cicero as a splendid city. It declined from the time of Constantine, and is called 'but the corpse of a city' by Ambrose in 387. After suffering from the struggles of the Guelphs and Ghibelines, it fell in 1288 to the Este Family (q. v.), under whom it rose conspicuous in the 16th c. as a brilliant centre of art and literature. The title of duke was conferred by Friedrich III. in 1452, and M. remained almost continuously with the family till the expiry of the male line in 1801, after which it passed by female line to Austria. Insurrections in 1848 and 1851 were quelled with cruel severity, but finally in 1859 Francisco V., the last duke, was driven from his territories. M. was soon afterwards finally annexed by popular vote to the kingdom of Italy.

Modera'to, a musical term signifying that the time is to be taken at a moderate pace.

Mod'erator is the name given to the Chairman of the General Assembly of the Scotch churches.

Mo'dica, a town in Sicily, province of Syracuse, on the Scicli (anc. *Motychanus*), 42 miles S.W. of the town of Syracuse. It lies in a fertile valley, hemmed in by high rocks, and has a castle and several fine churches. Five miles N. is the Val d'Ispica, with curious old rock-dwellings. M. is the Mohak of the Saracens, and the *Motuka* or *Mutyca* of the Greeks and Romans.

Modill'ion, in Architecture, a horizontal bracket placed beneath the Corona (q. v.) of a cornice, and only differing from a Console (q. v.) in having its larger end placed backwards, and the smaller one in front.

Modula'tion, a change of key, is a very common and attractive feature in modern musical compositions. Without it the effect of a piece is apt to be wearisome. M. into the attendant or relative keys is termed natural M., into other keys extraneous M. For very brief modulations the term 'transition' is used.

Mod'ulus, a constant coefficient or multiplier used in various connections in mathematics—more especially, however, in the theory of Logarithms (q. v.).

Mo'dus. Lands in England may be exempt from tithe, or partially so, by custom or prescription, in which case a M., or compensation, is substituted at twopence an acre for the tithe of land.

Mö'en, a Danish island, separated by Ulvsund from Seeland on the N.W., and by Grönsund from Falster on the S.W. Area, 77 sq. miles; pop. (1870) 13,348. The surface is undulating, and the soil is fertile. The inhabitants are engaged chiefly in agriculture, fishing, and shipbuilding.—The chief town, Stege, on the W. coast, is very old. It still retains privileges received from Erik Glipping in the 13th c., was taken by the Swedes in 1659, and was the scene of a Swedish naval exploit, 25th May 1710, which resulted in the capture of thirteen Danish men-of-war. Pop. about 2000.

Mœ'ris (mod. *Birket-el-Kerûn*, 'the lake of the horn'), a lake of Central Egypt, in the province of Fayum (q. v.), is supplied with water from the Nile by the canal Bahr-Jusuf ('Joseph River'), and is 30 miles long and 6 broad. The fisheries, which were formerly of far more importance, now yield only about £100 a-year. We have a splendid, though perhaps not strictly accurate, account of the lake from Herodotus.

Mœ'sia was a Roman province, bounded on the N. by the Danube, on the S. by the mountains Haemus, Orbelus, and Scardus, on the E. by the Euxine, and on the W. by Mount Scardus and the rivers Drinus and Savus. It was divided by the river Cebrus into M. Superior in the W., and M. Inferior in the E. The original inhabitants were Thracians, but a large body of Gauls settled there, B.C. 277. M. was subjugated by the Romans in the time of Augustus, and as a frontier province was strongly fortified along the S. bank of the Danube. In 395 the Ostrogoths, afterwards called Moeso-Goths, settled in M., with the permission of the Romans, with whom, however, they soon quarrelled and fought. In the 6th c. Slavonians entered Upper M., and in the 7th Bulgarians entered Lower M., establishing themselves easily in lands that had been wasted by Goths, Huns, and Avars.

Mœ'so-Goth'ic, the language of those Goths (q. v.) who in the reign of Aurelian (270–275 A.D.) established themselves in Dacia. The Bible of Ulfilas (q. v.) shows that the M.-G. belonged, through its phonetic structure, to the Low German class, but grammatically it is, with a few exceptions, far more primitive than the Old English of the *Beowulf* or the Old High German of Karl the Great. Especially in the plurals of the verbs is the greater fulness of its forms apparent, closely answering as they do to the Latin terminations *mus, tis, nt*. The exceptions, however, are equally important, for they prove the grammatical, and therefore historical, impossibility of deriving either Old English, or High German, or both, from M.-G. See Diefenbach, *Vergleichendes Wörterbuch der Gothischen Sprache* (2 vols. Frankf. 1851); and Grein, *Das Gothische Verbum in Sprachvergleichender Ansicht* (Kass. 1873).

Moffat ('the foot of the moss'), an inland watering-place of Scotland, in the N. of Dumfriesshire, is situated in the rich sheltered valleys of the Annan, 2 miles N. by E. of the station of Beattock on the Caledonian Railway. The springs are chalybeate and sulphurous, and attract a large number of visitors, for whose accommodation there are handsome hotels, baths, reading and assembly rooms, &c. The town is protected to the N. by the M. Hills, which rise in Hartfell to a height of 2650 feet. Pop. (1871) 1730.

Moffat, Rev. Robert, D.D. a veteran African missionary, was born in Inverkeithing in 1797, and was sent in 1816 to Namaqua-land on the Orange River. When on a visit home in 1840 he published *Missionary Labours and Scenes in Southern Africa*. He is also the author of a translation of the Bible into the Bechuana language (new ed. 1872). His daughter married David Livingstone, and he may be said to have paved the way for the achievements of that great missionary, at whose funeral at Westminster Abbey he was one of the principal mourners. In 1873 he was presented with a testimonial of £5800. In May 1877, at the General Assembly of the Free Church of Scotland, in a speech on Foreign Missions, which virtually summed up his life work, Dr. M. reported that there were now churches and missions scattered over the Bechuana or Bassuto country from the Zulus on the E. to the Damaras on the W., that in connection with them there were 40,000 communicants and 45,000 pupils, and that some £250,000 worth of British merchandise is introduced yearly into the country. Since then he has probably startled a portion of the religious world by the publication of a letter in which he strongly pronounces in favour of the lawfulness of marriage with a deceased wife's sister. For an account of his labours, see *Rivers of Water in a Dry Place* (1863; new ed. 1876), and Miss A. Manning's *Heroes of the Desert* (1875).

Mofuss'il (*mufassal*, derived from an Arabic word meaning 'separate'), a term in universal use among Europeans in India, to express the country generally, the rural part of a district, 'the interior,' as opposed to the Sudder Station or civil headquarters. Even a villager, when absent from his cottage in the fields, is said to be in the M. In Bengal, it is specially used for the whole country exclusive of Calcutta, the traditional boundary being the Mahratta Ditch (q. v).

Mogadore', or **Suirah**, the chief seaport of Morocco, on a promontory running into the Atlantic, opposite a strongly fortified island, 130 miles W.S.W. of the city of Morocco. It has a great overland trade with the Sudan. In 1876, its exports, chiefly almonds, esparto, olive-oil, orchella weed, and beeswax, amounted in value to £275,333, of which £153,157 went to Great Britain and £118,064 to France. The value of the imports (cotton, sugar, tea, &c.) was £246,686, as much as £214,527 worth coming from Great Britain. There entered the port in 1876, 66 vessels of 24,001 tons (British 39, of 15,302 tons), and cleared 67, of 25,544 tons (British 40, of 15,845 tons). Pop. about 120,000.

Moguer (Arab. 'caves'), a town in the province of Huelva, Spain, overlooking the Rio Tinto, 43 miles W.S.W. of Seville. From its port, Palos, at the mouth of the river, Columbus set out on his great voyage of discovery, 3d August 1492. Pop. 7332.

Mogul (Mu'ghal, a corruption of Mongol), the name which history has indelibly fixed upon the dynasty founded by Baber, which endured at Delhi from 1526 to 1857. Baber himself was a Tartar, being descended on the father's side from Timur; his mother only was a Mongol, connected with the tribe of Genghis Khan. The name M. attached itself to the family in India as well as in Europe; and early travellers have familiarised us with the title of 'the Great Mogul,' though the court appellation was always Badshah, the Persian for king. The M. dynasty, which in power and historic grandeur yields only to that of Rome, was continued through seventeen emperors, of whom the greatest was the brave and enlightened Akbar (q. v.), and the last who retained any real authority was the bigoted Aurungzebe (q. v.). The dynasty closes with Mohammed Behaudur Shah, 'the king of Delhi,' who was tried, deposed, and banished for his participation in the Mutiny of 1857. His son still lives, an exile at Tungu in British Burmah; but the traditional glory which surrounded the name has now departed even from the minds of the Indian Mohammedans, having been to a large extent transferred to the *raj* of the new Empress. In architecture alone have the Moguls left a worthy memorial; in other public works they were lacking, but their mosques and their tombs at Delhi, Agra, and Futtehpore-Sikri will never be surpassed. It is curious that their emperors, almost without exception, attained to an extreme old age, when not cut off by a violent fate. The term M. is now generally applied throughout India, with an additional perversion of its original meaning, to all Mohammedan foreigners who are not of Afghan or Pathan blood. In this sense, which includes Turks and Persians, though not Arabs or Abyssinians, who are separately classified, the general census (1868–72) returns 219,755 Moguls in India, most numerous in the N.W. Provinces, the Punjaub, and Oude. See *The Fall of the M. Empire*, by H. G. Keene (Lond. 1876); Howorth's *History of the Mongols from the Ninth to the Nineteenth Century* (Lond. 1876), and *The History of India as told by its own Historians*, by Sir H. Elliot, and Prof. John Dowson (Lond. 8 vols. 1867–77).

Mohacs', a market-town of Hungary, in the comitat of Baranya, on the right bank of the Danube, 32 miles E.S.E. of Fünfkirchen by rail. It has five churches, large cattle-markets, and an important trade. Pop. (1869) 12,140. Here Lajos II. was defeated and slain, with 22,000 of his followers, by Suleiman the Magnificent, 29th August 1526, a defeat that for 160 years transformed a great part of Hungary into a Turkish province; and here too the Turks were in their turn totally routed by Karl of Lothringen, 12th August 1687.

Mo'hair, the hair of the Angora goat, an animal formerly peculiar to Asia Minor, but now acclimatised in Australia, Cape

and 130 from American ports. M. has many handsome buildings, a city hospital, the Alabama Medical College, 30 churches, 2 daily and several weekly newspapers, &c. Pop. (1870) 32,034. M. was settled by Lémoyne de Bienville in 1702, and was the capital of Louisiana till 1723.—**M. Bay**, an inlet of the Gulf of Mexico, is 30 miles long from N. to S., and 10 miles broad, and is protected by Forts Morgan and Gaines, the latter standing on Dauphin Island at the entrance. The depth is about 12 feet, but near the outlet it increases to 21, and here the 'cotton fleet' is loaded by lighters from M. with the rich produce of Alabama. The M. river is one of the branches by which the Alabama river enters the bay.

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Mock'ing-Bird (*Mimu[s]*) or Thrushes, found in N.



[40 years of age, he went, according] [to spend the Rajab, or month of] [rock near Mecca. Here,] [and nights in *tahannoth* (Heb.] [And when he slept he had] [dawn.' One night—'the] [which is better than a thousand months'] [which thrice called to him 'Cry.'] [asked, What shall I cry; and the voice] [name of thy Lord' (*cf.* Isa. xl. 6). These] [Koran, although, according to the] [appear in the ninety-sixth chapter.] [him how the Lord had created] [blood, and 'by the pen' had told him] [M. awoke, feeling 'as if a book had] [heart.' In a state of great excitement he] [wife, and told her what had happened.] [as she could herself, expressing] [would be the prophet of his people. She] [cousin Waraka, who was old and blind,] [Scriptures of the Jews and the Christians. When] [exclaimed '*Kóddus, koddus!* (Heb. *kadosh*,] [this is the *namus* (Gr. *nomos*, "law," in Arabic] [secret message, hence the messenger of the] [Moses. He will be the prophet of his] [comforted by the faith of his wife, which she] [her death, and of Waraka, M. now waited] [trembling for more revelations, but none came, and] [sank till he resolved to commit suicide. But when] [precipice on Mount Hira for that purpose, he] [by Gabriel or the Holy Ghost, crying, 'I am]

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Mod'elling, the art of co[n]structing as a model to be executed in [clay] other material. The fine [clay] formly moist, and is mani[pulated] assisted where necessa[ry] having curved ends. [The] work progresses. [Various] smiths, and other [implements] tools for the pu[rpose] preparation of [the] Paris, &c., fo[r]

Mo'den [Fashion] ated in a [manner] and bet[ween] conner[ion] is on[e] gir[l] ar[ound]

[great support,] [he immediate conse-] [was to transform his other uncle] [Lahab, into his legal guardian.] [of M. had become known through the pilgrims] [had preached, to the people of Medina, then called] [a great many of whom were Jews. Through them the] [Arabs had been familiarised with the god of Abraham, and] threatened with punishment for their unbelief in him, when the Messiah should appear. Thinking it possible that this prophet, who, though their own countryman, preached the god of Abraham (see MOHAMMEDANISM), might be the Messiah with whom the Jews threatened them, they secretly sent two deputations to M. at Mecca, and on his expounding his doctrine to the second, they swore allegiance to him. From the deputation he chose twelve men to be 'bishops,' and called the rest of the people of Medina 'aids.' When this transaction became known in Mecca the indignation was intense, and to avoid it the followers of M. fled to Medina to the number of 100 families. A price was set upon the prophet's head, and a number of noble youths banded themselves together to take his life, so that he and his faithful companion Abu Bekr at last fled also, reaching Yathrib (henceforth called Medinat-an-Nabi, the 'city of the prophet') in September 622. The Mohammedan Era or Hejrah dates from the first month of the first lunar year after this event, and from this time till his death M. is judge, lawgiver, and king. The Jews, who at the time of his coming to Medina had encouraged him and caused him to believe in his mission, in the belief that he was to convert all Arabia to Judaism, finding that their tool was becoming too powerful for them, turned round and tried to make him ridiculous, the result of which has been that the hatred of Mohammedans against Jews has always been greater than against any other infidels.

In the first year of the Hejrah M. proclaimed war against his enemies, especially the Koreish and certain Jewish tribes, and with 316 men he defeated 600 Meccans. Six years after, a peace was concluded, and a pilgrimage to Mecca was carried out. Desiring to spread the faith beyond Arabia, he sent messengers to Heraclius, the Byzantine emperor, to the governor of Egypt, to the king of Abyssinia, to Chosroës, king of Persia, and to Amra the Ghassanide. Amra put his messengers to death in revenge for which M. proclaimed war, in which he was defeated. The Meccans upon this seized the opportunity to rise against him, but before they were prepared he was upon them with 10,000 men, took the city by storm, and was proclaimed chief and prophet. In the year 10 of the Hejrah he went on a

pilgrimage to Mecca with at least 40,000 Muslims, whom he exhorted and blessed on Mount Arafat. He had just planned a vast expedition against the Greeks when he felt the hand of death upon him. Whether or not he intended to appoint a successor, as some think, he died without doing so, on the 11th or 12th of the third month of the eleventh year of the Hejrah (June 8, 632).

As to an estimate of the character of M., all that can be done here is to indicate the results arrived at by those who have studied the subject. He was introduced to Europe in 1529 by Luther, according to whom he was the 'Little Horn' of Daniel (viii. 9), and who wondered whether he or the Pope were the worst. According to Melanchthon M. was inspired by Satan, and his sect was altogether made up of blasphemy, robbery, and shameful lusts. His first regular biographers—Prideaux, Spanheim, D'Herbelot, &c.—distinguished him by such epithets as 'wicked impostor,' 'dastardly liar,' 'devil incarnate,' Behemoth, Korah, Beast, 666 (*cf.* Rev. xiii. 18). But this grotesque vehemence of language gradually gave place to more civil names and more temperate representations both of the man and his doctrine; and the latest investigators 'have taught the world at large that Mohammedanism is a thing of vitality, fraught with a thousand fruitful germs; and that M., whatever view of his character be held, has earned a place in the golden book of humanity.' See Sprenger's *Mohammad* (Berl. 1861–65); Ameer Ali's *Mohamed* (Lond. 1873); E. Deutsch's *Lit. Remains* (Lond. 1874); Muir's *Mahomet* (2d ed. Lond. 1877); and Bosworth Smith's *M. and Mohammedanism* (Lond. 1874).

Mohammed is the name of several Turkish sultans, of whom the only notable one is **M. II.**, surnamed *Bujuk* ('the Great'). He was born at Adrianople in 1430, and succeeded his father Amurath in 1451. At the commencement of his reign he ravaged Greece, and built a fort which commanded the Bosphorus. He laid siege to Constantinople (April 6, 1453) with 250,000 men and 300 galleys. After the partial defeat of his fleet by the Genoese, he transported it by night overland into the harbour of Constantinople. The siege lasted fifty days; the city was carried by assault on May 29, and the Eastern Roman Empire came to an end. Mohammed attacked Belgrade in 1456, but was defeated by John Hunnyades with a loss of 20,000 men. He next subdued Trebizond, Lesbos, and Bosnia. He captured Belgrade in 1465, and conquered Albania in 1467. He took Negropont in 1470, defeated the Persians in 1472, and conquered the Crimea in 1475. Five years later he threatened Italy, and made an unsuccessful attack on Rhodes. He died at Nicomedia in May 1481. M.'s actions at different times reflected cruelty, magnanimity, perfidy, and generosity. Barbarous as many of his deeds were, he encouraged learning and civilisation, was himself an able linguist, speaking Greek, Arabic, and Persian, and understanding Latin; he was also a painter, and had a great knowledge of geography and mathematics. Several of his letters translated into Latin were published by Landini at Paris in 1520. While he did not scruple at any deed of violence necessary to satisfy his vast ambition, it does not appear that he loved bloodshed for its own sake, and on many an occasion he was tolerant and humane. To his lust for conquest the Turks owe the firm establishment of their empire in Europe. He was a great warrior and a sagacious statesman. See Knowles' *History of the Turks*, and Hammer's *Geschichte des Osmanischen Reiches* (10 vols. 1827–34).

Mohamm'edanism, the religion which was founded by Mohammed (q. v.), can only be understood in the light of the religious condition of Arabia at the time when he took up his mission. The religion of the country was composed of three different elements: certain forms of heathenism, chiefly nature-worship, Judaism, and Christianity. (1) Heathenism. Fetishism prevailed to a certain extent, as appears from certain sacred stones and trees—*e.g.*, the Black Stone of the Kaaba, or temple ascribed to Abraham at Mecca, the White Stone at Taif, and various oracle-trees, one of which was near Mecca. Of a higher type was the worship of 'the host of heaven.' The Sun, the Moon, Jupiter, Venus, &c., had their temples, with their complement of priests. As a matter of course in such a stage of religious development, the people had their Lares (q. v.) and Penates (q. v.), sometimes of the rudest description; *e.g.*, in one tribe the household god took the form of a piece of dough. Angels and demons also were treated with pious attention as intercessors with the great Allah. (2) Christianity. The old theory that whatever is good in M. was derived from Christianity, has given way before recent investigation, for the Arabian Christianity of the time was of an incredibly low type. Mohammed's only instructors were certain Greek and Abyssinian slaves. The Syrian journeys, during which he is supposed to have become acquainted with it, are now considered to be mythical, as well as the monk Bahira-Sergius-Georgius-Nestor, by whom he is said to have been instructed. Thus, although the Christian doctrine of the sonship of Jesus Christ is understood in the Koran, it also combats the notion that Mary-Maryam 'the daughter of Imran, the sister of Harun,' was the mother of God, and a member of the Trinity. It also contains some extraordinary stories from the Apocryphal (New Testament) writings, and the heretical notion that it was 'not Christ who was crucified,' but Judas; the hallucination being imposed on Christ as a punishment for his allowing people to call him God. (3) The most important of the three religious elements was that of Judaism. A number of Jews were found in Arabia at a very early period. Nebuchadnezzar caused more to seek refuge in the same country, and the Asmonæans caused a whole tribe of Arabs in the N. to adopt their religion. These Jewish tribes lived scattered all over Arabia, chiefly in the South, leading a pastoral or agricultural life, or they were congregated in cities: *e.g.*, Yathrib (afterwards Medina), Kheibar (near Medina), and Yemen. Now the Jews were the cultivated class among the Arabs; they could all read and write, which few of the Arabs could do. The great accomplishment in Arabia at the time was poetry, and the Jews were especially gifted in this way. And not only were they superior in learning to their Arab countrymen, but they were familiar with the great Talmudic development of the Law which had been going on among their own brethren in Judæa and Babylonia; and great light is thrown by the Talmud on the teaching of the Koran, although the reverse of this has generally been supposed. In short they were called by the Arabs 'the people of the Book.'

As to the relation of M. to these antecedent faiths, Mohammed professed at the outset of his career to belong to the sect of the Hanifs (lit. 'hypocrites'), whose religion was a phase of Jewish-Christianity, or Christian-Judaism, and who styled themselves 'Abrahamite Sabians.' They believed in one God, and were guided by the Law, the Gospel, and certain 'rolls of Abraham and Moses,' called *Ashmaat* or *Shamaata* (Talmud. *Shemaata*, 'legal traditions' or Halacah), which were collections of Midrash (q. v). In this sect there were a number of men who had become disgusted with the fetishism into which most of their countrymen had sunk. Once four of them met at the Kaaba, during the annual feast, and expressed to each other their secret opinion: 'Shall we encompass a stone which neither heareth nor seeth, neither helpeth nor hurteth? Let us seek a better faith.' And the faith they adopted was the 'Religion of Abraham,' the Hanifite Creed. It was this creed that Mohammed established; he succeeded where others failed. To understand M., then, it is necessary to inquire what this 'Religion of Abraham' was, which formed its foundation. The word used for it in the Koran is *Milla* (Heb. for Chald. *memra*, Gr. *logos*). This 'Word' which Abraham proclaimed, teaches, says the Talmud, 'the existence of one God, the Creator of the Universe, who rules this universe with mercy and loving-kindness. He alone, also, guides the destinies of men. Idolatry, even when combined with belief in him, is utterly to be abhorred; he alone is to be worshipped; in him alone trust is to be placed in adversity. He frees the persecuted and the oppressed. You must pray to him and serve him in love, and not murmur when he asks for your lives, or even for lives still dearer to you than your own.' Regarding duties to man, it teaches: 'Loving-kindness and mercy are the tokens of the faith of Abraham.' 'He who is not merciful is not of the children of Abraham.' 'What is the distinguishing quality of Abraham's descendants? Their compassion and their mercy.' And this mercy and loving-kindness is to be extended to every human being 'without reference to garment, birth, rank, creed, or nationality.' Abraham, when he died, left to his children four guardian angels—Justice, Mercy, Love, and Charity. These traits of the faith of Abraham, which are to be gathered from the Talmud, form the foundation of M., 'often in the very words, always in the sense of these Jewish traditions.' 'Abraham,' says the Koran, 'was neither a Jew nor a Christian, but he was pious and righteous, and he was no idolater.' Both in

the Talmud and the Koran the greatest stress is laid upon the unity of God, the absence of mediators, and the repudiation of any special, exclusive, privileged creed.

The fundamental position on which Mohammed built his religion was that 'from the beginning to the end of the world there has been, and for ever will be, but one true orthodox belief; consisting, as to matters of faith, in the acknowledging of the only true God, and the believing in and obeying such messengers or prophets as he should from time to time send to reveal his will to mankind; and, as to practice, in the observance of the immutable and eternal laws of right and wrong, together with such other precepts and ceremonies as God should think fit to order for the time being, according to the different dispensations in the different ages of the world.' To this religion he gave the name of *Islam*, the great characteristic of which is generally supposed to be fatalism, but the real meaning of which is contained in Mohammed's own words:—'We have spoken unto thee by revelation—follow the religion of Abraham.' According to Deutsch, 'as far as Mohammed and the Koran are concerned, Fatalism is an utter and absolute invention.' The name Muslim, the derivative of Islam, is contained and explained in the Talmud. It is the word used for 'just, righteous man,' in a paraphrase of Proverbs xxiv. 16; and the word signifies 'one who strives after righteousness with his own strength.' Notwithstanding, it cannot be denied that the popular understanding of their creed on the part of Muslims practically amounts to Fatalism. 'God is supreme; what he wills can only be known by what he brings to pass; and against his decrees as manifested in the progress of events it is idle to strive.'

The great peculiarity of M. lies in this that it is 'at once a religious creed and a political revelation. Church and State are so completely identified that the religious life is made subject to the supervision of the courts of law, and the constitution of society and the government is supposed to be the result of a series of divine enactments. In religion, therefore, all spiritual development is treated as a crime against society and punished accordingly. In civil and political life all efforts after reform or improvement are regarded as a rebellion against the revealed will of God and punished as infidelity.' In short, every Mohammedan state is a theocracy, and hence the first propagation of M. was practically commensurate with the extension of the Saracen Empire. Mohammedan law consists of three elements, the Koran, the traditions, and the systems of jurisprudence taught by the four orthodox Imams. These, according to Muslim ideas, contain an accumulation of first principles which are above the reach of human criticism for two reasons: because they are an expression of the will of God, and because they are written in a language which is no longer perfectly understood. The Koran (q. v.) was set forth by Mohammed as a literal transcript of the ordinances written on the vast table which is before the throne of God for that purpose. These ordinances had often been revealed before to certain individuals selected from the race, but in the lapse of time these earlier revelations had become so corrupted that they rather deluded men than instructed them in the way of salvation. The Koran, as a perfect revelation of the will of God, superseded them all. The prophet had at all times, through the angel Gabriel, access to the 'preserved table,' so that in all his teaching it was not he that spoke, but the very Word of God. Further, in all his religious acts he was a divinely-revealed type and exemplar for the exact imitation of all his followers. The traditions, then, are the declarations of Mohammed regarding religious questions—moral, ceremonial, or theological, and records of all that he said or did, orally handed down by Ayesha, his favourite wife, the four 'rightly directed' califs—Abu Bekr, Omar, Othman, and Ali—and the six companions called the Evangelists of Islam. These transmitted their knowledge to their disciples; these to the next generation, and so on. Millions of anecdotes regarding the prophet, the greater number of which had originated in mere gossip or been fabricated by story-tellers, were soon floating about among the faithful, and in order to preserve whatever was authentic or valuable in them, collections were made, and certain tests applied to separate the true from the false. Thus Abu Daûd Suleiman (A.D. 817–889) wrote down 500,000 traditions respecting the prophet, from which he selected 4800. Al Bokhari (810–870) made what is called the 'Authentic Collection,' having selected 7200 out of a mass of 600,000. But there are six collections which are received by all orthodox Muslims. Out of the whole number of authentic traditions about 3000 refer directly to the prophet, and are partly historical and partly prophetical. The historical form an instructive commentary on the Koran, and are chiefly remarkable for the strange confusion of thought so apparent in the Koran, which placed on the same level serious moral offences, breaches of sumptuary regulations, and ceremonial omissions. The prophetical set forth especially the early Mohammedan beliefs regarding death, the resurrection of the dead, the last days, the final judgment, and the future life. As to the general body of the traditions they form 'a vast chaotic accumulation of legends about angels, demons, the origin of the world, and of all created beings.'

In their legal aspect the traditions were a collection of statutes supposed to embrace the entire sphere of man's daily life, so as to preclude the need for any appeal to the unassisted reason of man. The califs who succeeded Mohammed were merely the executors of a system already complete; but when a case arose for decision for which there was no precedent either in the Koran or the traditions, they had recourse to the method of 'analogical deduction.' This was the state of matters under the four 'rightly directed' califs, and after that analogical judgments were given by devout men who had learned by heart the Koran, the traditions, and the analogical judgments of the califs, especially seven divines known as 'the seven jurisconsults of Medina.' The first systematiser of this mass of unwritten learning, consisting of remembrances of the Prophet, the teachings of the traditionists, and the judgments of the seven jurisconsults, was Malek Ibn Anas, the first of the four orthodox Imams (see MOHAMMEDAN SECTS), and a native of Medina. He dictated a treatise called 'The Beaten Path,' *i.e.*, a system of jurisprudence embracing the entire sphere of human life, which speedily came to be regarded as of equal value with the Koran itself. The religion of Islam is divided into two parts: *Iman*, faith and theory, and *Din*, religion or practice. The one chief article of faith is that 'there is no god but the true God, and that Mohammed is his apostle.' But this is subdivided into six branches:—1. Belief in God; 2. in his angels; 3. in his Scriptures; 4. in his prophets; 5. in the resurrection of the dead and a day of judgment; and 6. in God's absolute decree and predetermination both of good and evil. There are four articles of practice:—1. Prayer; 2. alms; 3. fasting; and 4. the pilgrimage to Mecca. Nothing is more prominent in the Koran than the doctrine of the unity of God. The doctrine regarding the angels is borrowed from the Jews, who themselves had developed it under Persian influence. Besides angels and demons the Koran teaches the existence of another intermediate order of beings of a grosser fabric called Jin or Genii, some of whom are good and some bad. As to the Scriptures, the Koran teaches that God has given revelations of his will to his prophets at different times, to the number of 104. Of these 10 were given to Adam, 50 to Seth, 30 to Enoch, 10 to Abraham, and the other four—the Pentateuch, the Psalms, the Gospel, and the Koran—to Moses, David, Jesus, and Mohammed; but all are now lost except the last four. Of prophets whom God has sent into the world from time to time, all professors of the religion of Islam, there have been 124,000, or, according to another tradition, 224,000; of whom 313 were apostles sent with a special commission to reclaim mankind from infidelity and superstition; and six of them—Adam, Noah, Abraham, Moses, Jesus, and Mohammed—brought new laws and dispensations, which successively abrogated the preceding. As to a future state the Koran teaches that when corpses are laid in the grave they are examined by two angels as to their faith. If the answer be satisfactory, the corpse is permitted to rest in peace, if not, it is tormented till the resurrection. The body is entirely consumed except the bone called *ajb* (*os coccygis*), from which, as from a seed, the whole will be renewed at the Resurrection by a 40 days' rain. The ideas the same as those of the Jews regarding the bone Luz and the dew. Hell is divided into seven apartments: the first for the reception of wicked Mohammedans, who after being purified there for a time will at length be released; the second for the Jews; the third for the Christians; the fourth for the star-worshippers; the fifth for the magicians; the sixth for the idolaters, the seventh for hypocrites, who profess some religion but in heart belong to none. The righteous as they enter Paradise drink from a *pond* which is supplied by one of the rivers of Paradise, after which they never thirst again. Thereafter follows a

mighty feast, and then each is dismissed to the mansion assigned to him. The comforts of these dwellings are regulated according to the merits of each, but the very meanest will have 80,000 servants and 72 wives of the girls of Paradise, who are of ravishing beauty, and called from their large black eyes *hural eyun* (Eng. *houris*), besides the wives he had in this world. The most delicious viands and wines will delight the palate without producing satiety, the most magnificent garments and furniture will please the eye, and the most ravishing music will fill the air. But it is to be understood that these sensual enjoyments are only the lowest, such as are common to all the inmates of Paradise. There is superabundant recompense of a spiritual nature promised to those of the highest degree. This exquisite delight, in comparison with which all the other pleasures of Paradise are forgotten, consists in the enjoyment of the favour of God, and beholding his face morning and evening. The doctrine of the Koran regarding predestination is that whatever hath or shall come to pass in the world, whether of good or evil, is irrevocably fixed by the divine will, and recorded from all eternity on the *preserved table*.

Of the four articles of religious practice the first is Prayer, which Mohammed used to call 'the pillar of religion' and the 'key to Paradise.' Five times a day, according to the express injunction of Mohammed, who received a revelation on the subject on the occasion of his *Miraj*, or journey to heaven, every true Mussulman engages in prayer, turning his face meanwhile towards Mecca. Almsgiving is of two kinds: legal, the amount of which is fixed by law, and voluntary. It is held to be highly meritorious, and of great efficacy in procuring answers to prayer. Fasting also is a religious duty of the greatest importance. It is expressly enjoined in the Koran that the whole month of Ramadan be observed as a fast from daybreak till sunset. Lastly, the pilgrimage to Mecca is so important that he who fails to perform it may as well die a Jew or a Christian. The chief ceremonies prescribed for the pilgrims consist in going in procession round the Kaaba, running between Mount Safa and Mount Merwa, performing their devotions on Mount Arafat, offering sacrifices, shaving their heads and cutting their nails. See Sale's *Koran;* Sprenger's *Koran, Mohammad*, &c. (Berl. 1861–5); Deutsch's *Lit. Remains; art.* 'Islam' (Lond. 1874); Bosworth Smith's *Mohammed and Mohammedanism* (Lond. 1874); Vambéry's *Islam im neunzehnten Tahrhundert* (Leip. 1875); and Muir's *Life of Mahomet* (new ed. Lond. 1877).

Mohammedan Sects. Mohammedans are divided into a great number of different sects—exactly 73, according to a traditional prophecy of Mohammed's—four of which are admitted to be orthodox, and all the rest heretical. The former get the general name of Sonnites, *i.e.*, Traditionists, because they acknowledge the authority of the Sonna or collection of Traditions (see MOHAMMEDANISM), although, as we shall see, one of them—the Hanifites—do so only in a very small degree. Their founders are called the four orthodox Imams (see IMAM), and are regarded as the great authorities in jurisprudence. 1. The *Malekites*, who are most numerous in the N. of Africa, were founded by the Imam Malek Ibn Anas (A.D. 713–795), a native of Medina. His treatise, 'The Beaten Path,' which was a system of jurisprudence embracing the entire sphere of human life, and compiled from the Koran, the Traditions, and the judgments of 'the seven jurisconsults of Medina,' speedily came to be regarded as of equal value with the Koran itself. 2. The *Hanifites* were founded by the Imam Abu Hanifa-an-Noman (A.D. 699–767), a native of the Persian city of Basra, and the father of the legists known as 'the Jurists of Irak,' who differed from Malek chiefly in making almost no use of the Traditions as a source of law, admitting only 18 of them to be authentic. He professed to have drawn his jurisprudence entirely from the Koran, by 'analogical deduction.' Hence his followers have been called 'the followers of reason,' as distinguished from the other three Sonnite sects, or 'followers of tradition.' The Hanifite has been the most widely spread of the four orthodox systems. It was the one that prevailed at Bagdad during the time of the Abbasside dynasty, and is that which prevails in the Ottoman Empire at the present day. (3) The third sect, the *Shafites*, was founded by the Imam As-Shafi (A.D. 767–820), of the tribe of the Koreish, and the family of the Prophet, who followed the eclectic method of Malek rather than the deductive method of Abu Hanifa. He first acquired a thorough knowledge of the systems of his two predecessors, and then built up his own of materials taken from both, but especially from the traditional precedents of Malek. The chief seat of his system was in Egypt, but Shafite doctors were rivals to those of the Hanifite school in all the principal cities of Asia. (4) The last of the four Imams was Ahmad-ibn-Hanbal (A.D. 780–857), a native of Bagdad and pupil of As-Shafi. His system, which never extended much beyond the precincts of Bagdad, and is now almost entirely obsolete, was a reaction against the rationalising tendency of the Hanifite system, according to the elastic method of which the court jurists, by skilful manipulation, got the doctrines of the Koran to permit the most iniquitous practices of califs and governors. To meet the wants of the society of his time, he conceived that a supplementary revelation was needed, and this he found in the mass of traditions which had accumulated since the days of Malek-ibn-Anas. From this he compiled a legal system, which was to render all appeal to human reason entirely superfluous.

Of the heretical sects there are also four principal ones, of which the rest are subdivisions. (1) The *Motazalites* ('Separatists') are the followers of Wasel-ibn-Ata, who was expelled from the school of Hasan of Basra for teaching that a believer who had committed a grievous sin was not to be deemed an infidel, but was in a middle position. Besides the above, his followers adopted the following tenets: (1) they rejected all eternal attributes of God; (2) they held that the Word of God consisted of letters and sound; (3) they denied absolute predestination, holding that God is the author of good only, and not of evil; and (4) they held that God could not be seen in Paradise with the bodily eye, and rejected all similitudes applied to God. (2) The *Sefatians* ('Attributists') differed from the Motazalites chiefly in affirming the eternal attributes of God, this being the doctrine of the first Mohammedans. They afterwards introduced another species of attributes called declarative, expressed by speaking of God having, *e.g.*, hands, eyes, &c., which, when understood literally, led to the notion of a likeness between God and man. (3) The name *Kharejites* ('rebels') was first applied to 12,000 men who revolted from Ali (A.H. 37), after the battle of Seffein, because he had referred a matter concerning the religion of God to the judgment of men, declaring him to be an infidel therefor. They also held that an Imam who turned aside from the truth might be deposed, and that any man might be raised to that dignity, although he did not belong to the tribe of the Koreish, provided he had the necessary qualifications. (4) The *Shiites* ('adherents') were the adherents of Ali-ibn-Abu-Taleb, in opposition to the Kharejites, maintaining that he was the lawful Calif and Imam, that the supreme authority, both temporal and spiritual, belonged to his descendants, and that the dignity of Imam is a fundamental affair of religion, not depending on the will of the people, but fixed by the prophet.

At the present day the chief antagonism to the Sonnites or orthodox Mohammedans is on the part of the Shiites. The controversy between them turns chiefly on the following points. The Shiites reject Abu Bekr, Omar, and Othman, the first three successors of Mohammed as usurpers, while the Sonnites regard them as rightful Califs and Imams. The Shiites regard Ali (the fourth) as the first true Imam, esteeming him, indeed, to be at least equal to Mohammed himself. The Shiites reject as unworthy of credit the Sonna or Collection of Traditions which the Sonnites receive as of canonical authority. And both charge each other with corrupting the Koran and neglecting its precepts; in short, they regard each other as abominable heretics, worse than Jews or Christians. Now as the Turks generally are Súnites and the Persians Shiites, the greatest possible enmity exists between these two nations, although both are Mohammedan. See Sale's *Koran; Prelim. Diss.;* and R. D. Osborn, *Muhammadan Law*, in Contemp. Review (May 1877).

Mohammed Behaudur Shah, the seventeenth and last of the Mogul emperors of Delhi. He came to the throne, already in his old age, in 1837. He lent his name and influence to the Sepoy mutineers in 1857, and after the storm of Delhi by the British, he was captured alive by Captain Hodson in the mausoleum of Humayun. He was tried (January 27 to March 9, 1858), found guilty of murder, treason, and arson, and sentenced to transportation to Burmah. He subsequently died at Tungu, and there his youngest son, Jumma Bukht, still survives in exile. See Sir J. Kaye's *History of the Sepoy War* (vols. i.–iii.).

Mohawk River, the chief affluent of the Hudson, which it joins 10 miles above Albany, after an entire course of 140 miles. It flows in an easterly direction, through a beautiful and populous valley, once the chief abode of the M. *Indians*, a nation which belonged to the Iroquois family or confederacy. In 1784 this nation removed to Canada, where some hundreds still survive.

Mohic'ans or **Mohe'gans**, formerly a powerful tribe of North American Indians, belonging to the great Algonquin family, and occupying in the 17th c. the parts of the land now comprising the States of New York, Connecticut, and Massachusetts. Later on they were confined to Connecticut, and are now almost extinct.

Mohilev', or **Mogilev'**, a government of Russia, bounded N. by Vitebsk, E. by Smolensk, S.E. by Tchernigov, and W. by Minsk. Area, 227 sq. miles; pop. (1870) 908,858 (103,000 Jews, 40,000 Poles). M. is drained by the Upper Dnieper, and its affluent the Zosh, and is one-third tilled land, one-fourth forest. —**M.**, on the right bank of the Dnieper, 92 miles S.W. of Smolensk, is the chief town. It has a cathedral, 21 other Greek churches, and 4 monasteries; is the seat of the Roman Catholic primate of Russia, and has 4 Catholic churches. There are one Lutheran church, and 22 synagogues. The manufacturing industries of M. are considerable, and much fruit is grown in the vicinity. There is a large transit trade with the Baltic and the Black Sea. Pop. (1870) 40,431. Another **M.** is in the government of Podolia, and is finely situated in a mountainous district on the Dniester, 195 miles N.W. of Odessa. It has extensive general trade with Moldavia and Wallachia. Pop. (1870) 18,129.

Möhler, Johann Adam, a Catholic theologian, born at Tgersheim, in Wurtemberg, May 6, 1796, educated at Mergentheim and Ellwangen, studied at Tübingen and Rottenburg, and in 1819 was ordained priest. Returning to Tübingen, he was appointed a *privat docent* (1822), and Professor of Theology (1828); but, becoming embroiled in a bitter religious controversy with Baur and others of his colleagues, he was glad in 1835 to accept the chair of Biblical exegesis at Munich, where he died, April 12, 1838. Of his writings, in which he strove to harmonise the system of Schleiermacher with the teachings of the Church, the principal are *Die Einheit in der Kirche* (Tub. 1825), *Athanasius* (Mainz, 1827), *Symbolik* (Mainz, 1832), and *Neuen Untersuchungen der Lehrgegensätze Zwiechen den Katholiken und Protestanten* (Mainz, 1834). His *Nachgelassenen Schriften* (2 vols. Ratisb. 1839-40) were edited by Döllinger, and his *Patrologie* (Ratisb. 1839) by Reithmayr.

Mohurbhu'nj ('peacock'), the largest of the tributary states of Orissa, India, in political connection with the government of Bengal, lies S. among the hills, E. of the district of Midnapore. Area, 4243 sq. miles; pop. (1872) 258,680; revenue, £20,515; tribute, £106. The products are honey, resin, lac, *tussur* silk cloth, timber, rice, and iron. The Rajah was of some importance at the beginning of the century, but much of his territory has lately passed under British administration. The capital is Baripada.

Mohurr'um (*muharram*, derived from an Arabic word meaning 'sacred,' 'prohibited;' *cf.* the Latin *sacer*), the first month of the Mohammedam year, in which it was held unlawful to make war. The name is specially applied to the great fast or festival which is held during the first ten days of this month, in commemoration of the martyrdom of the grandsons of the Prophet, Hassan and Hussain. Dirges are recited of their sufferings, and tinsel models of their tombs are carried in crowded processions from the Imambara to the Karbala on the last day. This festival is only observed by the Shiah sect; and its celebration, which is attended with great pomp in all the large Mussulman towns of India, has always a tendency to result in a disturbance with the rival sect of Sûnis.

Moi'dore, a now disused coin of Portugal, equal to 4000 reis, or about 27s. sterling.

Moines, Des, the capital and largest city of Iowa, U.S., on the Des Moines River, at the mouth of the Raccoon, 357 miles W. of Chicago by rail. It has been the State capital since 1855, and among its buildings are a U. S. court-house built of marble, an arsenal, twenty churches, &c. In 1876 a new State-house was being erected at a cost of $3,000,000. The State library contains 20,000 vols. M. has three daily, seven weekly, and three monthly newspapers, and in the vicinity there is extensive coal-mining. Pop (1860) 3965; (1870) 12,035.

Moir, David Macbeth, a minor poet, was born January 5, 1798, at Musselburgh, near Edinburgh, and practised there as a surgeon. He early published *The Bombardment of Algiers*, and other poems, and became a contributor to *Blackwood's Magazine*, under the *nom de plume* of Delta (Δ). *The Legend of Genevieve* (1824), *Domestic Verses* (1843), and *The Autobiography of Mansie Waugh* (1828) first appeared in the magazine. The last of these is an admirable picture of the small, vulgar, shrewd, conceited, yet kindly Scot. It displays something of the racy humour of Galt with more tenderness and poetry, and constitutes M.'s best claim to remembrance. In 1851 he published *The Poetical Literature of the Past Half Century*, and *The Lament of Selim*. He died at Dumfries, July 6, 1851. Aird edited his works in one vol. (1857).

Moire is a term applied to watered silks. Stout silk of double width is only so figured, and the waved effect is produced by moistening the fabric, folding it carefully, so that the individual threads of the warp or woof lie directly over each other—the condition on which a successful result depends—and subjecting the whole to great pressure. The watered portions reflect the light, and are then displayed to advantage.

Moirée Metallique (Fr.), a name given to tinplate, exhibiting a beautiful crystalline appearance, produced by sponging over the metal a mixture of nitric and hydrochloric acids, then washing, drying, and lacquering. Boxes and other articles are made of it, but they are less common now than formerly.

Moissac, a town of France, department of Tarn-et-Garonne, on the right bank of the Tarn, 17 miles W.N.W. of Montauban. Pop. of commune (1872), 9036. There are the ruins of an ancient abbey with curious statues and carvings. M. has a trade in cereals and wines.

Mokudd'um (*mukaddam*, derived from an Arabic word meaning 'one who goes before, a leader'), a term introduced by the Mohammedans into India for the headman (*pradhan*, or *potail*) of the Hindu village community. In Orissa, where this name is especially in use, the M., from being merely a collector of the government revenue, has developed into a landlord with a proprietary interest in the soil. See Hunter's *Orissa* (Lond. 1872).

Mo'la, a seaport of Italy, in the province of Bari, on the Adriatic coast, and 12 miles S.E. of the city of Bari by rail. It lies amid gardens and olive groves, and has several fine churches. Pop. (1874) 11,775.

Molasse', the name given in Switzerland to the loose sandy deposits which occupy the central lake-region between the Alps and Jura, and which correspond in age to the Miocene (q. v.) formations. The contemporaneous conglomerate at the foot of the Alps is called *Nagelfluc*. The shells are vegetable remains, and indicate freshwater agency for the most part, and a subtropical climate.

Molass'es. See SUGAR.

Mold (Cymr. *Wyddgrug*), a parliamentary borough in the county of Flint, Wales, on the Alun, 11 miles W.S.W. of Chester, and connected with the rest of England by a branch of the Chester and Holyhead Railway. It is situated in a region rich in minerals, particularly coal and lead, and has in its vicinity many ancient British, Roman, and Old English remains, and the ruins of a fortress, and of a fortified hill. The county assizes and quarter sessions are held here. Pop. of borough (1871), 4534.

Mol'dau (Bohemian *Vltava*), the chief river in Bohemia, rises at the foot of the Vogelstein in the Böhmerwalde at a height of 3868 feet, flows S.E. to Hohenfurt (1736 feet), then turns N. towards Budweis, where it becomes navigable, and Prag, where it attains a breadth of 300 feet, and finally joins the Elbe at Melnik, after a course of 262 miles. It receives on the right the Masch, Luschnitz, and Sazawa, and on the left the Wotawa and Beraun.

Molda'via and **Walla'chia.** See RUMANIA.

Mole (*Talpa*), a typical genus of the family *Talpidæ*, which in turn is included in the *Insectivorous* order of Mammalia. The family *Talpidæ* is distinguished by its members having

a variable number of incisor teeth, the canine teeth being frequently absent, and their place taken by false molars. The molar teeth have sharp tubercles, adapted for crushing the insects on which these animals feed. The feet have five toes, and the animals are *plantigrade, i.e.*, place the whole sole of the foot on the ground in walking. In the Moles themselves six upper and four lower incisors exist. The canines number two and the molars six in each jaw, the premolars numbering eight above and six below. The muzzle is long and blunt at the extremity; the eyes are small and concealed by the fur, and the tail is short. Five toes exist, the fore feet have the soles turned backwards, and the claws are strong. The common M. (*Talpa Europæa*) is one of the most familiar of quadrupeds. Its burrows or dwellings are of very definite shape and form. A central fortress is generally constructed, from which various tracks radiate to the feeding ground. The nest in which the female brings forth the young is also formed in an ingenious and careful fashion. The young, numbering from 4 to 7, are born in April, but may appear later in the summer. The colour of the M. is generally blackish grey, but some specimens have been found of white and cream colour. The M. is very pugnacious. Fierce combats take place between the males, and it is alleged that the victor not merely kills but eats the vanquished. The ordinary food consists of earthworms, which the M. captures with dexterity. The fore-limbs are mainly used in burrowing, and from the manner in which the palm of the hand is turned backwards, the work of scooping out the earth is readily performed. A special bone is developed for the support of the muzzle, and the collar-bones are strongly made. The golden M. (*Chrysochloris aureus*) is a S. African species, the hairs of whose fur shine with iridescent hues, and thus obtain for it its name. The teeth of the golden M. interlock in a curious fashion. Its fore feet have four toes, and the hinder feet are five-toed, the nail of the middle finger being very large. The star-nosed M. (*Condylura* or *Astromycles cristatus*) is a N. American species, deriving its name from the peculiar star-shaped cartilaginous disc in which the nose terminates. About twenty horny 'caruncles' or rays form this peculiar structure, the nostrils opening in its centre. The colour resembles that of the common M. The shrew M. (*Scalops aquaticus*) is also a N. American species, and appears to be of aquatic habits. The length of its muzzle is about 16 inches.

Molé, Matthieu, one of the most illustrious magistrates of France, belonging to an old parliamentary family, was born in 1584. While holding the office of procureur-général, Richelieu in 1641 appointed him First President of the Parliament of Paris. During the stormy period of the Fronde (q. v.), he defended with equal zeal the interests of the people and the rights of the crown, and in consequence had to struggle at times against both. In 1651 he was made Keeper of the Great Seal, and although his sense of justice was at times embarrassing to the Court and the nobles, it won for him a national respect which secured his position against assault. M. died 30th January 1656. See his *Mémoires* (3 vols. Par. 1854-56), edited by Champollion-Figeac. —**Edouard François Matthieu M.**, born 5th March 1760, became President of the Parliament of Paris in 1788. He married a daughter of Malesherbes, emigrated in 1789, but returned to France in 1794 to fall a victim to the guillotine on the 20th of April.—**Louis Matthieu, Comte de M.**, son of the preceding, was born at Paris, 27th January 1781, emigrated with his father on the outbreak of the Revolution, lived partly in Switzerland, partly in England, and at the age of sixteen returned to France, where he sought by hard study to make up for the neglected education of his youth. Through the influence of Mme. de Beaumont he entered into the society of Pasquier, Chateaubriand, and Joubert. In 1806 M. was brought under the notice of Napoleon through a review which called his attention to a volume—*Essais de Morale et de Politique*—published the year before. He was immediately chosen as one fitted for positions under government. In February 1806, he became Auditor of the Privy Council; in June *Maître des Requêtes;* in November 1807, Prefect of Côte d'Or; in February 1809, Councillor of State; in October, Director-General of Roads and Bridges, after which he was raised to the peerage and entered the Cabinet. Under Louis XVIII. he acted (1817) as Minister of Marine. In the first cabinet of Louis-Philippe M. (14th August 1830) was Foreign Minister, and (1836) he again took the post, accepting (1837) the Premiership after the resignation of Guizot. Two years after he resigned, and (21st February 1840) was appointed a Member of the French Academy. On the 23d November 1855 he died at the Château de Champlâtreux. He had practically retired from affairs for fifteen years.

Mole-Cricket (*Gryllotalpa*), a genus of *Orthopterous* insects, burrowing in the ground by means of greatly developed fore-limbs. These limbs are short, stout, and flat, having strong spinous projections, especially in their terminal parts. The eggs, numbering from 300 to 400, are laid in tough capsules in subterranean galleries. The common M.-C. (*G. vulgaris*) is scattered over the greater part of Europe. It attains a length of 2 inches, and is of a brownish colour. The wings are short, and the fore-legs are used for cutting plant tissues, as well as for burrowing. Like its mammalian namesake, the mole, it is very combative. It also effects great destruction amongst plants. *G. longipennis* and another species (*G. didactyla*) commit ravages of great extent amongst the sugar-canes in the W. Indies. *G. borealis* is an American species inhabiting moist earth near ponds and rivers. The M.-C. has a peculiar chirp or call, made by movements of the wing-covers.

Mol'ecule (Fr. diminutive of Lat. *moles*, 'a mass'), is the smallest quantity of a substance which can exist in a free state. Molecules must not be confounded with atoms, which are defined as the ultimate indivisible particles composing matter. A M. may be divided, but it then ceases to be the same M. Molecules of the same substance are alike in mass, form, and constitution, but are different from those of other substances. Concerning the ultimate constitution of molecules we know nothing definite, but theory inclines to regard a M. as an aggregation of atoms, or even of other molecules. For instance, in chemistry, a M. of water is made up of a M. of hydrogen and half a M. of oxygen. Now, according to Avogadro's Law, deduced originally from experiment, but an immediate consequence from the kinetic theory of gases (see GASES), equal volumes of different gases at the same temperature and pressure contain the same number of molecules. Hence to form water, hydrogen and oxygen must be mixed in the proportion of two volumes of the former to one volume of the latter. The study of molecular physics is daily becoming more and more important; and it is in this direction that we naturally look for the next great advancement in science. The phenomena of light, sound, electricity, magnetism, &c., are now recognised as molecular phenomena; and anything which tends to make clearer our vision of the ultimate nature of matter must necessarily result in wider views of the transformations of these various forms of energy.

In natural history the *molecular theory* of organisation is a theory which assumes that the various tissues and parts of animals and plants originate from the aggregation of infinitesimally small particles of organic nature named 'molecules.' The late Professor J. Hughes Bennett of Edinburgh was one of the chief supporters of this idea, and described the formation of cells as resulting, in many cases at least, from aggregation of molecules. These molecules are believed to possess inherent vital properties, in virtue of which they grow and reproduce their like, and exhibit the movements described under the title of *molecular motion* —a process of movement, however, liable to be closely imitated by the motion of particles of inorganic substances in fluids.

Mole-Rat (*Spalax*), a genus of *Rodent* Mammalia, forming the type of a family (*Aspalacidæ*) having large and projecting incisor teeth, very small outer ears, and small and rudimentary eyes. The feet are short, and the claws small. The tail is short or absent. The Common M.-R. (*Spalax typhlus*) or 'sleeper,' inhabits S. Russia, Syria, and Asia Minor generally. It burrows, like the insectivorous mole, underground. Its food is of vegetable nature, and appears to consist largely of roots. The colour is a light brown, inclining to red. The average length is 10 inches. Nearly allied to the M.-R. is the Coast-Rat or Sand-Mole (*Bathyergus maritimus*), found on the coasts of S. Africa. The teeth are exceedingly prominent, and the claws very long and powerful. The colour is a greyish brown, and the length about 15 inches.

Mole'skin, a stout heavy fabric of cotton woven like satin, and used principally for the trousers and other working garments of out-door labourers, and for the clothing of male inmates of workhouses, &c.

Moles'worth, Rev. William Nassau, an English historian, born at Milibrook, near Southampton, 8th November 1816, was educated at King's School, Canterbury, at St. John's and Pembroke College, Cambridge, where he graduated in 1839, took orders in the Church of England, and was made vicar of St. Clement's Spotland, near Rochdale, in 1844. He has written a *History of the Reform Bill of* 1832 (1864), *A New System of Moral Philosophy* (1867), and a *History of England from the Year* 1830 (3 vols. 1871–73; new ed. 1874). The last in particular is an admirable record of one of the most instructive periods in the national history.

Molesworth, Sir William, an English philosophical politician, belonged to an old Cornish family, and was born in London, 23d May 1810. Educated at Edinburgh and in Germany, he entered the House of Commons in 1832 as an advanced Liberal, voting for national education, the ballot, and Jewish emancipation. From 1837 to 1841 he represented Leeds, and when Lord Durham's Canadian administration was under discussion he made some remarkable speeches on Colonial government, and attacked with crushing effect the system of transportation. Four years of leisure were devoted to study and to the fine edition of Hobbes' Works, which cost him £6000. In 1845, in spite of his support of the Maynooth Grant, he was returned for Southwark, which he represented till his death, 22d October 1855. M. understood and assisted the financial reforms of Peel, took office in the Public Works Department under the Aberdeen Ministry, and was made Colonial Secretary by Palmerston in 1855. He has been called 'the liberator and regenerator of our colonial empire;' and he was certainly a man of vast information on political subjects, of clear and exact thought, and of great administrative promise. M. was the owner, and for a time the editor, of the *Westminster Review*, and an intimate friend of John Stuart Mill and Grote.

Molfett'a, a seaport of Italy, province of Bari, 61 miles S.W. of Foggia by rail, has a small harbour, formed by a mole and natural breakwater, and a fine cathedral, numerous churches, a castle, and a college. The linen manufacture is the principal industry, and there is a considerable trade in corn, oil, fruits, &c. In the neighbourhood are the celebrated Nitre Caverns—one of them 1400 feet in circumference—which yield 500 tons of saltpetre annually. Pop. (1874) 26,516.

Molière, Jean Baptiste Poquelin (the name 'Poquelin' is spelled in half a dozen different ways), son of Jean Poquelin, originally a *tapissier*, subsequently valet-de-chambre to Louis XIII., with reversion of the office to his son, was born at Paris, 15th January 1622. Until his fourteenth year he attended at the shop, and learnt nothing; but through the influence of his grandfather he became attached to the drama, was sent to the *Collége de Clermont*, afterwards studied under Gassendi with much profit, and became an accomplished scholar and disciple of Epicurus. He accompanied the king in the capacity of valet-de-chambre to Languedoc in 1642, and on his return to Paris associated himself with a company of players who performed at the Faubourg Saint-Germain, assuming in 1646 the name of Molière. From 1646 to 1658 his movements were of the most irregular sort, but he has been traced with his company to the towns of Nantes, Lyon, Bordeaux, Narbonne, Pezenas, Grenoble, and Rouen. During these wanderings he had the patronage of the Prince de Conti, and wrote *L'Étourdi*, a comedy of intrigue, and the *Dépit Amoureux*, in which his bent towards the humorous interpretation of life and character began definitely to reveal itself. In 1658 M. and his troupe returned to Paris, played before Louis XIV. on the 24th October, in the farce *Docteur Amoureux*, which obtained a *succès de rire*. Liberty was given him to establish a company at the Petit-Bourbon Theatre, bearing the official name *La Troupe de Monsieur*. During the next fifteen years he wrote thirty comedies. His first triumph was achieved in *Les Précieuses Ridicules* (November 1659), which, while in form it resembled a farce, was penetrated by the most trenchant spirit of comedy, and made an end of the absurdities of the Hotel Rambouillet. More and more he determined to study the actual world, and to lean less upon Terence, Plautus, and the Italian school. *Sganarelle* (1660) and *Don Garcia ou le Prince jaloux* (1661) reveal the growth of his insight in this direction, and *L'École des Maris* (1661) rises to the creation of more definite types of individual character than he had yet produced. It marks the height of his earliest manner. M. married in 1662 a girl of eighteen, Armande Béjart, his relationship with whom exercised a powerful influence over his feeling and thought, which was reproduced in more than one of his dramas. In the midst of much domestic happiness he produced (1662) *L'École des Femmes*, a pure comedy of manners, and the following year *L'Impromptu de Versailles*, which is full of satirical portraiture of contemporaries. A son was born to him 19th January 1664, to whom Louis XIV. acted as godfather. Besides the production of some lively farces, M. this year succeeded in getting a hearing for three acts of *L'Hypocrite*, which afterwards became the *Tartufe*, but was soon suppressed. Some of its dominant ideas were, however, allowed to get vent in *Don Juan ou le Festin de Pierre*, which appeared in 1665, much to the disgust of the clergy, whose uproar caused the elision of some important scenes. But the friendship of the king, who supported him amidst an abundant hostility of criticism, was now shown by a pension and the honorary title to M.'s company of *Troupe du Roi*. On the 15th September appeared his *L'Amour Médecin*, in which the faculty was overwhelmed with raillery of the most brilliant and incisive sort, the result of observations made upon medical pomposity and inefficiency during an illness. On the 4th of June 1666 was acted *Le Misanthrope*, one of the brightest examples of comedy in existence. In it M. subjected intrigue to the natural development of characters, and, taking for the central motive of the piece the unhappiness of his own experience with a young wife surrounded by admirers, he played with his own moods of bitterness in the spirit of wise and healthful comedy. *Le Médecin malgré lui*, a bright vivacious satire, belongs to the same year. Not till the 5th of February 1669 was *Tartufe* allowed in its integrity to appear upon the Paris stage. It is the play by which M.'s name has become best known to the world, and has taken rank among the highest of his achievements. There is consummate art in the management of the principal figure, the priestly sensualist, who stands branded as the crown and flower of hypocrisy; there is admirable discrimination and variety among the surrounding characters, and an infinite range of emotional and intellectual expression. In 1668 appeared *L'Avare* and *Georges Dandin*, the former modelled on *Plautus*, but so enriched with additions of M.'s own that it has been called a *chef d'œuvre de l'imitation originale*. *Le Bourgeois Gentilhomme* (October 1669) reduced to an absurdity the prevalent passion for aping aristocratic ways; *Les Femmes Savantes* (March 1672) presented to the laughter of Paris, in scenes and language abounding with beauties, the absurdities of pedantry, and the farce *Le Malade Imaginaire* (1673) closed his career as a dramatist. He died at Paris, 17th February 1673, the Archbishop of Paris refusing him a Christian burial, but at the king's request the body was interred in the cemetery of St. Joseph. Like Shakespeare, M. found but mean traditions of comedy in the literature of his country, mere uproarious farce and buffoonery, which he raised into a high and enduring art. The immemorial puppets of previous writers he swept off the stage, and substituted living men and women, in whose attitudes and relationships he let the world mirthfully see itself. As was Shakespeare, too, it is his special glory, whilst catching and satirising the tendencies of his generation, to have stamped the hall-mark of humanity on his characters, so that they remain representative for all time. His genius has penetrated the language of France, and his wit and wisdom flow spontaneously as proverbs from the lips of all men. His joyful humour, his robust sense, his profound and inexhaustible knowledge of the human heart, and his detestation of cant, are among the qualities which entitle him to the first place in the literary history of his country. It would be impossible within our space to enumerate even the chief editions of M.'s *Œuvres*. We may note those of Barbin (7 vols. Par. 1674), of Bret (6 vols. Par. 1773), of Petitot (6 vols. Par. 1812), of Taschereau (8 vols. Par. 1823–24), of Moland (7 vols. Par. 1863–64), of Paulin (5 vols. Par. 1874), of Eugène Despois, which contains all the historic and literary documents relating to each play (Hachette, vols. i. and ii. 1873–75). The person responsible for most of the obscurities and errors which long shrouded and distorted the biography of M. is Grimarest, whose *Vie de M.* appeared in 1705; but within the present century the researches of loving scholars have done much to rectify the mischief. See Taschereau, *Histoire de la Vie et des Écrits de M.* (1825); Bazin, *Hist.*

Historiques sur la Vie de M. (1851); Soleirol, *M. et sa Troupe* (1858): Lacroix, *La Jeunesse de M.* (1858); Soulié, *Recherches sur M.* (1863); Fournier, *Le Roman de M.* (1863): Campardon, *Documents inédits sur J.-B. P. M.* (1871); Claretie, *M., sa Vie et ses Œuvres* (1873); Despois, *Le Théâtre Français sous Louis XIV.* (1875; Eng. trans. by M. Henri Van Laun, 6 vols. Edinb. 1875-76).

Moli'na, Luis, a Spanish Jesuit, born at Cuença, New Castile, in 1535, studied at Coimbra in Portugal, and was appointed Professor of Divinity in the Portuguese university of Evora. In 1588 he published a book entitled *De Liberi Arbitrii Concordia cum Gratiæ Donis Divina Præscientia, Providentia, Prædestinatione, et Reprobatione* ('Harmony of Free Will with the Gifts of Grace, &c.'), in which he set forth opinions on the relation of Grace to Free Will, differing from the received doctrine of the Church, as expressed by Augustine, and expounded by Thomas Aquinas. The book was immediately attacked by the Dominicans (q. v.), who charged M. with Semi-Pelagianism, while the Jesuits, without at first adopting his opinions, denied that they were Pelagian or heretical at all. The controversy waxed so hot, that in 1594 the Pope (Clement VIII.) enjoined silence on both parties, and the dispute was referred to a committee of theologians which met in 1598. Their meetings, called 'Congregationes de Auxiliis,' were continued for three years, and then a decision adverse to M. was given in 1601, the year in which M. died.

Molinism is the name given to the doctrine taught by Molina (q. v.) regarding Grace and Free Will. At the third of the Congregations (de Auxiliis) the opinions of M. were thus summarised:—1. A reason or ground of God's predestination is to be found in man's right use of his Free Will; 2. In order that the grace which God bestows on men may become the *gift* of perseverance, it is necessary that they be foreseen as consenting and co-operating with the divine assistance offered them, which is a thing within their power; 3. There is a mediate knowledge ('scientia media') by which God knows future contingent events before he forms his decree; 4. Predestination is either general, for which there is no ground on the part of the persons themselves beyond the mere good pleasure of God, or particular, for which there is a ground in the foreseen good use of Free Will. This 'scientia media' was afterwards adopted by Jesuit theologians, and the Dominican views in an extreme form were published in the *Augustinus* of Jansen (q. v.).

Molinos, Miguel de, a Spanish mystic of noble family, was born at Patacina, near Saragossa, 21st December 1627, and studied theology at Pamplona and Coimbra. After having received orders, he went to Rome, where he became a much-sought-after confessor. He published his *Guida Spirituale* in 1675, in which he insisted that perfect Christianity consisted in tranquillity of soul, the pure love of God apart from desire of recompense, the renouncing of the world, and the entire abstraction of thought and will from temporal things, and their concentration upon God. In 1683 he was arrested by the Inquisition, and in 1687 sixty-eight propositions of his books were declared contrary to the purity of the Church. He was then imprisoned till his death, December 29, 1690.

Moll'ah, a title given to certain Turkish officers whose functions are principally judicial, but partly ecclesiastical. The four mollahs who preside over the great pashaliks of Adrianople, Brussa, Damascus, and Cairo, are of the highest rank. The others who legislate in smaller districts are appointed monthly.

Mollus'ca (Lat. *molluscus*, 'soft,' from *mollis*), a sub-kingdom of animals, including those forms which, zoologically speaking, may be named 'shell-fish.' Thus mussels, limpets, and clam-shells are true M. In addition to the groups of true shell-fish, such animals as the sea-mats (*Polyzoa*), &c., sea-squirts (*Tunicata*), and lamp-shells (*Brachiopoda*) are included in this sub-kingdom; and the cuttlefishes (*Cephalopoda*) and 'sea-butterflies' (*Pteropoda*) are also M., the former animals being the highest members of the group. The Polyzoa, Tunicata, and Brachiopoda are by most zoologists recognised as forming a lower assemblage of the M., to which the name of *Molluscoida* (q. v.) has been applied. The *general characters* which relate the large series of animals named 'molluscs' into one sub-kingdom, are found (1) in the general, but by no means universal, presence of a *Shell* (q. v.). Many molluscs want a shell; *e.g.*, the Polyzoa and Tunicata: but some molluscs included in shell-possessing groups may also be 'naked.' Thus the *Doridæ* or 'sea-lemurs,' and the sea-hares, &c., among the *Gasteropods*, illustrate naked molluscs, classified with true shell-bearing forms; but it is notable that in their early or embryonic state of existence, such naked molluscs, along with all other higher M., possess a rudimentary shell. (2) A *perfect digestive system* is, save in a very few instances, apparent in all M. The recognition of this character serves to distinguish such lower M. as the Polyzoa from the Zoophytes, to which, in outward appearance, they present a close resemblance. The latter have at most an incomplete digestive tract. The digestive system lies in the median line of the body, while the heart, or centre of the *hæmal system* lies dorsally in M., and the chief *nerve-centres* ventrally, or on the lower aspect of the body. (3) The character of the *nervous system* forms a distinctive feature in M. This system, in all higher M., consists of three *ganglia* or nerve-masses. These are connected together by nerve-cords, and are disposed, one in the head (*cerebral* or *cephalic ganglion*), one in the foot-region (*pedal*), and one in the neighbourhood of the heart and gills (*branchial* or *parieto-splanchnic*). This irregular disposition of the nervous system has suggested Owen's name of *Heterogangliata* ('irregularly-gangliated'), applied to the M. in opposition to the term *Homogangliata*, applied to *Annulosa*, in respect of the regular and defined nature of the nerve-centres in the latter animals. In Molluscoida the nervous system consists of a single nerve-mass only. (4) The *symmetry* or shape of the body in M. is typically *bilateral* or 'two-sided.' But being more developed to one side than the other, the *bilateralism* of M. is described as existing on each side of a curved median line, instead of being described or defined by a straight line, as in Annulosa and Vertebrata. In higher M., the lower or ventral surface of the body is specially adapted to form a *foot*, which becomes greatly modified in the various classes—forming the true 'foot' in Lamellibranchiata, the crawling-disc of Gasteropods, and the tentacles or arms of Cephalopods, &c. The foot is wanting in Molluscoida. (5) In all higher M. a distinct heart exists. The heart, moreover, consists of at least two chambers. In lower M. (as in Polyzoa) a distinct heart may be wanting. In higher M. there is no tendency to form *compound colonies* of animals, such as is illustrated by the Polyzoa and Tunicata amongst lower M.; and in the higher M. reproduction is always subserved by *sexual* methods.

The *digestive system* of M. comprehends a mouth, occasionally surrounded by tentacles (*Polyzoa*), and containing, in higher forms, jaws or a dental apparatus; the jaws of cuttle-fishes, and dental apparatus or *odontophore* of Gasteropods, exemplifying the structures of the mouth in M. In Lamellibranchiata no hard parts exist in the mouth. The alimentary tract itself includes a gullet, stomach, and intestine; the anus or vent frequently being in the same plane as the mouth. A large *liver* is usually developed, and *salivary glands* are generally represented. The *kidneys* of M. are represented in such classes as *Lamellibranchiata* and *Gasteropods* by the *Organ of Bojanus*, a structure adapted for separating waste nitrogenous matters from the blood. The *heart* of higher M. is purely *systemic* in its nature, *i.e.*, it serves solely to propel pure blood through the body; the venous blood returning to the breathing organs through the veins without the direct action of the heart. In Cephalopods, rudimentary or subsidiary hearts may be formed by dilatations of the veins at the bases of the gills; these so-called 'branchial hearts' serving to propel venous blood into breathing-organs. The *respiratory* or *breathing function* may be performed in M. by ciliated tentacles (*Polyzoa*), by a breathing-sac (*Tunicata*), by elongated 'arms' (*Brachiopoda*), by true gills (*Lamellibranchiata, Gasteropoda, Pteropoda*, and *Cephalopoda*), or by a lung-chamber (snails, slugs, &c.). In some low forms of M. the general body-surface may constitute the breathing-organ (*e.g.*, some Pteropods).

The *nervous system* of M. has been already described. The *cephalic ganglia* appear to regulate the sensory apparatus; the *pedal ganglia* supply the muscular system with nerve-filaments, and hence may be named the *motor centres* of M.; and the *branchial ganglia* supply the viscera generally, and hence may be regarded as functionally corresponding with the *Sympathetic* nervous system of the higher animals. *Organs of sense* are developed in varying degrees of perfection in M. Eyes of

simple structure are developed in some Lamellibranchiates; such organs being represented by the row of colour-spots seen around the margin of the *mantle* in the *pectens* or scallop-shells. In some Tunicata, colour-specks, probably visual in function, exist just within the mouth-aperture. Tentacles, or organs of *touch*, are present in many M.; these being well seen in the snails and Gasteropods generally, in Polyzoa (where they subserve respiration), and in Tunicata. The arms of Cephalopoda subserve touch and prehension as well. The sense of *hearing* is represented in higher M. by *auditory vesicles* usually placed near the foot; while in some few M. an *olfactory* apparatus is supposed to be represented.

The *sexes* are distinct in many M., but, as in snails, &c., male and female organs may be found existing in one and the same individual. The copulation of two such *Hermaphrodite* individuals, curiously enough, appears necessary for the fertilisation of the eggs. Subsidiary glands (*nidamental glands*) are frequently developed in connection with the generative system of M.; these structures serving (as in Gasteropods and Cephalopods) to invest the eggs with tough outer capsules. The classification of M. is represented in the following table, and the chief characters of the various classes are described in such articles as BRACHIOPODA, LAMELLIBRANCHIATA, &c. :—

Mollusca.	Classes.
DIVISION I.—MOLLUSCOIDA, or LOWER MOLLUSCA. Mollusca characterised by the low organisation of heart and nervous system as compared with the higher Mollusca.	1. *Polyzoa:* Ex. Sea-Mats, &c. 2. *Tunicata:* Ex. Sea-Squirts. 3. *Brachiopoda:* Ex. Lamp-shells.
DIVISION II.—HIGHER M., or M. PROPER.	4. *Lamellibranchiata:* Ex. Oysters, Mussels, Clams, &c. 5. *Gasteropoda:* Ex. Whelks, Snails, &c. 6. *Pteropoda:* Ex. 'Sea-butterflies.' 7. *Cephalopoda:* Ex. Cuttlefishes.

Fossil M.—M. are abundantly preserved as fossils, owing to their having *hard parts* in the form of shells. They are represented in the oldest rocks, and commence their existence in the *Cambrian Period*, when no less than five classes (*Polyzoa*, *Brachiopoda*, *Gasteropoda*, *Pteropoda*, and *Cephalopoda*) are represented by fossil species. In the *Silurian Rocks*, the Brachiopoda were so abundant that the Silurian Period has been named the 'age of Brachiopods.' The Tetrabranchiate (or four-gilled) cuttlefishes attained the height of their development in the Silurian and Mesozoic rocks, and are represented in existing seas by one existing species only—the Pearly Nautilus (see NAUTILUS). The Lamellibranchiates first appear in the Lower Silurian; but of the soft-bodied sea-squirts, or Tunicata, no record has been preserved in the history of fossil forms.

Molluscoi'da, a subdivision of the *Mollusca* (q. v.)—regarded by some zoologists as a distinct sub-kingdom of the animal world—represented by the lampshells, *Brachiopoda* (q. v.), sea-mats, &c., or *Polyzoa* (q. v.), and by *Tunicata* (q. v.), or 'sea-squirts.' The M. are decidedly of lower organisation than the *Mollusca Proper*, or Higher Mollusca. They exhibit inferiority (1) in the absence, or at most rudimentary nature, of the heart; (2) in the nervous system consisting of a single ganglionic mass, whereas in Mollusca Proper it consists of three well-marked ganglia; (3) in the absence of a foot; and (4) in the presence of a *sexual* form of reproduction, such as *budding* or *gemmation*, well seen in the sea-mats (*Polyzoa*) and certain tunicates. It is doubtful, however, whether these differences entitle zoologists to separate the M. completely from the Mollusca.

Moll'witz, a village of Prussia, in the province of Silesia, 4 miles W. by S. of Brieg. Pop. 645. It is famous as the scene of a great victory won by Friedrich II. of Prussia over the Austrian Marshal Neipperg, April 10, 1741.

Mo'loch, properly **Mo'lech** (Heb. 'king,' *cf.* Baal, 'lord'), and perhaps also **Milcom,** although some consider the last to be a distinct deity, was the national god of the Ammonites (1 Kings xi. 5, 7). He was one of the Fire or Sun-gods common to all the Semitic tribes, who had brought that form of Nature-worship with them from their original home in the highlands of Armenia. As Baal and Astarte represented the regenerative power of Nature, the fructifying influence of the Sun, M. represented its destructive side, and was worshipped under the symbol of a flame of fire. The rites with which he was worshipped were human sacrifices, dedication of the first-born, purifications and ordeals of fire, mutilations, vows of perpetual virginity, &c. This worship was first established at Jerusalem by Solomon (1 Kings xi. 5, 7), and was kept up till the time of Josiah (2 Kings xxiii. 10, 13). It was restored by Josiah's son and successor (xxiii. 32), and was only completely rooted out by the Babylonish Captivity. The Jewish Rabbins have contended that human sacrifices were not offered to M. by the Israelites, for the children offered to him were not burned, but only made to pass between two fires; and this theory is a favourite one in modern times. But it is maintained, on the other hand, that the allusions to actual slaughter are too plain to be explained away: *e.g.*, in Deut. xii. 31, Ps. cvi. 37, 38, Jer. vii. 31, Ezek. xvi. 20, 21, xxiii. 37, and 2 Chron. xxviii. 3 (*cf.* 2 Kings xvi. 3).

Moloch Lizard (*Moloch horridus*), a species of lizard found in Australia, and presenting a singular appearance from its being covered with strong plates and spines, while the head bears two prominent processes. A protuberance armed with two spines occurs in the back of the neck.

Molt'ke, Hellmuth Karl Bernhard, Graf von, Chief Marshal of the German Empire, is the son of an officer of a Mecklenburg family, and was born at Gnewitz, October 26, 1800. Soon after his birth his parents settled in Holstein, and in his twelfth year M. was sent to Copenhagen military school. He obtained a lieutenancy in the 8th Prussian regiment of infantry in 1822, and studied at the Military Academy and at the Divisional School, Frankfurt-on-the-Oder. He went to Turkey in 1835, and receiving a commission from the Porte, served in the campaign of 1839 against Mehemet Ali, returning to Prussia in 1845. He became a member of the Grand General Staff in 1848, chief of the Staff of the 4th Army Corps in 1848, chief of the Grand General Staff in 1858, and lieutenant-general in 1859. In the last year he accompanied the Austrian headquarters during the Italian campaign. As chief of the Prussian staff, he planned the invasion of Denmark in 1864. His magnificent generalship crushed the Austrian army at Sadowa in 1866, when he received the order of the Black Eagle. In the Franco-German war he held the supreme command of the four great armies which simultaneously entered France. To him pre-eminently belongs the honour of that unparalleled and unbroken series of great victories, from the battle of Weissenburg to the capitulation of Paris, which humbled the military power of France, and inspired all Germany with patriotic pride. He was created Graf (Count) 1870, field-marshal January 1871, and chief-marshal September 1871. M. has never been surpassed as a strategist, in perfect mastery of detail, in calm clear foresight of all the chances of a gigantic campaign. Usually a silent thinker, a speech he made in the German Reichstag in the spring of 1877, calling attention to the military activity of France and the necessity of increased watchfulness on the frontier, created an exaggerated feeling of alarm. He has written the following works, all-important to the military student, *Der Russisch-Türkische Feldzug* (1835), *Briefe über Zustände und Begebenheiten in der Türkei* 1835–39 (Berl. 1841; Eng. trans. 1877); *Der Italienische Feldzug von* 1859 (3d ed. Berl. 1870), and *Der Deutsch-Französische Krieg* (Berl. 1873 *et seq.*). An English translation of his *Observations on the Influence that Arms of Precision have on Modern Tactics* was published in 1871.

Molucc'as, or Spice Islands, a great, widely-scattered group in the E. Indian Archipelago, belonging to the Dutch, and lying between Celebes on the E. and Papua on the W.; lat. 3° S.—6° N., and long. 126°—135° E. Area 45,000 sq. miles; pop. (1873) 348,111. By far the largest are Gilolo and Ceram, and other important members of the group are Amboyna, Banda, Buru, Ternate, Tidore, Batshian, Makian, Motir, and Obi. They are all of volcanic origin, very irregular in outline, and rise abruptly in grand mountain masses, clad to the summit with luxuriant forests of teak, ebony, sandal, iron, satin, palm, and bread-fruit trees. Among the natural products are rice, sago, cotton, indigo, coffee, sugar, and spices. **Amboyna** yields the best

cloves, Banda and the Uliassers the best nutmegs. Ternate, to the W. of Gilolo, is said, of all the islands, to produce the greatest variety of spices. Along the coasts there are valuable trepang and pearl fisheries. The southern portion of the M. is governed directly by the Dutch through the Residencies of Banda and Amboyna, the northern part indirectly through the sultans of Ternate and Tidore. Amboyna is the capital of the M., and after Batavia, the chief seat of Dutch commerce in Oceania. The original inhabitants are Malays, but Arabs, Hindus, Chinese, Japanese, and Mestizoes are numerous. In the islands indirectly governed, the inhabitants, mostly Mohammedans, are greatly given to piracy. The M. were visited and claimed in 1521 by the Portuguese, who subsequently behaved to the inhabitants with vile deceit and cruelty. Assisted by the natives, the Dutch drove out the Portuguese in 1607, and have since remained masters of the islands, except from 1810 to 1814, when they were subject to the English. See separate articles on AMBOYNA, BANDA, BATSHIAN, GILOLO, &c.

Molybde'num (symbol Mo, atomic weight, 96), a silvery-white, hard, almost infusible metal, discovered by Hjehn in 1782. Its chief source is the ore *molybdena*, which is the bisulphide of M. (MoS_2), and which when roasted in air to a dull red heat and digested with strong ammonia yields molybdate of ammonia. By the addition of hydrochloric acid, *not in excess*, molybdic acid (MoO_3) is precipitated. The metal is obtained by reducing the acid with charcoal at a white heat. Its properties are little known, and the rarity of the metal renders its compounds of small moment.

Mombas', a town of E. Africa, in the territory of the Sultan of Zanzibar, and on a coral islet at the mouth of two rivers. The harbour is good, but the town, inhabited by half-caste Arabs, is ruinous and filthy. It was visited by Vasco da Gama in 1497, and from 1529 to 1720 it was held by the Portuguese, who erected a strong rock-fort, the walls of which are still standing. M. was occupied by the English in 1824, but abandoned two years later. Pop. 10,000.

Momein', a considerable town in the Chinese province of Yunnan, on the edge of the plateau of Yunnan, more than 5000 feet above the sea, about 135 miles N.E. from Bhamo, the farthest navigable point on the Irrawaddy River in British Burmah. It was formerly the centre of a valuable transit trade in minerals, &c., and subsequently a rallying-point of the Panthays, or Mohammedan rebels. M. was the farthest point reached by an official British exploring expedition into W. China in 1867. It is said to have been since almost destroyed by the victorious Chinese. See Dr. Anderson's *Mandalay and Momein* (Lond. 1876).

Mo'ment of a velocity or of a force about a given point is the product of its magnitude into the perpendicular from the point upon its direction. Similarly the M. of momentum of a moving body about a given point is the product of the momentum into the perpendicular from the point upon the direction of motion of the body. The sum of the moments of momenta of a system of mutually acting particles about any axis is constant. The *M. of Inertia* of a system of particles with reference to any axis is the sum of the products of the mass of each part into the square of its distance from the axis, and is represented mathematically by Σmr^2. If M be the mass, and k be taken so that $Mk^2 = \Sigma mr^2$, k is called the radius of gyration. It is an important quantity in the mathematical discussion of rotations.

Momen'tum, or Quantity of Motion of a rigid body moving without rotation is proportional to the mass and velocity conjointly. Hence, defining unit M. as the M. of unit mass moving with unit velocity, the M. of mass m moving with velocity v is measured by the product mv. M. is therefore a *vector* or directed quantity; and momenta are to be compounded like other vectors, such as velocities and forces. A force acting upon a given mass is measured by the M. it produces in unit time; and the unit force is of course that which produces unit M. in unit time. Taking the pound, foot, and second as the units of mass, length, and time respectively, let us find the value of the poundal or absolute unit of force. A body falling for one second at the equator acquires a velocity of 32·088 feet per second—a M. therefore of $m \times 32{\cdot}088$. The unit force would give to the body a velocity of 1 foot per second; hence the value of the force of gravity at the equator is, in terms of the absolute unit, 32·088. Consequently 32·088 is the number of absolute units or *poundals* which measure the *weight* of a pound at the equator. In other words the poundal is equal to the weight of about half an ounce.

Momm'sen, Theodor, an illustrious German scholar and historian, born at Garding in Slesvig, November 30, 1817, was educated at the Altona Gymnasium (1834–38), studied law, philology, and history at Kiel till 1843, and travelled in France and Italy (1844–47). In 1848 he accepted a call to the chair of law in the university of Leipsic, but, losing the post through his action in the political troubles of that and the following year, was successively appointed Professor of Roman Law at Zürich (1852), Breslau (1854), and Berlin (1858). In 1875 he returned to Leipsic as Professor of Jurisprudence. As an historian, M. has won for himself a world-wide reputation. His *Römische Geschichte* (5th ed. 3 vols. Berl. 1868–70; English trans. by W. P. Dickson, Lond. 1862–63) gives to the general reader the results of his own and others' researches during the last fifty years in the fields of archæology, philology, and political economy, and, while agreeing generally with the earlier work of Niebuhr, clears up many points which that writer had necessarily left in obscurity. Altogether it may be said that his way of treating his materials, though strictly critical, is eminently constructive. His political opinions tinge his narrative with the hues of life. No German historian has ever approached the lucid vigour, the trenchant eloquence, and the picturesque pomp of his style. Besides the *Römische Geschichte*, M. has written *De Collegiis et Sodaliciis Romanarum* (Kiel, 1843), *Oskische Studien* (Berl. 1845); two 'epoch-making' works, executed in conjunction with Henzen for the Berlin Academy, *Corpus Inscriptionum Neapolitanarum* (Leips. 1851), and *Corpus Inscriptionum Latinarum* (Berl. 1863); *Geschichte des Römischen Münzwesens* (Berl. 1860); *Römische Forschungen* (Berl. 1864); *Digesta Justiniani Augusti* (Berl. 1868–70); *Römisches Staatsrecht* (Leips. 1871), &c. During 1877 M. made a tour through Italy to complete his study of old Roman inscriptions, and was everywhere received with civic honours. Never since the days of Erasmus has a scholar been so royally welcomed.

Momor'dica, a small genus of cucurbitaceous climbing plants with fleshy fruits, which are prickly or warted externally, and burst when ripe into irregular valves. An Indian species named *M. Charantia*, now frequently grown in hothouses, is very ornamental, particularly when the ripe warted fruit bursts, and shows the seeds covered with their fleshy red aril. Another Indian species, *M. mixta*, has large creamy flowers and red prickly fruit shaped like a bullock's heart. The fruit of *M. balsamina* infused in oil forms a vulnerary in repute in some Eastern countries. The 'squirting cucumber' represented in the woodcut, is by recent systematists separated into a genus called *Ecbalium*, but it was long known as *M. elaterium*, and gave name to the drug Elaterium (q. v.).



Momordica elaterium.

Mompox', a town of Colombia, S. America, on the Magdalena, 110 miles S.E. of Cartagena, has some trade and shipbuilding. Pop. 10,000.

Mon'achism (from Gr. *monachos*, 'a monk'), means the monkish life in all its forms. Christian advocates of the system have always maintained that it owes its origin to the Gospel, which indicates a vow of poverty as a step towards perfection (Matt. xix. 16–29). Contemplative asceticism, however, is a thing of the remotest antiquity. Monks have been as common among the Buddhists of India and Thibet as ever they were in Europe. The Neo-Platonists recommended M., and the Jewish Nazarites, Rechabites, Essenes, and Therapeutæ, all lived more or less after this manner. Persecution was probably the chief cause of Christians first betaking themselves to live in the desert

(see EREMITES). During Maximius' persecution a hermit Antonius excited much attention by his extravagant asceticism, attracted a number of imitators around him, and has received the name of the Father of M. (see ST. ANTHONY). When a number of hermits had been brought together in this way, Pachomius (about 340) founded a habitation on the island of Tabenna, in the Nile, where they might live together, a *koinobion* (Gr. *koinos*, 'common,' *bios*, 'life'), with a system of rules for their government, including vows of poverty, chastity, and obedience to the president (Gr. *abbas*, *archimandrite*). About the same time similar societies were founded—by Amun, on the Nitrian mountain, by Macarius (the elder), in the desert of Sketis, and by Hilarion, in the desert of Gaza. The peculiarities of the M. of this period consisted in solitariness, manual labour, spiritual exercises, and restraint of the bodily appetites, for the sake of mortifying the flesh and allowing the spirit the better to contemplate divine things. It was received in the East with enthusiastic admiration, and the number of monks soon increased to an enormous extent. 'As there were no more persecutions, and no more opportunities of martyrdom; as Christianity had even acquired external dominion; the erroneous notion was spread abroad that there was no longer an opportunity in the world for the full exercise of Christian virtue. The general corruption or consciousness of individual guilt caused many to seek solitude. Many sought escape from the oppressive circumstances of life. Others wished to make a figure and obtain an influence. Others were attracted by sloth; and lastly, others were drawn away by mere imitation.' The most distinguished teachers of the Church eulogised the system; examples of it were found in pre-Christian times (*e.g.*, Elijah and John the Baptist); the Therapeutæ were shown to have been Christians (Acts ii. 44; iv. 32); and, in short, the original condition of the first Christians was shown to have been a state of M.

Hitherto Monasteries (q. v.) had been confined to the deserts, but Basil the Great (329–379) established one near Cæsarea in Cappadocia, and from this time they became common near the haunts of men. Meantime M. had been developed in many various forms. The *Rhemoboth* or Sarabaitæ merely lived an ascetic life in society. The *Boskoi* wandered about in companies in Mesopotamia. The *Cœnobites* lived together in convents. The *Anchorites* (q. v.) were distinguished for their ingenious modes of crucifying the flesh, the highest point in the art perhaps being reached by the 'Pillar-Saints' (q. v.), imitators of Simeon, who in 420 took up his abode on the top of a pillar near Antioch. There were also convents for females (Ascetriæ, Monastriæ, Castimoniales, Sanctimoniales, Nonnæ) as early as for males.

In the West, M. was at first regarded with contempt as a piece of Oriental fanaticism, and when it was introduced, partly owing to this feeling and partly owing to the difference in climate, it was in a far less ascetic form. Monasteries were established in Italy (at Milan and Rome, and on the small islands on the coast) and in Gaul in the end of the 4th c. In Africa, notwithstanding the praise bestowed on the system by Augustine, the hatred of M. was kept up longer than almost anywhere else; its converts were for long found only among the lower classes.

As M. was considered the perfection of Christianity, it soon came to be regarded as the nursery for the clergy, and especially for bishops. The next idea was to transfer it altogether to the clergy, on whom Celibacy (q. v.) and a strict monastic life were imposed by zealous advocates of the system. A new form was given to M. by Benedict (q. v.), whose system (529) was distinguished especially by exacting a promise from all who entered a monastery never to leave it again. This system soon spread in Italy, Gaul, and Spain, and thus was established the first monastic order—the Benedictines (q. v.)—under a particular 'rule.' In these primitive times monasteries were a beneficial influence wherever they were planted, for the monks 'reclaimed waste lands, educated the young, removed, both by precept and example, the contempt for labour which slavery had produced, gave the first impulse to art by the ornamentation of churches, handed down to posterity the history of their time in chronicles, and by their copyists preserved to it the writings of antiquity.' But in the rude times of the middle ages, when monasteries were bestowed as fiefs on persons not monks, and abbots strove for political power, 'all discipline was neglected, and disorders and excesses of all kinds prevailed among monks and nuns.' An attempt at reformation was made in the 10th and 11th centuries. The rule of St. Benedict was restored in the convent of Clugny by the abbot Berno (910), and additional rules were added by the abbot Odo (927–941), so as to form an essentially new order—Cluniacensis. Similar reforms were carried out in Italy and Germany a little later (about 1020–70). About the same time a new development of M. appeared in the *donati* or *oblati*, who yielded up themselves and all their property to the service of the monastery; the *fratres conversi*, lay brothers who managed the household department, and the *fratres conscripti* or *confrates*, who had a share in the spiritual blessings of the brotherhood.

The reformation above referred to was unfortunately followed by fresh decadence; and this phenomenon has uniformly repeated itself every time there has been a reform, and even with every new order of monks that has been formed. Reputation for sanctity brought increase of wealth, and increase of wealth was accompanied or followed by desire of independence, ambition, and love of pleasure. Every new order, however fair it might promise at first, invariably developed in a short time all or some of the evils exhibited by the others. So invariably did this occur, and so great was the confusion produced in the Church by the innumerable orders, that in 1215 Pope Innocent III. forebade the formation of any new ones. But scarcely had the law been passed when the Pope was constrained to grant exemption from it in favour of the Mendicant Orders (q. v.), till further multiplication of these again was forbiddden by Pope Gregory X., 1274.

Yet another form of M. was developed in the 12th c. in connection with chivalry. The idea that fighting with the infidel was one of the highest deeds of piety, and of the greatest value in working out one's salvation was a highly popular one in such a warlike age, and went far to compensate for the self-denial of M. Thus several orders of monks formed themselves into orders of monkish knights, *e. g.*, the Knights Hospitallers (q. v.), or new orders were formed on this principle, *e. g.* the Knights Templars (q. v.), in the course of the 12th and 13th centuries.

Amid the great efforts to reform the Church, which were made in the 15th c., the monastic orders, with their general corruption, could not be overlooked. But notwithstanding all the efforts to reform them that were put forth by the Popes and Church Councils, complaints of the corruption of M. never ceased during this period, and the evil was not cured till the Reformation of the 16th c., when the system was entirely discarded by the Protestants; and in so far as it has been kept up in the Roman Catholic Church, the strictest discipline has as a rule been maintained. See Gieseler's *Lehrbuch d. Kirchengeschichte* (Eng. trans. 1855.)

Mon'aco (the *Monœci Pontus* of antiquity), capital of the tiny principality of M., on the coast of the department Alpes Maritimes, 5 miles N.E. of Nice by rail. It is picturesquely situated on a bold rock, round which wind beautiful promenades. Many visitors are attracted by the mildness of the climate in winter and by the sea-bathing in summer, but perhaps a greater inducement is the 'tapis vert' at the Casino, for M. is a legalised gambling place. There is some export trade in oil, oranges, citrons, perfumery, 'artistiques,' liqueurs, pottery, &c. With the surrounding territory M. has an area of 6 sq. miles. Pop. of the principality (1873), 5741; of the town, 2667. M. has belonged to the Grimaldi, a Genoese family, since 968. For a time (from 1848) it was dependent on Sardinia, and in 1861 the adjoining communes of Mentone and Roccabruna were sold by Carlo III. to France.

Mo'nad, the name given to some of the lowest forms of living beings. They exist as exceedingly minute specks of protoplasmic matter, and occur in stagnant water, in infusions of animal and vegetable matter, and in like situations. Some of the monads, at least, are believed by competent authorities to be of vegetable nature, and there appears little doubt, from recent researches, that many so-called monads represent stages in the development of the *Protozoa* (q. v.). Many monads are provided with vibratile *cilia* or filaments, used in locomotion.

Monad (Gr. *monas*, 'unity') in Leibniz' system of philosophy, is the primary element of matter. Monads are simple substances, are neither extended, figured, nor divisible, and form by aggregation all compound substances. Created and yet simple, they are necessarily indestructible, and are in reality the true atoms of nature. Leibniz divides them into two classes—those which though they have *perception* lack consciousness, and those which to perception add a certain consciousness called *apperception*.

The members of the latter class differ according to the degree of their consciousness—there being a gradation from lower to higher types. The Deity is the *Prime M.*, or *M. of Monads.* The term **M.** is used vaguely in the various systems of Zeno, Leucippus, Democritus, &c.; but Leibniz was the first to systematise the conception.

Monad'nock, a solitary and conspicuous mountain in the S.W. of New Hampshire, U.S., which rises from the swell of land E. of the Connecticut River to a height of 3180 feet.

Mon'aghan (Irish Gael. *Muineachán*, 'a place abounding in little hills'), an inland county of Ireland, province of Ulster, is bounded N. by Tyrone, W. by Fermanagh, S. by East Meath and Cavan, and E. by Armagh and Louth. Area, 496 sq. miles; pop. (1871) 114,969. The surface is hilly, especially in the E. and N.W., where the Slieve Beagh Mountains reach 1254 feet. There are many bogs and small lakes. The chief rivers of M. are the Blackwater (for 12 miles the N.E. boundary), and in the S.W.) the Finn, an affluent of the Shannon. The Silurian formation, which occupies the greater part of the country, is capped in the N.W. by the carboniferous limestone. There are valuable quarries of lime, marble, and sandstone. The soil of M. is in general loam resting on clay, and is still ill drained in the W. and N.W. In 1876 there were 139,739 acres under crops (chiefly flax, oats, wheat, and potatoes); 143,698 in grass; 5044 in plantation; and 29,679 bog, waste, and water. M. has (1876) 10,838 horses, 85,555 cattle, 15,999 sheep, and 32,066 pigs. The county is traversed by the Ulster Canal, and by one branch and two main lines of railway. The towns are M. (q. v.), Clones, and Carrickmacross. M. returns two members to Parliament. The chief antiquities are the 'Worm Ditch' at Scotshouse, and the round towers at Clones and Inniskeen.

Monaghan, the county town of M., Ireland, on the Ulster Canal, and 16 miles S.S.W. of Armagh by rail. It has three principal streets, diverging from a square called the 'Diamond.' There are in M. an Episcopalian church, a Roman Catholic cathedral (built 1862–68) and college, and several Dissenting chapels. Linen is manufactured, and there is considerable trade in agricultural produce. Pop. (1871) 3760.

Mon'astery (from Eccl. Gr., *monastēs*, 'a monk,' and that from Class. Gr. *monos*, 'solitary') meant originally the dwelling of a single monk, as distinguished from *cœnobium* (Gr. *koinos*, 'common,' and *bios*, 'life'), the habitation of a number of associated monks; but afterwards the name was used in the West with the same meaning as cœnobium in the East. The head of the M. was called the *Abbas* (Aram. 'father'), *hegumenos* (Gr. 'president'), *archimandrite* (Gr. from *archōn*, 'ruler,' and *mandra*, 'a fold'). Under him were other officers: *e.g.*, the *centenarius* and *decanus* ('dean'), who presided over a hundred and ten respectively. In later times, under the generic name of M., there were the specific names of Abbey, which was governed by an Abbot, and Priory, governed by a Prior, an inferior kind of abbot or abbot-vicar, to which Commandery and Preceptory corresponded in the military orders. In the mendicant orders the proper name was Friary or Convent. The houses of females are Convents or Nunneries.

Monas'ticism. See MONACHISM.

Monastir', Toli, or **Bitolia** (anc. *Octolophum*, or *Heraclea*), a town of European Turkey, vilayet of Selanik, in a wide plain at the E. base of the Peristerie Mountains, and on the Dragor, 95 miles W.N.W. of Saloniki. The seat of a governor-general, and a garrison town, it has 11 mosques, extensive bazaar, and an important transit trade with Constantinople, Trieste, Vienna, &c. The town is named from the neighbouring monastery (*Monastir*) of Bukova. Pop. 45,000.

Monboddo, James Burnet, Lord, a Scotch philosopher, was born at Monboddo, Kincardineshire, 1714. He was educated at Laurencekirk and Marischal College, Aberdeen, studied law at Groningen in Holland, was called to the Scotch bar in 1738, and rose to the bench in 1767. His book on the *Origin and Progress of Language* was published in 1771–76; and another work on *Ancient Metaphysics* appeared immediately before his death, which took place at Edinburgh, May 26, 1799. M. was an able judge, but in all other matters an eccentric enthusiast. He endeavoured to conform his manner of living to that of the Greeks and Romans. He is chiefly known as the author of a fantastic monkey-development theory, the reasonableness of which may be judged by his explanation of how men came to have no tails—they wore them off by sitting! Yet his writings abound with shrewd sense and wit.

Monca'da, Francisco de, Conde de Osona, born of an illustrious Spanish family at Valencia, December 29, 1586, rose to be Privy-Councillor and Minister of War, Ambassador to the court of Vienna, and Generalissimo of the Spanish forces in the Netherlands. He fell at the siege of Goch, a fortress of Kleve, in 1635. His fame as a Spanish classic rests on his *Expedicion de los Catalanes y Aragoneses contra los Griegos y Turcos* (Barcel. 1623), the materials for which he borrowed from the Catalan chronicler Muntanar; but he also wrote a *Vida de Boecio* (Frankf. 1642), and other works. See Ticknor's *History of Spanish Literature* (vol. iii. p. 146).

Moncalie'ri, a town of Italy, province of Turin, 5 miles S. of Turin by rail, on the right bank of the Po, which is here crossed by a bridge of seven arches. Among its fine buildings is a château where Victor Emmanuel I. died in 1823. M. has a large October cattle fair, and commands a splendid view of the Alps and plains of Piedmont. Pop. (1874) 9994.

Moncreiff', an old Scottish family, which received a baronetcy in 1625. The most distinguished members of the family are:—**Sir Henry Wellwood M., D.D.**, eighth baronet, an eminent clergyman of the Church of Scotland, born at Blackford Manse in February 1750. From 1775 till his death in 1827 he was minister of St. Cuthbert's, Edinburgh, and was highly esteemed both as a pastor and a preacher. He took an active part in the administration of the affairs of the Church, and was the leader of the evangelical party. He was elected Moderator of the General Assembly in 1785. His chief works are the *Evidences of the Jewish and Christian Revelations*, *Account of the Life and Writings of John Erskine, D.D.*, and a collection of *Sermons*, in 3 vols.—2. His second son, **James Wellwood M.**, born 13th September 1776, succeeded as ninth baronet, and took rank among the foremost members of the Scottish bar, at that time adorned by some of the most illustrious lawyers Scotland has produced. He was raised to the bench as Lord M. in 1829, and his judicial career materially enhanced his reputation. He died 30th April 1851.—3. He was succeeded by his eldest son, **Sir Henry Wellwood M.**, born in 1809, ordained minister of East Kilbride in 1836, and after the disruption translated to Free St. Cuthbert's, Edinburgh. He is the seventh baronet in lineal succession who has been a minister of the Church of Scotland. M. is senior principal clerk of the General Assembly of the Free Church, was elected its Moderator in 1869, and obtained from the University of Edinburgh in 1860 the degree of D.D. His chief works, in addition to various pamphlets, are, *Creeds and Churches in Scotland* (1869), *The Claim of Right* (1877), and *Free Church Practice* (1877).—4. **James Wellwood M.**, second son of (2), was born at Edinburgh, 29th November 1811, educated at the High School and University of his native city, and passed advocate in 1833. After holding the office of Solicitor-General for Scotland for 14 months, he became Lord Advocate in 1851, when Lord John Russell was Premier, and this appointment was renewed under the governments of Lord Aberdeen, Lord Palmerston, Lord Russell, and Mr. Gladstone. He was M.P. for the Leith Burghs from 1851 till 1859, for the city of Edinburgh from 1859 till 1868, and for the universities of Glasgow and Aberdeen from December 1868 till October 1869, when he was appointed Lord Justice-Clerk. During his long Parliamentary career, M. rendered important service to his party in the debates of the House of Commons, and his name is most honourably identified with the efforts made by Liberal governments, of which he was a member, to establish a system of national education in Scotland. Of the educational measures introduced by him, that of 1861, for increasing the salaries, fixing the examinations of teachers, and for the abolition of tests, alone passed into law; but his prolonged and devoted labours undoubtedly prepared the way for the adoption of the Act of 1872. He was elected Dean of the Faculty of Advocates in 1858, and Rector of the University of Edinburgh in 1868. He is a contributor to the *Edinburgh Review*, and author of a work of fiction entitled *A Visit to my Discontented Cousin*, which originally appeared in *Fraser's Magazine*. He was created a baronet in 1871, and in 1874 was raised to the Peerage of the United Kingdom, under the style of Baron M. of Tullibole.

Mondo'vi, a town and fortress in N. Italy, province of Cuneo, on an affluent of the Tanaro, 9 miles E. of Cuneo by rail, lies among vineyards and chestnut woods, 1824 ft. above the sea. M. is a bishop's see, has a fine cathedral of the 15th c., manufactures silks, woollens, cottons, and paper, and has considerable trade. Pop. (1874) 16,543. Here the French under Masséna and Augereau defeated the Austro-Sardinian forces under Beaulieu, 21st April 1796.

Mone'sia Bark is derived from a Brazilian species of *Chrysophyllum*, and a preparation of it is used as a stomachic and alterative in leucorrhœa, chronic diarrhœa, &c. The bark is full of a milky juice, but after drying becomes heavy, brown, and hard, with a taste at first sweet, afterwards astringent and bitter. *Monesin* is the active principle.

Mon'ey (Fr. *monnaie*, from Lat. *moneta*) is the measure and standard of value and the medium of exchange. It is also a convenient store of value. All these functions are separable; *e.g.*, in Elizabeth's time silver was the measure of value, gold was used for large payments in quantities depending on its current value in silver, and corn was the standard of value in the leases of college lands. The early use of cattle as M. is traceable in the words *pecunia*, fee; *katema*, skat, and capital. The wampum beads and cowry shells of N. America are still more primitive. Corn (which is still deposited in Norwegian banks), oil, cacao nuts, tobacco, eggs, and dried codfish, and other kinds of raw produce have also been used. The cotton pieces of Guinea, and libongos, or straw mats of Angola, cubes of tea in Tartary, and the Scotch nails mentioned by Adam Smith are among the manufactured articles which have served as M. The qualities of good M. seem to be: (1) that it shall have substantial intrinsic value generally appreciated; (2) it must be portable—gold can be taken from London to Paris at a cost of ·4 (including insurance)—£5 in Spartan currency (iron) would weigh a ton; (3) it must be practically indestructible; (4) it must be homogeneous, so that the equal weights will have the same values; (5) it must be divisible without great loss (gold loses in melting about 1s. 4d. per ounce); (6) it must not be too variable, as it is used as a standard of value in long contracts; (7) it must be easily known as intrinsically genuine, and must be able to receive and retain a mint mark. In the earliest times the various metals used as M. were not coined, but passed by tale, or number of pieces of the same weight and shape. The sycee silver, now used in China, seems to be a small shoe-shaped ingot, with an assay-stamp of doubtful value. Coins proper 'are ingots, of which the weight and fineness are certified by the integrity of designs impressed on the surfaces of the metal.' The objects in selecting a form of coin are to prevent counterfeits and the fraudulent removal of metal from the coins, to minimise the depreciation by tear and wear, to produce an artistic and historical monument of the nation. The last object has not been attained in Great Britain. The standard unit of value is an entirely arbitrary weight of the standard metal. Hence, it seems not to matter much whether or not we have, as M. Chevalier suggests, a universal standard unit of value corresponding with the metric system of weights. As in the case of the Old Eng. *mancus, meare, ora, thrimsa*, and shilling, the *monies of account* may be entirely different from the unit of *value* (1 lb. silver), and the *current* M. (silver pence and halfpence). We must also distinguish from standard M. such token M. as our bronze coinage, of which the legal value often varies 75 per cent. from the metallic value. M. which is legal tender, or which has what the French call *cours forcé*, is what under the Coinage Act (33 Vict. c. 10) a creditor must accept from his debtor, subject to liability for costs in an action for his debt. The popularity of M. depends very much on custom: thus, the Austrian mint has since 1870 issued Maria Theresa dollars for use in the Levant and N. Africa. There is a constant tendency in new M. to disappear from circulation. This is on account of the 'picking and calling' by bullion dealers, &c., who melt, export, or hoard the full weight M. 'Bad M. drives out good,' so that sovereigns are constantly circulating which are 6d. or 8d. below the standard. The chief systems of metallic money are: (1) currency by weight, which, as Aristotle says, was the oldest, and which still exists in the Chinese *tael* and elsewhere; (2) unrestricted currency by tale, in which the State would merely certify the weight of the various portions of metal: by the system of *parallel standards* the coins would circulate by tale at ratios varying according to the market values of the metals; (3) single legal tender system, which has always been found insufficient, as when in England the want of a legitimate copper coinage was supplied by tradesmen's tokens; (4) the multiple legal tender system; (5) the composite legal tender, where subordinate token coins of a metal different from the standard of value and principal legal tender are recognised as tender for small amounts. International M. would no doubt facilitate commercial accounting and statistical inquiries, and would prevent a good deal of melting and recoining which at present goes on. Its possibility is shown by the fact that several coins are received as tender beyond the nation by whom they were issued. The competing schemes for a decimal system in British money are known as the *Pound and Mil* system, which would alter the farthing 4 per cent to make it $\frac{1}{1000}$ of £1; and the *Penny and Ten Franc* system, which would reduce the penny 4 per cent. to make it $\frac{1}{100}$ of ten francs. For the higher forms of M. see PROMISSORY NOTE, BILL OF EXCHANGE, CHEQUE, BANK, &c.

Monferra'to, a former marquisate of Italy, bounded N. by the seigniory of Vercelli, E. by Milan and Genoa, S. by the Apennines, and W. by Piedmont. It had an area of 1300 sq. miles, and was divided by the Tanaro, an affluent of the Po, into Upper and Lower M. Casale (q. v.) was the capital. Aleran, the founder of the House of M., was created a marquis by Otho II. in 995. His successors played a prominent part in the Crusades (q. v.), one of them, Konrad, being chosen King of Jerusalem (1192), and another, Guglielmo VII., marrying his daughter Yolande to the Byzantine emperor Andronicus Paleolus (1284). Theodoro, the second son of this marriage, succeeded to the marquisate, which remained vested in his descendants, until, on the death of the last of the line (1533), it passed to the House of Gonzaga (q. v.). Since 1703 it has been incorporated with Savoy, and now forms part of the province of Turin.

Monge, Gaspard, a celebrated French mathematician, was born at Beaune (Côte-d'Or), May 10, 1746. While studying at the military school at Mézières he invented his famous *Géométrie Descriptive*, and succeeded Bossut as tutor and professor there in 1772. In 1780 he was admitted to the Academy of Sciences. During the Revolution he took charge of the manufactories for supplying war-material to the army, and was the prime mover in the subsequent founding and organising of the École Polytechnique. In Italy, where he had been sent to take charge of the transport of artistic spoils to France, he met Bonaparte, whom he accompanied to Egypt. There he used well his opportunities as a scientific man. On his return to Paris in 1799 he resumed his work as a teacher, and was placed at the head of the École Polytechnique, but was deprived of his position under the reign of Louis XVIII. He died at Paris, July 28, 1818. As a mathematician M. has gained celebrity by his discoveries in pure geometry, while in the published papers of the Academy of Sciences his numerous memoirs upon the geometry of curves and surfaces, upon differential equations, and problems of attraction, attest his wide knowledge of the science. His chief works are *Traité Elémentaire de Statique* (1788; 7th ed. 1834); *Géométrie Descriptive* (1799; 6th ed. 1837); *Application de l'Algèbre à la Géométrie* (1805); and *Théorie des Ombres et de la Perspective*, published by Brissin (1819). See Dupin, *Essai historique sur les Services et les Travaux Scientifiques de M.* (Par. 1819).

Monghyr' (*Mungir*), the chief town of the district of the same name, in Bengal, British India, on the right bank of the Ganges, 256 miles by rail N.N.W. of Calcutta. Pop. (1872) 59,698. It is favourably situated on a rock overhanging the river, both for commerce and defence. Its history goes back to an early period, and in 1763 it was chosen as the capital of Bengal by the last independent Nawab, Meer Cossim. M. contains a large fort, no longer kept up, and many temples, tombs, and other buildings. The trade, both by river and railway, is very considerable. There are manufactures of all sorts of iron-ware, including cheap guns, inlaying swords with gold and silver, cabinet work, boots, and dyeing.—The *district* of M., which lies on both banks of the Ganges, has an area of 3913 sq. miles; pop. (1872) 1,812,986. In the extreme S. it is hilly. The crops are rice, wheat, pulses, oil-seeds, indigo, and opium. The cultivating classes are not well off. The chief towns, besides M. town itself, are Shaikpura, Jumma-pur, Khagurriah, and Barheya. In 1876–77 the exports were valued at £430,000, chiefly oil-seeds, wheat, and other food grains, indigo, hides, and *ghee*; the imports at £314,000, chiefly piece-goods, salt, and sugar.

Mongo'lia, the land of the Mongols, and part of the Chinese empire, is a vast plateau 2000 feet above the sea, extending between Siberia on the N. and China Proper and Thibet on the S., and between Turkestan on the W. and Mantchuria on the E. Area estimated at 1,304,000 sq. miles; pop. 600,000. M. is in great part occupied by the Desert of Gobi (q. v.), is girt by high mountain ranges (the Altai, Khin-ghan, &c.), and contains the head waters of the Amoor, Yenisei, and Angara. The climate is one of great extremes. Apart from the desert region the soil is mainly baked clay, affording root only to stunted bushes and tufts of saline grass. Yet in the more favoured spots the Mongol manages to rear herds of camels, horses, and sheep, which he exchanges for Chinese tea, corn, and manufactured goods. The chief centres of population are Urga and Karakorum, and in the N.W. are the trading stations Uliassutai and Kobdo. See *M., the Tangut Country, and the Solitudes of Northern Thibet*, by Lieut.-Col. N. Prejevalsky (Eng. trans. with notes by Col. Yule, Lond. 1876).

Mon'gols, The, a branch of the great Turanian family (see TURANIAN), appear in the 9th c. A.D. inhabiting the neighbourhood of Lake Baikal and the eastern portion of Siberia. They were divided into the M. proper, the Buriäts, and the Kalmuks (q. v.). These Genghiz Khan (q. v.), the founder of the Mongolian empire, welded in the 13th c. into a nation, which included also the Tungus (q. v.) and Turkic tribes. His descendants founded the Yuan dynasty in China, and in the W., after crushing the califs of Bagdad and the Seljuks (q. v.) of Iconium, conquered Moskow, and invaded Poland and Silesia (1241), but were forced by the united armies of Germany, Poland, and Silesia to retire into Moravia and Hungary. In 1243 they withdrew to Karakorum, between the rivers Onon and Tamir, there to elect a new Khan. Their empire at this period stretched from China to Poland, from India to Siberia; but, vast and unwieldy, it was doomed to a speedy decay. Expelled from China (1360), the M. rallied once more in Central Asia under Timur (q. v.), but in 1468 his empire too fell by its own weight; and in Jagatai alone, extending from the Sea of Aral to the Hindu Kush, was a Mongolian dynasty able to maintain itself. Hence came Baber (q. v.), who conquered India, and founded the Mogul (q. v.) line. At present the M. are mostly subject to those nations whom they once subdued—the Czar of Russia, the Sultan of Turkey, and the Tungusic sovereign of China. See D'Ohsson's *Histoire des M.* (4 vols. Amst. 1834–35); Max Müller's *Science of Language* (2 vols. Lond. 1862); and Henry H. Howorth's *History of the M. from the 9th to the 19th c.* (1 vol. Lond. 1876).

Moniteur, Le, formerly the official French journal, dates under the title of *Gazette Nationale*, or *Le Moniteur Universel*, from May 5, 1789. Since 1811 it has been known simply as *Le Moniteur Universel*. It was founded by Joseph Panckoucke, and after his death passed into the hands of his daughter, Madame Agasse. Always a docile instrument in the hands of the party in power, it has been republican, imperialist, and royalist in turns. Its editors often held high official rank, and its contributors on art, science, and literature numbered for many years the most brilliant writers of the nation. Under Napoleon III. it ceased to be a private property. On January 1, 1869, it was superseded by the *Journal Officiel* as the Government organ, and it has been conducted independently since, although during the siege of Paris it was selected by the Government of Defence for their official publications. At present (1877) it unofficially supports the Government of Marshal MacMahon. A reprint of its earlier numbers, published by Leonard Gallois in 32 vols. (1840, &c.), forms a most complete and interesting record of the great events of the first Revolution.

Monitor (Lat. 'a warner'), a name given to a genus of Lizards (q. v.), representing the family *Varanidæ*, in which the tongue is slender, bifod or cleft, and protrusible, and the body covered with scales. The head is long, and the tail keeled or ridged on its upper surface. The feet are well developed, and have toes furnished with strong claws. The M. inhabits the Old World, with the exception of one species, found in Mexico. The *M. Niloticus* of N. Africa is a familiar example. It may attain a length of 6 feet, and is said to devour the eggs of crocodiles. The name is derived from the animal's emitting a whistling sound, supposed to warn the observer of the approach of the crocodile. It is found most frequently in the neighbourhood of rivers. Representations of the M. occur upon the monuments of the ancient Egyptians.

Monito'rial or Mu'tual Instruc'tion Sys'tem, consisted in the employment of selected pupils as the teachers of their schoolfellows, under the superintendence of a head-master. It was first applied to solve the problem of popular education in England by Bell and Lancaster (q. v.) early in this century; and from its cheapness and the readiness with which it could be set in operation was extensively adopted. Its inherent defects, however, led to its speedy disuse, and it has been entirely supplanted in the public schools of Great Britain by the pupil-teacher system, established by the Committee of Privy Council for Education. See Pillans' *Rationale of Discipline;* Wood's *Sessional School;* Bell's *Madras School; British School Manual;* Currie's *Common School Education.*

Monk. See MONACHISM.

Monk, George, Duke of Albemarle, the second son of Sir Thomas M. of Potheridge, was born at Merton, near Torrington, in Devonshire, December 6, 1608. He took part in the descent on Cadiz (1625), and in the expedition to the Isle of Rhé (1627), and next served for ten years in the Dutch army under Lords Oxford and Goring. Returning to England on the eve of the Civil War, he attended Charles I. to Scotland (1639) as lieutenant-colonel in Lord Newport's regiment, and in 1642 passed over to Ireland with Leicester and Ormond to quell the revolt in Ulster. Recalled and arrested on suspicion of favouring the Parliament (1643), but soon released, M. rejoined his troops at Nantwich, where, in January 1644, he was defeated by Fairfax, made prisoner, and sent to the Tower. Three years' captivity and the persuasions of his kinsman Lord Lisle induced him to enter the parliamentary service (1646), and he was once more despatched to Ireland, where a treaty concluded with O'Neill brought him under the temporary displeasure of Cromwell. He accompanied that general, however, on his Scotch campaign, fought with distinction at Dunbar (1650), and was left with 7000 men to accomplish the subjection of the Highlands. This he achieved by four months' hard fighting, and in 1653 was joined with Blake and Dean in the command at sea, where he won two signal victories over the Dutch. A peace was concluded (1654), and M. resumed the command of the forces in Scotland, living for five years quietly at Dalkeith, and busying himself with gardening, but always regarded with a jealous eye by Cromwell, who in one letter charges him openly with plotting for the re-establishment of monarchy. Only with the Protector's death was the moment for action come. Rejecting Richard Cromwell's offer of £20,000 a year, M. gathered a convention at Edinburgh, levied money and recruits, and marched on London, the cry of a 'Free Parliament' preceding him like wildfire. He entered unopposed, and even while organising the Convention Parliament, opened negotiations with the exiled court. Charles, on his landing at Dover (May 23, 1660), embraced M., called him 'father,' and shortly after created him Earl of Torrington, Duke of Albemarle, a Knight of the Garter, and a Privy Councillor. He presided at the Admiralty (1664), governed London during the great plague (1665), and with Prince Rupert defeated the Dutch fleet in a three days' fight (1666). He died January 3, 1670, and was buried in Westminster Abbey. A far-seeing politican and an able and popular general, M. had a happy knack of taking the tide of affairs at its flood. His action in the Restoration is explained by his abandonment of the royalist cause at a time when it seemed desperate; and though a man of no greatness, he possessed the shrewdness and power of striking on the hot iron that render a man capable of great results. See Skinner's and Guizot's Lives of M.; Evelyn's and Pepys' *Memoirs;* Hallam's *Constitutional History;* and Macaulay's *History of England.*

Monk-Bird (*Tropidorhynchus corniculatus*), a species of Insessores, belonging to the Tenuirostral section of the order. It receives its name from its bare head resembling the shaven crown of a monk. The M.-B. is a native of S. Australia, where it is also named the 'Friar Bird,' 'Leatherhead,' and 'Poor Soldier.' The bill is elevated at the base, and the fourth and fifth quills are longest. The tail is long and rounded. The feet and claws are very strong. The bird feeds on the nectar of flowers, and also on insects. Its voice is powerful, but somewhat harsh. The wings are short, and the flight proportionally weak. The general colour is a greyish-brown, the tip of the tail being white. Long white feathers decorate the breast, and the under parts are light brown.

Monk'ey, the general name applied to the members of the mammalian order *Quadrumana* ('four-handed'), this latter division being included in the larger order of the *Primates*, in which Man (q. v.) is also ranked. The term 'Ape' is now limited to denote the more man-like of the Quadrumana—such as the Gibbon, Orang, Gorilla, and Chimpanzee, while the Baboon is by some authorities also styled an 'Ape,' although it is of a decidedly lower type than the four genera first mentioned. The lowest Quadrumana are the Lemur, Aye-aye, &c., which exhibit so many peculiarities and evidences of lower structure when compared with other Quadrumana, that they are by many authors included in the division *Prosimiæ* or Lower Quadrumana. Thus the term 'M.' may most significantly and properly be applied to the great bulk of Quadrumana, which typically represent the order, and which are intermediate in position between the lemurs on the one hand and the anthropoid or man-like apes on the other. A readily appreciated definition of a M. would be that of a higher mammal having a discoid or deciduate placenta, the *hallux* or great toe being usually opposable to the other digits, and the *pollex* or thumb also generally opposable to the other toes—so as to convert both feet and hands into prehensile organs. The incisor teeth generally number four, and the molars six in each jaw. Perfect collar-bones or *clavicles* are developed, and the mammary glands are *pectoral*, *i.e.*, placed on the breast. Monkeys are divided into 3 well-marked groups. Of these the (1) *Strepsirhina* have curved or twisted nostrils, situated at the extremity of the snout. As a rule the incisor teeth number six in each jaw, those of the lower jaw being aslant. Tuberculate molars occur. The second toe has a claw-like nail; all the feet have five toes, and the thumbs are opposable. To this group belong the Aye-aye or *Cheiromys*, the Lemur, and Loris, the Strepsirhine Monkeys being confined for the most part to Madagascar, and some few species inhabiting the E. Archipelago. The (2) *Platyrhina* Monkeys inhabit the New World exclusively, and are represented by the Spider M. (*Ateles*), Howling M. (*Mycetes*), Marmoset, Squirrel M. (*Callithrix*), &c. In these the nostrils are broad and widely separated. The tail is prehensile, and the premolar teeth number six in each jaw. No cheek pouches or natal callosities exist; and the thumbs are either wanting, or if present are but feebly opposable. The (3) *Catarhina*, or Old World Monkeys, have thirty-two teeth, arranged as in man. In one genus (*Colobus*) only are the thumbs wanting, the thumbs and great toes being opposable. The canine teeth are large and projecting, and cheek pouches and natal callosities are frequently found. The tail is long, and never prehensile. Cheek-pouches and callosities exist in such Catarhine Monkeys as the *Semnopitheci* of India, the Guenons, Macaques, &c. In the baboon and mandrill the tail is short and the muzzle is long; while in the anthropoid ape or man-like monkey the tail and cheek-pouches are wanting, and natal callosities are generally absent.

Monkey-Pot, the popular name given to the fruit of *Lecythis Grandiflora*, a Brazilian species belonging to the natural order Myrtaceæ, tribe Lecythidaceæ (q. v.). The capsule, containing eatable almond-like fruits, resembles in general shape an S-shaped urn, 5 inches long by 3 broad, closed at its upper end by a lid which fits into a circular opening nearly 2 inches in diameter.

Monk's-Hood. See ACONITE.

Monk's-Rhubarb. See DOCK.

Monkwearmouth. See SUNDERLAND.

Mon'mouth, the county town of Monmouthshire, England, finely situated at the confluence of the Monnow and Wye, 184½ miles W.N.W. of London by the Great Western Railway. Its famous castle, of which only a fragment remains, was the favourite residence of John of Gaunt, and the birthplace of Henry V., hence called 'Harry of M.' The church of St. Mary, with its beautiful spire, in part dates from the 14th c. M. has iron and tinplate works, corn-mills, and tanneries, besides wood-turning and paper-making industries, and a trade on the Wye in bark, timber, and country produce. With Newport and Usk, it sends a member to Parliament. Pop. (1871) 5879.

Monmouth, James, Duke of, son of Charles II., by Lucy Walters, was born at Rotterdam, 20th April 1649, entrusted to the care of Lord Crofts, whose name he took, brought up as a nobleman by Henrietta Maria, and made his appearance at Whitehall, 1662. Pepys writes in his *Diary* for September 7th, of that year, 'Here I also saw Madam Castlemaine, and which pleased me most, young Crofts, the king's bastard, a most pretty sparke of about fifteen years old.' In his sixteenth year he received the title of Duke of Monmouth, and married Anne, daughter of the Earl of Buccleuch, who brought him a fortune of ten thousand a year. He took her name, and became Duke of Buccleuch in Scotland, a Knight of the Garter, Master of the Horse, Commander of the first troop of Life Guards, Chief Justice of Eyre, S. of Trent, and Chancellor of the University of Cambridge. In 1673 M. led the English auxiliaries against the Dutch, and earned a high reputation for courage and military skill. On his return from the Low Countries he was received by the people of London with royal honours, and the story began to be bruited abroad that he was the legitimate son of the king. Though the king made a solemn asseveration before his Council to the contrary, the rumour was credited, and the Duke of York had to retire from England. By his clemency at the battle of Bothwell Bridge, M. won (1679) still more the affection of the Protestant party. Acting under the advice of the Earl of Shaftesbury, he made what were really a series of royal progresses throughout England, bore on his escutcheon the English lions and French lilies without the baton sinister, mixed in rustic sports, acted as godfather to the children of the peasantry, and touched for king's evil. The popular enthusiasm ran so high that Charles compelled M. to retire to Holland, while the Duke of York was recalled to the court. But in 1680 M. was again permitted to return, and again he courted the favour of the people by royal progresses. Being apprehended at Stafford, he made his escape to Antwerp (1684), where he became the centre of a host of intriguing exiles. After the king's death he planned an invasion—the Earl of Argyll to land in Scotland and promote his cause there, whilst he was to set up his own banner in the S. of England. M. disembarked in Dorsetshire (21st June 1685), published a violent manifesto against James II., gathered round him crowds of farmers and traders, but failed to attract the nobles and gentry. Advancing through Taunton and Frome, M., though he had meanwhile heard of the failure of the Scotch expedition, rashly attacked the king's troops at Sedgemoor (July 5th), and suffered a miserable defeat and capture. James had no mercy on him, though M. appealed in most humiliating terms for pardon. He was executed at London, 25th July 1685. M. was a confirmed libertine, but his accidental attachment to Protestantism secured him popular esteem. The attractive boldness of his character, and his charm of manner, were not, however, supplemented by the stronger virtues necessary for permanent distinction. See Robert's *Life, Progresses, and Rebellion of James, Duke of M.* (Lond. 2 vols. 1844); Macaulay's *History of England* (vols. i. and ii.), and Green's *Short History of the English People* (1875).

Monmouthshire, a county in the W. of England, is bounded W. and N.W. by the Welsh counties of Glamorgan and Brecknock, N. and N.E. by Hereford, E. by Gloucester, and S. by the Severn's estuary. Area, 368,399 statute acres; pop. (1871) 195,448. The northern part of M. is mountainous, and celebrated for its scenery. The highest points are the Cradle, 2648 feet, and the Sugar-Loaf, 1856 feet. The chief rivers are the Usk and the Wye, the latter of which partly confines the county on the W. Bordered by the Caldeco, and Wentloog Levels, the coast, 22 miles long, is low-lying, and protected by extensive sea-walls. M., in part formed of Old Red Sandstone, and of the S. Welsh carboniferous measures, is particularly rich in coal, ironstone, and limestone. In 1876 there were 37,473 acres under corn crops, 13,674 under green crops, 23,486 in clover, sanfoin, and grasses, and 152,236 in permanent pasture, exclusive of mountain and heath; and M. had 10,597 horses, 42,222 cattle, 194,455 sheep, and 14,714 pigs. The chief crops are wheat, barley, oats, turnips, and swedes. Grazing and farming are the general occupations, but in the W. part the dominant industries are the mining of coal and iron, and the iron manufacture. The towns are Monmouth, Newport, Chepstow, Rhymney, Pontypool, Tredegar, and Abergavenny. M. is a centre of antiquarian interest, and among its many ruined piles are Caldecot (more Calcot), Raglan and White Castles, and the abbeys of Tintern and Llanthony.

Monochlamyd'eæ, or **Apet'alæ**, the fourth sub-class of the Dicotyledons (q. v.), embracing those plants whose flowers have a calyx only or no perianth. It is subdivided into (1)

Angiospermæ, in which the ovules are in a pericarp, to which Polygonaceæ, Lauraceæ, Euphorbiaceæ, and Amentiferæ belong; and (*b*) *Gymnospermæ*, in which there is no pericarp, as in the Coniferæ and Cycadaceæ.

Mon'ochord (Gr. *monos*, 'single,' and *chordē*, 'a string'), an instrument formed by a board with bridges at both ends, between which a string is distended, used for experiments on the vibrations of strings, and for ascertaining the relative proportions of musical sounds. It was known to the ancients, and is said to have been invented by Pythagoras. The name is also given to an old instrument of the Clavichord kind, which should be more correctly called monichord.

Monocotyle'donous Plants form one of the primary classes in the natural system of botany, comprising those plants in which the embryo has only a single cotyledon, the vascular bundles of the stem are dispersed through the cellular tissue, and the prevalent number of the parts of the flower is three or six. The leaves are usually parallel-veined. This great class may be conveniently separated into three divisions:—1. Those with glumaceous flowers, including grasses and grass-like herbs, such as sedges; 2. Those with petaloid flowers and ovary inferior, as in the orchis, the iris, the agave, &c.; 3. The flower petaloid, ovary superior, as in the palms, the lilies, the arums, &c. The great systematist, Mr. Bentham, in a paper recently laid before the Linnæan Society, propounds an arrangement into four series, viz., *Epigynæ*, *Coronariæ*, *Nudifloræ*, *Glumales*. The term *Endogens*, as found in botanical books, is synonymous with M. P.

Monodel'phia (Gr. *monos*, 'single,' and *delphus*, 'the womb'), De Blainville's name for the highest division of mammalia (including all the higher mammals and man), in which the two oviducts or *Fallopian tubes* coalesce to form a single *uterus* or womb, which may, however, exhibit at its *fundus* or base a partial separation into two halves. The so-called 'cornua' or 'horns' of the uterus in the horse, &c., exemplify this condition, and attest the formation of the uterus as a double organ, or from a union of the Fallopian tubes. In M. the uterus opens into a single *vagina* or outlet, which is completely separated from the bowel or *rectum*. All M. have a *placenta*, and hence this division of the mammalia corresponds with that of the placentalia.

Mon'odon. See NARWHAL.

Monœ'cious (Gr. *monos*, 'single,' and *oikion*, 'a dwelling') is a term used in botany to imply that male and female organs in different flowers are borne on one and the same individual plant. Familiar examples are the oak, birch, beech, and hazel, where the catkins are the male flowers, and the female are much less conspicuous. The cucumber being a M. plant, gardeners often effect artificial fecundation. See DIŒCIOUS and HERMAPHRODITE.

Mon'ogram (Gr. *monos*, 'single,' and *gramma*, 'a letter') is a device or figure formed by interlacing two or more letters which are the chief components of a name or title of a person or place. The use of monograms is very ancient, dating from the time of Philip of Macedonia; while in the ancient records of India and China they are common. The study of monograms is specially interesting historically; since upon a knowledge of them depends the true understanding of many inscriptions and monuments. See Heller's *Monogrammen-Lexikon* (1831), Bruillot's *Dictionnaire des Monogrammes* (3 vols. 1832–34), and Nagler's *Die Monogrammisten* (4 vols. 1857–70).

Mon'ograph (Gr. *monos*, 'single,' and *graphē*, 'a writing'), is the name given to a paper or memoir which deals exclusively with one particular topic. It was originally restricted to a scientific memoir, but is now applied to any historic, literary, or theological paper which undertakes to deal exhaustively with a special subject.

Mon'olith (Gr. *monos*, 'single,' and *lithos*, 'a stone'), is a pillar or anything cut from a single block of stone. Remarkable examples are found in Egypt, and several European cities boast of Monolithic columns removed from that country. See OBELISK.

Monoma'nia (Gr. *monos*, 'single,' and *mania*, 'madness') is the term applied, by some physicians, to that form of insanity in which the mind of the patient is absorbed by one idea, or is irrational on one subject only. There is great disparity of opinion among psychologists regarding the proper use of the term. With one author, M. means only a fixed morbid idea; with another, only partial exaltation; while a third restricts it to a single morbid impulse. Examples of M. may occur under the form of delusional insanity, or those states in which marked delusion is present, whether of a melancholic or exalted character, the former condition being termed melancholia with delusion, and the latter M. with delusion; or of a destructive character, homicidal and suicidal insanity, &c., with delusion; or under the form of emotional insanity, or morbid state of the emotions without delusions, the affective M. of Esquirol. This form of insanity may be marked by a perverted moral sense, or by impulses of a destructive character without delusion. The species or varieties of M. must correspond to the faculties of the mind, and to their combinations; so that we have intellectual, emotional, and volitional monomanias, as also mixed forms; and each variety may be marked by exaltation or depression. M. may be simple or complex, stationary or progressive; thus monomaniacs may be sound on all points except one, or the M. may be associated with more or less general incoherence. As a general rule, even in apparently simple cases, other faculties are implicated, so that persons suffering from M. cannot be regarded as responsible for their actions. In some cases, however, it is impossible to say where sanity terminates and insanity begins. There are many varieties of M., and in all cases they are to be regarded with suspicion as the first symptoms of general insanity. The more marked forms of M. are those characterised by a particular delusion, such as that the person is made of glass. According to Pritchard, M., or partial insanity, is characterised by some particular illusion or erroneous conviction impressed upon the understanding, and giving rise to a partial aberration of judgment. The individual affected is rendered incapable of thinking correctly on subjects connected with the particular illusion; while in other respects he betrays no palpable disorder of the mind. When there is no morbid perception, but only a false conception, French writers employ the expressions *conception fausse*, *conviction délirante*, *idée fixe*. The chief varieties of M. are M. of Suspicion, of Fear, of Superstition and unseen agencies, of Vanity or Euphoria, of Pride and Ambition, of Religion, as also Erotomania, Kleptomania, and Dipsomania. See *Psychological Medicine*, by Drs. Bucknill and Tuke (Lond. 1874).

Monongahe'la, a river of the United States, rises in the Alleghanies in the W. of Virginia, flows N. into Pennsylvania, and at Pittsburg joins the Alleghany to form the Ohio, after a sinuous course of 300 miles in a rich mineral and timber yielding country. It is navigable to keel boats for 200 miles.

Monoph'ysites (Gr. *monos*, 'single,' and *physis*, 'nature') are those who have maintained that the divine and human natures in Jesus Christ are so united as to form but one nature, which is partly divine and partly human. This heresy originated with Eutyches (q. v.), who taught that by the union of the divine and the human nature in Christ the latter was extinguished, so that the Glorified Saviour is wholly divine. The modification of this doctrine which was adopted by the M., was due to Dioscorus, Patriarch of Alexandria, who presided over the 'Synod of Robbers' at Ephesus (449). Dioscorus was deposed by the Synod of Chalcedon (451), which condemned Eutyches; but the patriarch elected in his stead was murdered, and the patriarchate of Alexandria remained in the hands of the M., with brief interruptions till the 8th c. So strong had the sect become by 476, that in that year the Emperor Basilicus was persuaded to publish an edict renouncing the Synod of Chalcedon altogether, in which he was supported by the Patriarchs of Cæsarea, Jerusalem, and Antioch, and about 500 bishops. About the middle of the 6th c. it was much depressed, owing to the persecution by the orthodox party, and internal dissensions; but a revival took place in Syria, Mesopotamia, and Egypt, under Jacobus Baradæus (541–578), and originated the Jacobites (q. v.). Besides the Jacobites, the M. at the present day include the Copts (q. v.), the Maronites (q. v.), and the Armenians (q. v.).

Monop'oli (Gr. 'the solitary city'), a seaport of Italy, province of Bari, on the Adriatic coast, 25 miles S.E. of the city of Bari by rail. It is the seat of an archbishop, and is situated in a rich olive district. Near it are some fine rock-hewn tombs, whose contents are preserved in the Bari museum. Pop. (1874) 13,800.

Monop'oly (Gr. *monos*, 'sole' and *pōlia*, 'sale'), as used in Aristotle's Politics (i. 11), means simply the operation, known in Scotch law as forestalling and regrating, and in English law as engrossing, of one man buying up the whole supply of a commodity to sell it at his own price. Such an offender was in Roman law called a *Dardanarius*, and punished under the *Lex Julia de Annona* (D. 48, 2, 2). M. of clothing, fish, and all other articles of food was prohibited by the Emperor Zeno (Code iv. 59), under pain of confiscation and exile. The matter is also mentioned in a previous constitution of Leo in the year 473; there seems to have been a corrupt practice among the Imperial Magistrates of obtaining authority for this illegal traffic. At Athens a law limited the amount of corn a man might buy. The definition of the old Scotch offence seems to have been borrowed in 1592 (c. 150) from an English statute, which did not apply to retail dealers, 6 Edw. VI. c. 14. Forestalling consists in the buying or contracting for any commodity on the way to market, or dissuading any one from carrying his commodity to market, or making motion to enhance the prices in the market. The regrator, again, was he who bought victual, flesh, fish, or other wares in fair and market, and sold them again either in the same or in any other fair or market within four miles, or who, by buying, contract or promise, gets into his hand the corn growing in the field. At the end of the 16th c. heavy fines were imposed in a few such cases where cattle and corn 'had been kept up to a dearth.' In one case a conviction followed on the charge against a *merchant* of buying corn in order to sell it again, it being said that this was unlawful except for maltsters and dealers in meal. So late as 1607 a Leith merchant was convicted of buying a ship-load of timber in the harbour before landing or entry in the town's books. These laws belong to a period when the privilege of buying and selling certain commodities was often given by the Crown or superior to a certain community to be exercised in a certain place, often at prices to be fixed. In English law every grant by the Crown of the sole right of buying, selling, making, using, &c., was bad if it raised the price, deteriorated the article, or impoverished artificers. But the Crown had the power, much abused by Elizabeth, of creating by letters-patent the exclusive privilege of buying and selling, where the grant was of general use, or where an individual had brought something new or useful into the country. This led to the great statute of monopolies, 21 Jas. I. c. 3, which restricted monopolies in favour of the true inventors to fourteen years, provided the M. was not mischievous to the state nor generally inconvenient (see PATENT). Patents and copyrights are thus not monopolies in a legal sense of the word; they are statutory rights of property. The old M. implied a right to tax the public to any extent which would not make them forego the use of the commodity. Limitation of competition, even where it merely excludes foreign production, is in every case bad. A patent merely postpones a part of the increased cheapness which the public owe to the inventor. The word M. is still applied to cases where, from the conditions of trade, certain persons possess exclusive natural advantages. Small capitalists cannot enter certain trades with hopes of success; the local situation of one great industry near another on which it depends is another example. Great hardship on the one hand, and great meanness on the other, have often accompanied combinations to buy up, especially in times of scarcity. But it is impossible to suggest any legal limit for the general market: it is only in a small department, like the Stock Exchange, that it may be possible to introduce some wholesome rule against the mere speculation in prices.

Monos'toma, or **Monos'tomum** (Gr. *monos*, 'single,' and *stoma*, 'mouth'), a genus of *Trematode* worms or flukes, having a single sucker only, in which the mouth opens. In their perfect state they exist as parasites in water-fowl, their miniature or embryonic forms being found within freshwater mollusca, such as the *Planorbis* or pond snail. *M. lentis*, a familiar species, has been known to occur within the lens of the human eye in a case of cataract.

Mon'otheism (Gr. *monos*, 'one,' and *theos*, 'God'), means the belief that there is but one God, as opposed to Polytheism (q. v.), or Dualism (q. v.). This Supreme Being, however, is conceived in several ways: in *one form*, as the Jehovah of the Hebrews and the Allah of the Mohammedans; in *three forms*, as the Trinity of Christians; or in *all forms*, as the Infinite of the Pantheists.

Monoth'elism (Gr. *monos*, 'one,' and *thelēma*, 'will') was a heresy which arose in the Church in the 7th c. as a development of the teaching of Eutyches (q. v.), with which it was almost identical, its distinctive doctrine being that in consequence of the union of the divine and the human natures in Christ he had only one will, the divine, which governed all his actions, both divine and human. This theory is said to have originated with Theodore, Bishop of Pharan, in Arabia, and was adopted by the Patriarchs of Constantinople and Alexandria as a likely foundation for a compromise between the Monophysites (q. v.) and the Orthodox, and in this light it was laid by the latter before the Emperor Heraclius, who received it with enthusiasm. But the doctrine was condemned by a Lateran Council (649), and afterwards by the Council of Constantinople (680).

Monotrem'ata (Gr. *monos*, 'single,' and '*trēma*, an 'opening'), the lowest order of Mammalia, represented by the *Ornithorhynchus* (q. v.) or 'duck-billed water mole' of Australia, and by two species of *Echidna*—the porcupine ant-eaters of the same region. The name M. is derived from the urinary, generative, and digestive systems opening into a common cavity or cloaca, which in turn opens on the surface of the body by a single aperture. This disposition of parts is eminently bird-like, and even more so is the form and arrangement of the female reproductive organs. The two oviducts or 'Fallopian tubes' in M. remain separated throughout their entire extent, each dilating to form a uterine cavity which opens into the cloaca. So bird-like is this arrangement that the name *Ornithodelphia* was given by De Blainville to the division of Mammalia of which the M. is the only representative order. Further characters of M. are that (as in birds) the bones of the skull become firmly united together, so as to obliterate the *sutures* or lines of union; that the jaws want teeth, and in the *Ornithorhynchus* are covered with horny plates, so that the animal appears to be furnished with a bill, resembling that of a duck in shape; that the *coracoid bones* are developed separately from the *scapula* or shoulder-blade, as in birds; and that these bones extend to the breast-bone, while the clavicles also are united as in birds. Marsupial bones, similar to those found in Marsupialia (q. v.), exist in M., but these structures never support a pouch or *marsupium* in the present order. The testes of the male M. are retained throughout life within the abdomen. No outer ears are developed, and the mammæ are unprovided with nipples. The brain-structure of M. is decidedly bird-like. The *corpus callosum* is small, and by Owen is believed to be absent altogether. The feet have five toes each, and the males have a *tarsal spur*. No *placenta* is developed, and the angle of the lower jaw is not inflected.

Monotropa'ceæ is now from structural affinities generally considered a sub-order of *Ericaceæ*. The plants, however, comprised in it are very exceptional in appearance, all having the aspect of parasites, and their leaves are reduced to scales. In Britain the group is represented by *Monotropa Hypopitys*, found growing among decaying organic material in connection with the roots of fir, beech, and willow.

Monrea'le, a town in Sicily, province of Palermo, on the Monte Caperto, near the river Oreto, 4½ miles W.S.W. of Palermo. It is the seat of an archbishop, and has a magnificent cathedral (dating from the 12th c., and restored since the fire of 1811), held to be the finest specimen of the Sicilian Norman style, and built in the form of a Latin cross, 333 feet long and 131 wide, with bronze doors (1186). Eighteen granite pillars support the pointed vaulting of the nave, which is in the Arabian style, and the walls (70,400 sq. feet) are covered with the richest mosaics. M. has also a rich Benedictine monastery (1174), with beautiful cloisters. On the road from Palermo to M. began (30th March 1282) the massacre known as the Sicilian Vespers. Pop. (1874) 16,211.

Monro', Alexander, *primus*, a celebrated Scotch anatomist, son of a physician, and grandson of Sir Alexander Monro of Bearcrofts, was born in London, September 8, 1697, and educated at London, Paris, and Leyden. He was appointed lecturer of anatomy to the Surgeon's Company at Edinburgh in 1719, and delivered a course of lectures on that subject in 1720

The great Medical School of the University of Edinburgh dates from his appointment as Professor of Anatomy in 1721. He was a brilliant lecturer and successful demonstrator. His father was one of the founders of the Royal Infirmary, and on its opening M. became physician to the institution. He was secretary to the society afterwards known as the Philosophical Society, and was a large contributor to the six volumes of *Medical Essays* which it published in 1732. M. died July 10, 1767. His works include *Treatise on Osteology* (1726), *Observations Anatomical and Physiological* (1758), and an *Account of the Success of Inoculation of Small-pox in Scotland* (1765). Memoirs of M. were written by his son Donald, a physician and medical writer, born 1731, died 1802.—**A. M.**, *secundus*, youngest son of the preceding, born March 24, 1733, at Edinburgh, educated there and at Berlin, succeeded his father as Professor of Anatomy in 1760, a position he held for forty-eight years, and also as Secretary to the Philosophical (afterwards the Royal) Society, to whose Transactions he contributed. He died October 2, 1817. Among M.'s works may be noticed his treatises *On the Structure and Functions of the Nervous System* (1783), *A Description of the Burs Mucosæ of the Human Body* (1788), *The Structure and Physiology of Fishes* (1785), and *Three Treatises on the Brain, the Eye, and the Ear* (1797).—**A. M.**, *tertius*, son of the preceding, born in Edinburgh, November 5, 1773, succeeded his father in the Chair of Anatomy in 1808, having been joint-professor for ten years previously. He retired in 1847, and died at Craiglockhart, near Edinburgh, 10th March 1859. The three Monroes had thus been connected with the University of Edinburgh for more than 120 years. M. *tertius* contributed to the *Transactions of the Royal Society*, and was author of *Outlines of the Anatomy of the Human Body* (4 vols. 1813), and other works.

Monroe', capital of M. county, Michigan, U.S., near the entrance of the Raisin into Lake Erie, 35 miles S. of Detroit by rail. It has large flour and saw mills, and manufactures of tobacco and machinery. Near it are extensive vineyards. Pop. (1870) 5806.

Monroe, James, fifth President of the United States, was born, of an old Cavalier family, in Virginia, April 28, 1758. He fought with distinction in the revolutionary war, and at its close studied law, and became a member of the legislature of Virginia. Elected to Congress in 1783, he was one of the delegates appointed to frame the Constitution of the United States. Sent as United States Minister to Paris in 1794, he was recalled within a year on account of his democratic enthusiasm. In 1799 M. was elected Governor of Virginia, and under Jefferson's Presidency was successively envoy to France (1802) and minister at London (1803-8). In the former capital he negotiated the purchase of Louisiana for his Government for fifteen million dollars. He was Secretary of State from 1811 to 1817, when he was elected President, being re-elected in 1820. Under his Presidency the United States acquired Florida. He died at New York, 4th July 1831. Without shining talents, M. was a prudent, energetic, and successful administrator. His policy aimed at the peaceful development of the great resources of his country, but he was also propounder of the famous 'M. doctrine,' that no European power had a right to interfere in the affairs of America, and that the introduction of their system to any part thereof would be dangerous to the United States. See John Quincey Adams' *Lives of J. Madison and J. M.* (Rochester, U.S., 1850).

Monro'via. See LIBERIA.

Mons (Fr.; Flem. *Berghen:* both names mean 'hill town'), the capital of Hainault, Belgium, on the Trouille, 16 miles N. of the French frontier, and 40 S.W. of Brussels by rail. Its fortifications were demolished in 1866, but it can still be defended by flooding the vicinity with the waters of the Trouille. The chief buildings are the beautiful Gothic cathedral of St. Waudru, founded in 1450, and an interesting town-house built in 1443. The castle is now used as an asylum. Lying in the heart of a great mining centre, M. has an active trade in coal, and is an important railway junction. A canal (*le Canal de Condé*) connects the town with the Scheldt. It also trades in horses, cattle, flax, hemp, &c., and manufactures woollens, cottons, linens, lace, pottery, tobacco, and cutlery. Pop. (1875) 24,539. It suffered much during the wars of the 17th and 18th centuries.

Monse'lice (the *Mons Silicis*, 'Flint Mountain,' of the Lombards), a town of Italy, in the province of Padua, 27 miles N.N.E. of Ferrara by rail, with silk-mills, a ruined castle, and dismantled walls. Pop. (1874) 9765.

Monsoon' (derived from the Arabic word *mausim*, 'a regular season'), the name applied to the periodical winds which prevail in the Indian Ocean, and directly determine the climate and rainfall throughout the peninsula of India. Like the Trade Winds Proper (q. v.), of which they are really only a modified continuation, their existence is due to the unequal distribution of earth and water on the surface of the globe in the neighbourhood of the equator, which, combined with the rotation of the globe, causes regular interchanges of currents of hot and cold air. The S.W. M., which, roughly speaking, blows from April to October, brings its annual rainfall to the Malabar or E. coast of India, and ultimately to Bengal and Hindustan Proper. A reverse current from the N. E. prevails during the remaining months of the year, on which depend the winter rains of Upper India, and the one rainy season of the Coromandel or W. coast. The changes of the season, or breaking of the M., are usually ushered in by variable gales and thunderstorms.

Mon'ster, Monstros'ity, terms applied in physiology and anatomy to describe any organism which departs in an extreme and marked degree from the type of structure of its kind. The science of *Teratology* is that which undertakes the description of such organisms, and which endeavours to trace the lines of their deviations. Tales of beings half-brute and half-human are common enough among the early legends of our own and other countries; and even as late as the 16th c. we find Rueff and Schottus discussing the probability of monsters being produced through the sexual union of women with devils. The *causes* of monstrosity have been referred in our own day, and are still so referred by many persons, to the influence upon the unborn progeny of some impression made on the mind of the mother. A parturient woman, after seeing the stump of an arm which has undergone amputation, bears a child which wants an arm. Another is startled by a frog, and bears a child whose countenance is frog-like. Such instances might be multiplied without end. The *post hoc* in such cases, of course, is accounted for on the principle of *ergo propter hoc*, and the result being first found is naturally and easily referred to some cause. Admitting to the full the influence upon and connection of the mother with the fœtus, cases of monstrosity are not to be explained on such grounds as those on which the popular belief is founded. It frequently occurs, indeed, that a woman who has borne a first malformed child, and who fears for a like result in her second pregnancy, bears the second child in a perfectly hale and normal condition. Yet in such a case, if mental influence is to count for anything in producing malformation, one should certainly expect the second child to exhibit even a greater departure from the normal type than the first. Monsters are produced by no chance rules, but by the infringement of some law or laws; the malformation itself following a law of its own in the course of its production. What are popularly named 'freaks of nature' have no existence in fact—so-called 'freaks' simply representing the action of a law of abnormal growth in counterbalancing the law of healthy development.

Monsters exhibit certain well-defined groups or classes which are defined according to the nature and extent of the abnormality. Thus one prominent group consists of monsters, in which parts which are normally present, exist in a small, or atrophied condition, or may be altogether wanting. *Acephali* or headless fœtuses, and *anencephalous* or brainless monsters, are by no means uncommon, and illustrate this first group. Parts which are normally united may be unconnected—as when the walls of the chest or abdomen are imperfectly developed—and those instances in which such conditions occur exemplify a second class of cases of monstrosity. Union of normally free parts forms a third description of abnormalities, illustrated by the closure of the mouth, nostrils, or the union of internal organs. More typical, however, are the cases included under a fourth head—that of excessive development of parts and structures. This excess may proceed to the degree of producing portions or the whole of a second fœtus attached to the body of the first and normal one. Such 'double monsters' are the best known of all. The duplicity may be *anterior*, where the bodies of the two individuals are united face to face; or *posterior*, where union occurs by the opposite surfaces.

In *lateral duplicity*, the union is for the most part anterior, but the bodies are to a great extent separable at the sides. Sometimes *inferior duplicity* also occurs, the bodies having separate heads, but being united to a greater or less extent by the trunks. Other groups of monstrosities present excessive developments of internal organs only—these resulting frequently from diseased action. *Triple* monsters are also known to occur both in man and in the lower animals, and it is also to be noted that monsters most frequently occur in those animals which have been domesticated by man. Malformations of the genital organs produce cases of *hermaphroditism*, real or supposed, but the laws which appear to regulate the production of the latter lesions are comparatively well ascertained. The 'Siamese Twins,' who died at a comparatively advanced age; the 'Double-Headed Nightingale,' two united negro-children; and the 'Hungarian Sisters,' are the most famous instances of human monstrosities.

Monstrosity in Botany.—Vegetable Pathology may be divided into Teratology or the study of malformation, and Nosology or the diseases of plants; it is, however, impossible to draw any sharp line of demarcation between the two, and often one cannot be conceived without the other. The causes of the phenomena are various. Atmospheric influence and the nature of the soil affect changes in the size, number, arrangement, and shape of the organs of a plant. Adhesion in growth produce much alteration in appearance, and in like manner the separation of organs normally united. Changes in form coming under the head of fasciation may be illustrated by the cauliflower and the cockscomb, and other changes arising from the metamorphosis of whole parts of plants, causing a variety of monstrous growths, come under Prolification, Antholysis, and Gemmation. The attacks of parasites, and animal injuries, are also fruitful of vegetable monstrosities. See METAMORPHOSIS OF ORGANS.

Mon'strance (Lat. *monstrare*, 'to show') is a utensil used in Roman Catholic churches for holding the Host (q. v.) when it is exhibited to the people, either on the altar or in procession, consisting of a sun-shaped holder, in which the host is placed, fixed on a foot or stand. Being for such a sacred use, it is of course generally of the most costly materials and workmanship, and, like all the utensils used in the Eucharistic service, is consecrated.

Monstrelet, Enguerrand de, a French chronicler, was born about 1390, is supposed upon his own authority to have belonged to a noble family, was connected in 1430 with the court of Jean de Luxembourg, under whom he held some office until 1440. At Compiègne he saw Jeanne Darc, and witnessed the interview of the Duke of Burgundy with her. In 1444 he took the oath as Provost of Cambray, and died 20th July 1453. M.'s fame rests upon his *Chronique*, a work composed of three books, two only of which are his. The first extends from 1400 to 1422, and the second carries on the narrative to 1444. The work, compared with the vivacious pages of Froissart, is inexpressibly dull, but its value as an accurate record of facts is quite as great. The best edition is that of M. D'Ouët D'Arcq (2 vols. Par. 1857–58).

Montagna'na, a town in N. Italy, province of Padua, 45 miles W.S.W. of Venice. It has an old citadel and walls, some woollen and linen weaving, and a trade in hemp and spun silk. Pop. (1874) 9178.

Montagnards were the members of the party called La Montagne (the Mountain), which played such a bloody part in the great French Revolution. They were so designated because they sat on the topmost benches in the National Convention. The power of the party was shattered by the fall of Robespierre in July 1794. The name has since been occasionally given to extreme Revolutionists, and was applied to a short-lived corps of urban militia organised in Paris after the Revolution of 1848.

Mon'tagu, Lady Mary Wortley, eldest daughter of Evelyn, Earl and afterwards Duke of Kingston, a pleasure-loving nobleman, was born in London in 1689. As a child she was famous for beauty and intelligence, and the pet of the Kit-Kat Club. Bishop Burnet assisted her in her Latin, and she was an insatiable reader. When in her teens she fell in love with Mr. E. Wortley M., a Whig M.P., but difficulties regarding the match intervened which were only solved by an elopement in 1712. On the accession of George I. Mr. M. was appointed a Commissioner of the Treasury, and his lovely and accomplished wife shone as a resplendent meteor in circles of wit and fashion. In 1717 he was nominated Ambassador at Constantinople, whither Lady Mary accompanied him, and to this visit we owe those charming letters on Oriental life, which, though not published till after her death, have been the delight of posterity ever since. On her return to England in 1718 she advocated the introduction of inoculation, and at length her ardour and courage won the day against the faculty and public prejudice. About this time she published *Town Eclogues*, and her violent literary feud with Pope occurred. Satirised by her former admirer in the *Dunciad* and *Imitations of Horace*, she retorted vigorously in a retaliatory poem. In 1737 she left England, where her husband remained, and she resided principally at Lovero, Italy, till his death in 1761. She died in London, August 21, 1762. An edition of her letters in 3 vols. was published by the notorious Captain Cleland in 1763, and an additional volume (suspected to be a forgery) in 1767. A collection of her works was published in 1803 (2d ed. 1817). In 1837 Lord Wharncliffe published her *Letters and Works* (3d ed., with memoir by W. Moy Thomas, 1861). Her letters depict with a certain lightsome grace and simplicity the manners and fashions of her time, and are full of lively feminine gossip. Those on Turkey are decidedly the best. See *Queens of Society* (Lond. 1860).—**Edward Wortley M.**, the erratic and profligate son of the preceding, was born in 1713. He sat in the House of Commons during two parliaments, and published *Reflections on the Rise and Fall of Ancient Republics* in 1739. He spent many years in the East, ultimately became a Mahometan, and died at Venice, 2d May 1776, while making preparations for a pilgrimage to Mecca. In Nichol's *Literary Anecdotes of the 18th Century* there is an interesting sketch of his career.

Montaigne', Michel Eyquem de, was born of a noble family at the Château de Montaigne, in Perigord, 28th February 1533, taught from the cradle to speak Latin, finished his studies at the Collége of Guyenne, entered upon a course of law at Bordeaux or Paris, and (1554) became Councillor in the Parliament of Bordeaux. Until 1568, when his father died, M. faithfully discharged his legal duties, but in 1570 resigned his office, and was appointed by Charles IX. chevalier of the Order of St. Michel. Though court life was distasteful to him, he accepted (1576) the post of Gentleman-Ordinary to the king, and later that of Gentleman of the Chambers to the King of Navarre. Meanwhile he had translated the *Natural Theology* of Raymundus Sebondus, and in 1580, after some years of retirement he gave to the world his *Essais* in two books. During the same year he set out upon a travelling tour through Italy, Switzerland, and Germany. An interesting journal of his travels, written partly in the most careless French and partly in ungrammatical Italian, still survives. He was recalled at the King's order to accept the mayoralty of Bordeaux, which had been conferred on him (1581). Having sustained the interests of the town so well before Henry III., he was re-elected for another term. In 1585 he prepared a new edition of his *Essais*, and three years later returned to his château, where he died 13th September 1592. M. is among the greatest of the French moralists. Anything like a systematic body of ethics is not to be found in his *Essais*. Their charm consists in a delightful frankness, garrulity, and egotism. His experiences were wide and various, his adoration of antiquity immense, his meditative insight as keen as it was profound. The result is that his Essays are full of life and movement, penetrated with appropriate learning, and coloured by the hues of a philosophy which drew none of its inspiration from the current religion. M. was a thorough man of the world, but he was temperate because he stood aside from party, wise because his thoughts were unhampered by tradition, and genial through natural bias. The Essays have another merit of a different kind. French critics note that they form an epoch in the history of the French language. A certain supple grace of expression—the result of M.'s classic studies—was infused by him into the national diction, and has ever since remained one of its chief distinctions. Among modern editions may be noticed those of Victor Leclerc (5 vols. 1826), Buchon (1837; new ed. with *Notice* by Prevost-Paradol, 4 vols. 1865), Louandre (4 vols. 1870), Dezeimeris and Barckhausen (2 vols. 1870–75), Motheau and Jouaust (2 vols. 1873–74), and Courbet and Roger, with Glossary (1 and 2 vols. 1874). See J. F. Payen, *Notice Bibliographique sur M.* (1857).

Documents inédits ou peu connus sur M. (1847–56); Grün, *La Vie Publique de Michel M.* (1855); Malvesin, *Michel M., son Origine, sa Famille* (Bord. 1875).

Montalem'bert, Charles Forbes, Comte de, was born at London, 29th May 1810, began to study at the Scotch College, Paris, and finished at the Sainte-Barbe Institute. Along with Lamennais he took part in founding *L'Avenir* (1830), in which the principles of democracy and Catholicism were defended side by side, 'God and Liberty, the Pope and the People' being the motto under which the advocacy was maintained. He carried on with great earnestness and brilliancy a journalistic crusade in behalf of free Catholic education outside the influence of the university, and (May 1831) he opened a free school to embody his ideas. It was closed by order of the authorities, and M., who succeeded his father in the peerage that year, defended himself before the Chamber in an incisive and well-turned speech. But the increasing violence with which M. and his colleagues in *L'Avenir* were lashing the abuses of society, gave umbrage to the Church. The paper ceased to appear (1832), after an interview M. had with the Pope, the latter laying down the law that human guidance must be directed from the Church alone, and publishing an encyclical denouncing the alliance of democracy with Catholicism. M. retired to Germany for two years, where he wrote *L'Histoire de Sainte Élisabeth de Hongrie* (1836; 12th ed. 1868), and on his return took his place in the Chamber of Peers. In 1836 he married a daughter of the Belgian minister, in 1839 he visited London, and from Madeira in 1843 he launched a powerful *brochure*, calling Catholics to watch their interests upon the occasion of a new law being proposed in connection with secondary education. During the same period his speeches on points of policy which touched either the doctrines of political freedom or Catholic privilege, were much admired for their elegance, conscientiousness, and correctness. He accepted the revolution of 1848, and being returned to the Legislative Assembly, supported Louis Bonaparte until the *coup-d'état* drove him to resign. He was appointed a member of the French Academy in 1852. Five years later he retired altogether from political life, and devoted himself to literature. His familiarity with English institutions, for which he had a sincere admiration, often served in his political contributions to furnish contemporary contrasts with the state of matters in France. His greatest work, in spite of its inaccuracies, is *Les Moines d'Occident* (4 vols. 1861–67). It embraces the period between Benedict and Bernard, and is written with such lustrous beauty of language, such ardour of spiritual insight, that one thrills in responsive sympathy as he reads. Among M.'s other writings are *Du Devoir des Catholiques dans la Question de la Liberté d'Enseignement; L'Avenir politique de l'Angleterre; Pie IX. et Lord Palmerston. L'Espagne et la Liberté*, published in 1875, is, as its editor, Père Hyacinthe, remarks, 'in some sort his political, literary, and religious testament.' M. died 13th March 1871. See Mrs. Oliphant's *Memoir of the Comte de M.* (1872).

Monta'na, a western territory of the U.S., is bounded N. by the Dominion of Canada, S. by Wyoming and Idaho, E. by Dakota, and W. by Idaho. Area, 143,776 sq. miles; pop. (1870) 39,895, of whom 19,457 were Indians, 18,306 whites, 1949 Chinese, and 183 coloured. As its name indicates, M. is a country of mountains, traversed from N. to S. by the main range of the Rocky Mountains and by many lateral ranges, including the Bitter Root, Judith, and Belt Mountains. Its scenery is singularly grand and impressive, the physical features being on a scale of unsurpassed magnificence. The chief rivers are the Missouri (formed by the 'Three Forks'—the Galatin, Jefferson, and Madison), the Milk, and Yellowstone, and the Clark and other affluents of the Columbia, flowing W. to the Pacific. Among the mountains are many beautiful lakes, while the slopes and valleys are clad with forests of pine, spruce, cottonwood, cedar, aspen, &c. The S. boundary of M. encloses part of the remarkable Yellowstone National Park. The climate in the plains and valleys is very mild, the mean temperature ranging from 44° to 48°. In 1870, 139,537 acres had been taken up as farms, and the value of farm produce was $1,676,660, and of animals slaughtered $169,092. The chief crops are wheat, oats, barley, and potatoes. M., an excellent grazing country with abundance of 'bunch grass,' had 5289 horses, 12,432 milch cows, 24,306 other cattle, 2024 sheep, and 2599 swine. By far the principal industry is gold mining, and it is estimated that since the discovery in 1861 the mines have yielded gold to the value of $100,000,000. Placer, hydraulic, and quartz mining are carried on extensively. Of late years there has been some falling off in the enterprise, though many of the mines are as productive as ever. Other mineral products are silver, copper, lignite, and petroleum. Virginia City is the capital, and Helena the largest town, with a pop. of 3106. M. was organised as a separate territory in 1864.

Mon'tanists were a heretical sect in the early Church, which was founded by Montanus, a Phrygian, who about 150 began to profess that he received revelations from the Holy Ghost amounting to a new dispensation superior to that of Christ and his apostles, and which was to supplement the latter, and bring the Church to perfection. Two fanatical women, Maximilla and Priscilla, attached themselves to him as prophetesses, with a number of other adherents, and a sect was formed. The prophesyings of Montanus, Maximilla, and Priscilla, which were received by the M. as revelations, related chiefly to the discipline of the Church. New fasts were prescribed: two Lents (q. v.) besides that observed by the Church, and two weeks of Xerophagy (Gr. *xēros*, 'dry, fasting,' and *phagein*, 'to eat'), that is, total abstinence from meat and drink and from ablutions. Second marriages were forbidden as no other than fornication. Unbounded value was attached to complete celibacy, and profound contempt expressed for everything earthly. Sins were divided into two classes, according to John v. 16, 17, for one of which the sacrament of penance was appointed, but the other—incontinence, murder, idolatry—excluded the sinner for ever from the Church, although not from the grace of God. Men were forbidden to flee from or buy off persecution, which is sent by God. Millenarianism, which was held by the Church generally during the first two centuries (See MILLENNIUM), seems to have been prominently held by the M. An after development of the doctrine of the M. was that Montanus himself was the Paraclete, so that they altered the baptismal formula to 'Father, Son, and Montanus.' The sect flourished chiefly in Asia, where it continued down to the 6th c. In the Western Church, chiefly owing to the advocacy of Tertullian, it gained a certain hold about the end of the 2d c., but became extinct, in name at least, after the 4th c.

Montar'gis, a town of France, department of Loiret, at the junction of the Canal d'Orleans, Canal de Briare, and Canal de Loing, 69 miles S.S.E. of Paris by rail. M. has considerable trade in cereals, wine, saffron, wool, and cattle, and manufactures serge, cutlery, hosiery, leather, and paper. Pop. (1872) 8104.

Montau'ban (*Mons Albanus*), a town in France, capital of the department of Tarn-et-Garonne, at the confluence of the Tarn and Tescou, and 31¾ miles N.N.W. of Toulouse by rail. Most of the houses are built of brick. There are several fine public buildings, the most important being the cathedral (1739), which occupies the site of an ancient monastery called *Mons Aureolus*. There are considerable manufactures of woollens, cottons, silks, porcelain, flour, chemicals, and beet-sugar, and the town is a great entrepôt for the trade of Southern France. M. was founded in 1144, and was made a bishop's see in 1317. It was one of the chief Huguenot strongholds, and has the sole Protestant theological college in France. Pop. (1872) 16,635.

Montbé'liard (*Mons Pelicardis*; Ger. *Mömpelgard*), a town in the department of Doubs, France, at the confluence of the Alle and Luzine, 36 miles N.E. of Besançon by rail. It makes watches to the yearly value of a million francs, and has a large cotton industry. Pop. (1872) 6509.

Mont Blanc, the monarch of European mountains, and the central point of the Alpine system, belongs to the Graian Alps, forms (since 1860) part of the boundary between France and Italy, and towers to a height of 15,781 feet. It is a gigantic mass of granite and protogine, rising in steep rocky pyramids (*aiguilles*), and covers an area of 98 sq. miles. The waters of its fifty-six great glaciers (Mer de Glace, Glacier du Tour, d'Argentière, &c.) are carried off mainly to the W. by the Arve, through the beautiful Vale of Chamouny (q. v.), and E. by the Dora Baltea, an affluent of the Po, through the romantic valleys of Ferret and Allée Blanche. After M. B. itself, the chief heights are the Aiguille de Géant (13,156 feet), Les Jorasses (13,761), Aiguille Verte (11,218), Aiguille d'Argentiére (12,569), and Aiguille du

Midi (12,608). The snow-line descends to 8000 feet. M. B. was first ascended by Balmat, a guide, in 1786, and again in 1787 by De Saussure, the naturalist. Since then the feat has been frequently performed. The ascent, which takes two or three days, and costs 250 francs a-head, is made now about forty times annually, and is attended by no serious danger, or even difficulty, unless in bad weather. A party of eleven persons perished in a storm during the ascent in 1870. See Eugène Viollet-le-Duc's *M. B., its Geodesical and Geological Constitution, &c.* (Eng. trans. 1877).

Montbrison, a town of France, in the department of Loire, on the Vizezy, 22 miles N.W. of St. Étienne by rail. Its chief buildings are the church of Notre-Dame-d'Espérance, the Mairie and Palais-de-Justice (both ancient convents), and a public library of 15,080 volumes. M. has tanneries, breweries, and a spinning-mill, and in the neighbourhood are three mineral springs. Pop. (1872) 5386.

Montcalm de Saint Véran, Louis Joseph, Marquis de, a celebrated French general, born at the Château de Candiac, near Nîmes, February 28, 1712, entered the army at the age of nine, obtained his captaincy (1729), and commanded the Auxerrois regiment in the battles of Plaisance and Exiles. Created a field-marshal (1756), he was immediately despatched to Canada, which was then threatened by an English invasion, and opened the campaign by the capture of Forts Oswego and Georges. Though to 60,000 English he could only oppose 3000 regulars, as many militiamen, and 1800 undisciplined Indians, M. inflicted a severe defeat on Lord Abercromby, under the wall of Ticonderoga (July 18, 1758). But in the following year three simultaneous attacks were made on Canada. Wolfe (q. v.), advancing on Quebec (June 27), was at first repulsed, but scaling the Heights of Abraham (September 13), he appeared in M.'s rear. In the great English victory that followed, both generals fell, M. surviving his rival only by a day. A monument raised in Quebec by Lord Dalhousie (1827) bears the following inscription: *Mortem virtus communem, famam historia, monumentum posteritas dedit.*

Mont-de-Marsan, a town of France, capital of the department of Landes, 61 miles N.W. of Tarbes by rail, on the Midouze, a navigable affluent of the Adour, formed by the confluence here of the Midou and Douze. The buildings, wholly modern, include a lyceum, theatre, and public library of 12,000 volumes. M. has ironworks, distilleries, and crushing-mills for linseed and colza oils, and carries on a busy transit trade with Bayonne in Armagnac wines and brandies. Pop. (1872) 6964.

Montebell'o, a village of N. Italy, province of Pavia, 23 miles E.N.E. of Alessandria, was the scene of a double defeat of the Austrians, first by the French under Lannes (q. v.), 9th June 1800, and again by the Franco-Sardinian forces, 20th May 1859.

Montecu'culi, Raimondo, Count, was born at Modena in 1608, educated among the Jesuits, entered the Imperialist army, and in 1637 distinguished himself in Silesia by leading a charge of 2000 men against 10,000 Swedes. Taken prisoner in 1639 he was kept at Stettin for two years, where he devoted himself to science and a study of the art of war. He commanded the army which in 1657 assisted the king of Poland against the princes of Sweden and Transylvania, and in 1658 he, as Field-Marshal, helped the king of Denmark to drive the Swedes from Jutland. For some years he operated against the Turks, and at last, from a strong position on the banks of the Raab, he was able to rout them in their attempted passage across the river (August 1664). When war broke out between France and Holland, the Emperor took part with the latter, and in the autumn of 1673 M. led an army from Bohemia to the assistance of William of Orange, and, though watched by Turenne, outmanœuvred him, joined the Stadtholder, and captured Bonn. He was killed by accident at Linz, 16th October 1681. His writings were published by Ugo Foscolo (2 vols. Mil. 1807), and again by Grassi (2 vols. Tur. 1821). His Memoirs were published at Vienna in Latin in 1718.

Montefio're, Sir Moses, a Jewish philanthropist, the descendant of a wealthy family of bankers, was born in London, October 24, 1784. He was knighted in 1837, when he held the office of Sheriff of London, and was created a baronet in 1846. Since 1840 he has undertaken various missions to the East on behalf of his co-religionists, and his earnest, unwearied, and successful services in procuring kindlier laws and greater freedom for them in many states, notably in Poland, Morocco, and Turkey, has made his name revered throughout the world-wide Hebrew community. His philanthrophy has also been exerted in favour of oppressed Christian subjects in Mohammedan countries. He endowed a Jewish college at Ramsgate in 1867 in memory of his wife Judith (author of *Notes of a Visit to Egypt and Palestine*, 1844). On more than one occasion he has received the thanks of the Corporation of London for his humane efforts, and in 1873 he was presented with the freedom of the City. In June 1875, when over 90 years of age, he undertook a mission of investigation into the condition of the Jews at Jerusalem, and a special thanksgiving service for his safe return was held in the following September at the Great Synagogue, London. See Picciotto's *Anglo-Jewish History* (Lond. 1876).

Monte'go Bay, a seaport of Jamaica, in the N.W. of the island, 100 miles W.N.W. of Kingston. It has a good harbour, and a declining trade in sugar, rum, molasses, &c. M. has long been the seat of a U.P. mission. Pop. about 5000.

Monteleo'ne (the *Hipponium* of the Greeks, and *Vibo Valentia* of the Romans), a town of Southern Italy, in the province of Catanzaro, 48½ miles S.S.W. of Cosenza, and 3 miles distant from the Gulf of St. Eufemia. It has manufactures of silk, and a trade in fruits and wine; played an important part in the Neapolitan wars of the Middle Ages; and suffered greatly from the earthquake of 1783, in which its castle, erected by Friedrich II., was almost totally destroyed. Pop. (1874) 11,840.

Montélimar, a town in S. France, department of Drôme, at the junction of the Rubion and Jabron, near the left bank of the Rhone, 213 feet above the sea, and 49¾ miles N. of Avignon by rail. M. has considerable trade in wine, truffles, and raw silk, and manufactures leather, bricks, and confectionery. M. dates from the Roman period, and in the middle ages was called *Montlilium Leopardi.* Pop. (1872) 7737.

Montem, the triennial Whit-Tuesday festival of the Eton scholars, who, dressed in rich, fanciful habits, marched to 'Salt Hill,' a tumulus near the Bath Road, where 'salt'—money for the support of the captain of the school at King's College, Cambridge—having been collected among the spectators, they were sumptuously entertained at the Windmill Inn. According to an account in the *Courier* of 1799, the King and Royal Family graced the proceedings, the members of the procession numbered twenty-seven, and the 'salt' collected amounted to £800. Prior to 1759 the E. M. fell on December 6, the feast of St. Nicholas, whence it would seem to have been a relic of the installation of the Boy-Bishop (q. v.). Since 1847 a regatta has taken its place.

Montemay'or, Jorge de, a famous Spanish poet, born about 1515 at Montemayor, near Coimbra in Portugal, served for some time in the army, but afterwards went to Castile, and became a singer in the royal chapel. He accompanied Philip II. on his visit to Germany, Italy, and the Low Countries. Later, the Queen of Portugal, Philip's aunt, invited him to her court. M. fell, it is supposed, in a duel in Italy about 1562. By his brilliant though unfinished *Diana Enamorada* (1st ed. 1545; mod. ed. Madrid, 1802), he became the founder of the Spanish pastoral romance, which exercised a wide influence in Western Europe. The *Diana* comprises seven books, partly in prose and partly in verse, and is distinguished by its inexhaustible fund of tender sentiments, and by the dignity and harmony of its versification. He also wrote a number of poems, first published at Antwerp in 1554, under the title of *Obras*, but in subsequent editions the collection was termed *Cancionero.* See Ticknor's *History of Spanish Literature.*

Montene'gro (the 'Black Mountain,' so called from the dark forests with which it is covered; the Turkish name *Kara-Dagi*, and the Montenegrin *Tsernagora* have the same meaning), a semi-independent principality over which Turkey claims, but has practically failed to exercise, suzerainty, lies near the Adriatic, and is bounded W. by Dalmatia, N. by Herzegovina, E. by Bosnia, and S. by Albania. It has an area of 1770 English sq. miles. The country is mountainous in the extreme (Kutch Kom, the highest peak, is 9300 feet above the sea-level), and is well watered,

the chief stream, the Moratsha, falling into Lake Scutari. The ground is rocky and sterile, and the climate is cold but healthy. The products are chiefly maize, potatoes, tobacco, fish, honey, and smoked mutton, and there is an abundance of cattle, sheep, and pigs. Wine, brandy, sugar, arms, sandals, &c., are imported. Fear of invasion has prevented the formation of any roads, and all goods are carried along the narrow footpaths by women or horses. The chief markets for the principality are Cattaro and Rissino. The country is divided into 8 districts or nahijas. The villages (310 in number) are mere collections of hovels, and the capital, Cettinje, consists of a single street, with about 40 respectably-sized houses. The pop. was estimated in 1871 to be 195,585, and the number of men capable of bearing arms (ages 20 to 50), 21,850. The people as a rule are a tall, powerful, high-spirited race; but they are quite illiterate, and have necessarily the savage qualities engendered by four centuries of desperate fighting for independence. Their government is patriarchal. They are divided into 40 tribes, each ruled by elders and a chief called Knja, who acts as magistrate during peace, and commander in war. The assembled Knjas form the *Skuptchina*, or Montenegrin Parliament. A Prince-Bishop or Vladika of the House of Petrovitch, was both temporal and spiritual ruler from 1697 till 1852, when Danilo I. (who introduced important internal reforms) proclaimed himself Hospodar or secular prince. The Hospodar possessed the entire revenues of the country till 1868, when instead thereof a civil list was given him of 2000 ducats (£350), augmented by a grant from Russia of 8000 ducats (£1400), and from France of 50,000 francs (£2000). The religion is that of the Greek Church (incorporated with the Holy Synod of Russia since 1852), and there are some 200 priests, many of whom are unable to read, who follow ordinary secular occupations, and are liable for military service. The convents are those of Cettinje, Ostrog, and St. Stefano. The language is a pure dialect of the Illyrico-Servian branch of the Slavic.

History.—On the conquest of the ancient kingdom of Servia by Turkey (1389), M., then known as Zeta, continued to assert its independence, and has ever since maintained a chronic warfare with the Porte. Savage, sanguinary, and cruel as its people are, yet the virtues of fortitude, courage, and unswerving patriotism have never been more splendidly illustrated than in the history of their marvellously protracted struggle. Among the most notable campaigns are those of 1623, 1712, and 1768, in which latter year 20,000 Turks were slain. In 1820, and again in 1830, Turkish invasions were successfully repelled. Omar Pasha entered the principality in 1852, but withdrew on intervention by the great powers. Fresh collisions took place in 1858. The Montenegrins favoured the Herzegovinian insurrection of 1861, but on Omar Pasha's appearance before the capital concluded peace, and for the first time acknowledged the suzerainty of Turkey. Complications arose in 1874 and 1875. On July 2, 1876, war was once more declared, and in the campaign of that year Prince Nikita defeated Mukhtar and Dervish Pashas, who suffered severe losses. After the armistice, October 1876–March 1877, Suleiman Pasha marched his army through the Duga Pass from Nicksics to Podgoritza at a fearful sacrifice of life, and would probably have crushed the principality, had not the appearance of the Russians in Bulgaria called his forces to the Balkans. Nicksics, the Turkish stronghold to the N. of the principality, left to itself, capitulated September 8, 1877, to the Montenegrins, who are at present (November 1877) masters of the situation. See Lady Strangford's *Eastern Shores of the Adriatic* (Lond. 1864); J. G. Williamson's *Dalmatia and M.* (1848); *Le Servie et le M.*, by Reinach (Par. 1876); *Le M. Contemporain*, by Foilley and Wlahovitj (Par. 1876); *Der Krieg M.'s im Jahre* 1876, by Gopcevic (Vien. 1877); *M.*, by the Right Honourable W. E. Gladstone, in the *Nineteenth Century*, May 1877; and *M., its People, and their History*, by the Rev. W. Denton (1877).

Montepulcia'no, a town of Italy, province of Siena, 29 miles S.E. of the city of Siena, and about twice as far S.S.E. of Florence. It is built on a spur of the extinct volcano Monte Amiata (5644 ft.), has an old castle, a fine cathedral, and several well-built churches. The whole hill is covered with beautiful vineyards, which yield a wine that ranks among the finest in Italy. Pop. of town (1874), 2813; but with the suburbs, 13,160.

Montereau-Faut-Yonne, a town of France, department Seine-et-Marne, at the confluence of the Yonne and Seine, 17 miles S.E. of Melun, and connected with Paris by a railway. Pop. (1872) 6714. It has manufactories of earthenware and leather, and has considerable commerce in cereals, wines, and cattle. The 'Bridge' of M. is historically memorable as the scene of the assassination (1419) of John 'the Fearless,' Duke of Burgundy, by Tanneguy Duchâtel, one of the chiefs of the Orleanist party.

Monterey', a town of Mexico, capital of the province Nuevo Leon, on a small tributary of the San Juan, which joins the Rio Grande 110 miles E.N.E. of the town, and the same distance W.N.W. of the Gulf of Mexico. It has considerable manufacturing industry, and has a flourishing trade with the United States. Pop. (1869) 13,500. In the war of 1846, it capitulated after four days' siege to the American forces under General Taylor.

Mon'te Ro'sa, an Alpine group of nine lofty peaks, on the boundary between Piedmont and the Swiss Canton Valais. They are situated between the Pennine and Lepontine Alps, and are chiefly composed of felstone. The highest peak, Düfourspitze, is 15,217 feet high; the others are Nordende (15,132), Zumsteinspitze (15,004), Signalkuppe (14,964), Parrotspitze (14,577), Ludwigshöhe (14,219), Schwarzhorn (14,098), Balmenhorn (14,187), Vincent-pyramide (13,816), and Jägerhorn (13,042). The system is very rich in glaciers, the Lys-glacier and Cornet-glacier being the finest. Minerals are very abundant, but have not yet been worked to advantage.

Mon'te San Giulia'no, a town of Sicily, province of Trapani, 6 miles E.N.E. of the town of Trapani, stands on an isolated mountain (anc. *Eryx*) 2464 feet high. It has an ivy-clad castle of Saracen origin, and a cathedral somewhat 'restored' in 1865. Pop. (1874) 3056, rapidly falling off on account of migrations to the plain. On the mountain are the remains of a temple of Venus.

Mon'te Sant' An'gelo, a town of Southern Italy, province of Foggia, a few miles from the N. shore of the Gulf of Manfredonia, and 28 miles N.E. of the city of Foggia. Pop. (1874) 13,948. It has a picturesque castle and a famous old sanctuary of St. Michele. The vegetation in the vicinity is very luxuriant.

Mon'te Sar'chio, a town of Southern Italy, province of Benevento, 7 miles S.W. of the town of Benevento. Pop. (1874) 4880. Its castle, once the residence of the D'Avalos family, has been recently used as a state prison.

Mon'tespan, Françoise, Athenäis, Marquise de, daughter of Rochechouart Duc de Mortmart, was born in 1641, and in her youth bore the name of Mlle. de Tounay-Charente. In 1661 she was married to the Marquis de M., who brought her to the Court of Louis XIV., where her beauty and vivacity soon attracted the notice of the monarch. She superseded the soft La Vallière in the royal regards, and after 1667 received his exclusive devotion. The Marquis de M. did not accept the situation with the grace of a courtier, and was, in consequence, successively imprisoned in the Bastille, banished to Cayenne, and finally divorced. But M. was doomed to be superseded in turn. She required a governess for the children whom she had borne to the king, and the lady whose services she obtained (Madame Maintenon), robbed her of his affections. In 1686 Louis finally broke off his relations with M., who in 1691 was ordered to leave Paris. She entered the order of the Daughters of St. James, and died 27th May 1707. By her intercourse with Louis she had three sons, the Duc de Maine, the Comte de Vexin, and the Comte de Toulouse, and three daughters, Mlle. de Nantes, married to the Duc de Bourbon; Mlle. de Tours (died 1681), and Mlle. de Blois, married to the Duc d'Orleans; besides other children who died young. M. was ambitious and haughty, and enjoyed the splendour of her shame. See *Mémoires de Madame la Marquise de M.* (2 vols. Par. 1829).

Mon'tesquieu, Charles de Secondat, Baron de la Brède et de, a famous political philosopher, belonged to one of the best families of Guyenne, and was born 18th January 1689, at the Château de la Brède, near Bordeaux. From his

youth he was devoted to classical study, and in his twentieth year composed a treatise, never published, arguing in behalf of the salvation of pagans. On the 24th February 1714 he was appointed Councillor to the Parliament of Bordeaux, but his tastes lay more in the direction of the philosophy than in the details of jurisprudence. In 1721 he published the *Lettres Persanes*, a work in which he subjects to criticism, from the point of view of a foreigner, the complete circle of the national life. Its lively colouring and incisive observation gained him admission to the French Academy (1728), though there is a story current that, to turn aside the opposition of Cardinal Fleury, he published an edition with the objectionable passages cut out. M. resigned his post at Bordeaux in 1726, travelled in Austria, Hungary, Italy, Switzerland, and England, where he made the friendship of Lord Chesterfield and was elected a member of the Royal Society. On his return to France, he devoted himself for some years to the study of Roman history, and published in 1734 *Considérations sur les Causes de la Grandeur et de la Décadence des Romains*. In 1748 appeared his masterpiece, *L'Esprit des Lois*, in which politics were approached from a scientific aspect, and the character of the various forms of government analysed with precision and without partiality. The book was one of the forces which distinctly helped to produce the French Revolution. M. Demogeot says: 'M. is in turn the Voltaire and the Rousseau of the Revolution, but a Voltaire timid, circumspect, veiling his opinions in allusions and subtle censures that could not be impugned; . . . a Rousseau turned jurisconsult and historian, without passion, without a dream of the ideal, noting the facts and realities of the Past, satisfied with finding the "reason" of everything, and preferring to "explain" existing institutions rather than to change them.' M. died at Paris, February 10, 1755. Innumerable editions of his principal works have appeared, and his *Œuvres Complètes* have been very frequently published with the notes and comments of Helvetius, Voltaire, Mably, Cravier, La Harpe, &c. We may cite in particular the editions of 1799 (8 vols.), of 1816 (6 vols.), of 1819 (8 vols.), with the *Éloge* of Villemain, of 1826 (8 vols.), of 1835, and of 1862 (2 vols.).

Montever'de, Claudio, an Italian composer, born at Cremona in 1568, and died at Venice in 1649. He produced many pieces of sacred music, several operas, including *Orfeo* and *Ariana*, and five books of motets and madrigals. M. introduced many innovations into his compositions, which contributed much to the transformation and enrichment of the art of music.

Monte Vid'eo, San Felipe de, the capital of the S. American Republic of Uruguay, lies on the N. shore of the mouth of the Rio de la Plata (here 65 miles wide), 132 miles E. by S. of Buenos Ayres. It is regularly built, the streets running down from a steep hill to the sea, which surrounds M. V. on three sides. The finest building is the cathedral, in the Italian style, in front of which is the Plaza de la Constitucion. There are three other Catholic churches, San Francisco, La Caridad, and Los Ejercicios, a Protestant church (built 1846), and a Methodist chapel, an opera-house, several theatres, and a large hospital, the best in S. America. The harbour is fortified, and is commodious, but is neither deep nor well-protected from the W. and S.W. winds. There is a dry dock admitting vessels 275 feet long, and two others are in progress, one of which will take in ships of 420 feet. In 1875 there entered the port of M. V. 1658 vessels, of 953,605 tons (British 330, of 419,435 tons); cleared 1720, of 987,935 tons (British 346, of 430,474 tons). The chief exports are skins, wool, tallow, dried fish, oil, and extract of meat (36,000 cases in 1875); and imports wine, spirits, flour, cottons, woollens, and hardware. In 1875 the custom-house receipts amounted to $4,359,398. M. V. is connected by railway with San José, Florida, and Duragno, and a line to the Brazilian frontier was begun in 1874. Pop. (1872) 105,295.

Mon'tez, Lola, was born about 1820. Her birthplace is variously given as Seville, Limerick, and Montrose in Scotland. After an adventurous life in London, Paris, and Brussels, she came to Münich in 1846, won the favour of King Ludwig I. of Bavaria, who made her Countess of Landsfeld. She moulded in some degree the policy of the Bavarian Court, and was opposed to the Ultramontanes. In consequence of public disturbances caused by her own rashness and pride, she was expelled from the country in February 1848, returned to England, thence went to North America in 1852, where she excited a great *furore* as an actress, and latterly became a lecturer on social and moral questions. She published an *Autobiography*, and died at New York, 30th June 1861.

Montezu'ma I., the greatest of Mexican monarchs, succeeded Itzcoatl in 1436, and immediately began the subjugation of hostile neighbours, annihilating the Chalcese, defeating and killing the King of Tlatelolco, adding to his dominions the province of Cuihixcas—a tract of country 150 miles broad—next conquering another province called Tzompahuacan, subduing the powerful Mixtacas, and finally annexing the province of Cotasta in 1457. He died during a most disastrous famine.—**M. II.,** grandson of the preceding, reigned when Mexico was invaded by the Spaniards in 1519. At first, forbidding Cortes to move inland, he only excited the cupidity of his foes by the rich presents he sent them; and Cortes, making friends of several disaffected tribes, proceeded with their assistance to the capital. A plot formed by M. for their destruction at Cholula was discovered by the invaders, who, marching on the city, slew 6000 Cholulans, without the loss of a single Spaniard. Cortes on capturing Mexico kept M. a hostage, but released him on his acknowledging himself a vassal of Spain. He would never embrace the Christian religion however. Attempting afterwards to pacify some native insurgents, he was attacked by the infuriated mob as a traitor, and died from wounds caused by stones thrown at him, June 30th, 1520. See Robertson's *History of America*, and W. A. Prescott's *History of the Conquest of Mexico*.

Montfaucon, Bernard de, a French antiquary, born January 13, 1655, at the château of Soulage in Languedoc, served under Turenne, but in 1676 entered the Benedictine monastery of St. Maur, where he applied himself to the study of philosophy, theology, history, literature, and the dead and living languages. He received the post of keeper of the collection of medals at St. Germain des Prés (1694), made an antiquarian tour in Italy (1698–1701), was admitted member of the Academy of Inscriptions (1719), and died at Paris, in the abbey of St. Germain des Prés, December 21, 1741. In folio alone, M. published forty-four different works, among them *Diarium Italicum* (Par. 1702; Eng. trans. 1725), *L'Antiquité appliquée et representée en Figures* (15 vols. Par. 1719–24), and editions of Athanasius (1693), the Greek Fathers (1706), Chrysostom (1718), *Bibliotheca Bibliothecarum Manuscriptarum Nova* (2 vols. 1739), &c.

Montferrat. See MONFERRATO.

Montfort, a French family who derived their origin from Baldwin, Comte de Flanders, and Judith, daughter of Karl the Bald. M. was a small town between Paris and Chartres, and **Amalric II.,** its seigneur, is the first name which emerges in the chronicles (11th c.). **Simon I.,** his son, was thrice married, had four sons, each of whom succeeded him in turn—**Amalric IV.,** the last of these, being long engaged with Henry I. of England in a quarrel concerning his heritage d'Evreux. **Simon III.,** his grandson, married Amicie, daughter of Robert de Beaumont, Earl of Leicester; and his second son, **Simon IV.,** distinguished himself as a persecutor of the Albigensian heretics, went on the 5th crusade (1202), held the titles Comte de M., Earl of Leicester, and Comte de Toulouse, in making good his claims to which he perished. His fourth son, **Simon de M.,** was born in France about 1206; in 1226, two intermediate brothers being dead, he appeared at the Council of Bourges to claim the countship of Toulouse. Failing in that, M. crossed to England, where, after a few years, he got the consent of his brothers and Henry III. to enter upon the earldom of Leicester (1239). He had previously made a clandestine marriage with Eleanor, sister of the king. This marriage so irritated the nobles and Henry that M. had to leave England in order to get it legally recognised. In 1244 his name appears as one of a committee of barons appointed to treat with the king in respect of his exactions, and in 1249 he was sent to Gascony with the title of Seneschal, where he ruled with an iron hand. On his return, he became the leader of the English baronage in resisting royal encroachments, and in 1258 was one of the twelve chosen to put the Provisions of Oxford into execution; and to him were more especially due

the ordinances known as the Provisions of Westminster, by which the grievances of the barons were overtaken. For a year the provisional government thus established worked well enough, but in 1261 Henry repudiated the oaths he had taken, and, under M.'s supervision, preparations were made for war. In 1263, M. compelled him thrice to confirm the Provisions, and in the same year, when the whole question of dispute was referred to the arbitration of Louis IX. of France, M. was the only Earl who appeared against the King. Next year, the award being in favour of the Crown, M. took up arms, and though success was at first on the side of the King, he captured Warwick, besieged Rochester, and collected his forces at Lewes, where he offered to buy off the King if he would confirm the Provisions. A battle was fought, Henry and his son fell into Simon's hands, and he ruled the country for a year in their name. A new constitution was devised, under which the King was compelled to act under the advice of nine counsellors, three of whom were to be in constant attendance upon him. Of these, M. was one, and (December 1264) he called the Parliament known by his name, to which, for the first time, borough representatives were invited. But a feud arose between the family of M. and Gloucester, which developed into a war and culminated at Evesham, where he fell, August 4th, 1265. 'He stands out,' writes Professor Stubbs, 'best and most grandly in comparison with the meanness with which he was surrounded—the paltry faithless King, the selfish and unscrupulous baronage. He is relatively great; but he is not perfect. He is scarcely a patriot—a foreigner could hardly be expected to be so. He is somewhat more distinctly a hero, but he never quite rids himself of the character of the adventurer.' (See Stubbs' *Constitutional History of England* and *The Early Plantagenets* (Lond. 1873); Freeman's *History of the Norman Conquest* (1867-76); Creighton's *Life of Simon de M., Earl of Leicester* (Lond. 1876); Prothero's *Life of Simon de M., Earl of Leicester, with special Reference to the Parliamentary History of his Time* (Lond. 1877).

Montgolfier, Jacques Etienne, was born (7th January 1745) at Vidalon-lès-Annonais, near Lyon in France, where, with his brother, **Joseph Michel M.** (born 1740), he carried on a paper manufactory. They devoted much attention to physical science, and invented (1783) the air-balloon, called after them 'Montgolfière,' for which they were both admitted to the Academy. Etienne died at Servières, 2d August 1799. His brother invented the *bélier hydraulique* and the calorimeter, was made a member of the Institute in 1807, and died 26th June 1810.

Montgom'erie, the name of the Eglinton family, is derived from Roger de M., kinsman of William of Normandy, the first body of whose army he commanded at Hastings. Roger obtained the earldom of Shrewsbury. His grandson Robert came to Scotland in the reign of David I., and obtained the manor of Eglisham (Eaglesham) in Renfrew, which was for two centuries the chief seat of the Scottish Montgomeries, and still remains in the possession of the family. He is a witness to the foundation-charter of the monastery of Paisley in 1160, and died about 1175. A lineal descendant of his, Sir John M., seventh Baron of Eaglesham, married Elizabeth, daughter of Sir Hugh Eglintoun of Eglintoun, daughter and heiress of the Justiciar of Lothians, and niece of Robert II., and obtained with her the baronies of Eglinton and Ardrossan. The ballad of *Chevy Chase* records the death of one of Sir John's sons, Sir Hugh; and his brother, Sir John, who succeeded to the estates, was one of the hostages sent to England to ransom James I.—**Alexander,** his son, became Lord M. in 1449; and his great-grandson Hugh was created Earl of Eglinton in 1508. The title passed to another branch of the family in Alexander Seton, sixth Earl (1612), surnamed Greysteel, who fought against his own son and heir in the Parliament army at Marston Moor. He subsequently espoused the cause of Charles II.—**Archibald,** eleventh Earl, having no male issue, the title passed to Hugh M., who became a peer as Baron Ardrossan in 1806.—His son, **Archibald William,** K.T., D.C.L., LL.D., born in 1812, succeeded to the title of Earl of Winton in Scotland, 1840, and was granted the same title in the United Kingdom, 1859. It was he who held the celebrated tournament at Eglinton Castle in 1839. He was Lord-Lieutenant of Ireland during the Derby Ministries of 1852 and 1858, and was personally the most popular representative the British Crown ever had in that troubled land. In his own land of Ayrshire his dignified yet winning and benignant manners secured him an unbounded popularity. He greatly loved Burns, and learned from his verse the way to reach the hearts of his fellow-men. When the foundation-stone of the Burns Monument at Ayr was laid in 1844 with something like national honours, his was the noblest tribute of eloquence paid to the memory of the 'Ayrshire Bard.' He died 4th October 1861.—His son, **Archibald William,** fourteenth Earl of Eglinton, Lord M., Lord Seton and Tranent in the Scotch peerage, Earl of Winton and Baron Ardrossan in that of the United Kingdom, was born 3d December 1841, and married a daughter of the Earl of Yarborough, 6th December 1862, by whom he has several daughters. He has not yet taken any part in public affairs, but in 1876 he somewhat startled his countrymen by expressing his inability to admire the poet whom his father loved and honoured. See Fraser's *Memorials of the Montgomeries* (2 vols. 1859).

Montgomery, the capital of Montgomeryshire, in North Wales, on the Severn, 26 miles S.W. of Shrewsbury by rail. Its castle, of which the tower and parts of the wall still remain, was built in 1093 by Roger of M., whose name the town still preserves. M. has a trade in country produce, and is one of the M. district of boroughs, which returns one member to Parliament. Pop. (1870) 1285.

Montgomery, capital of Alabama, U.S., on the left bank of the Alabama River, 150 miles N.N.W. of Pensacola by rail. A great cotton-mart, and capital of the Confederate States till 1860, it has a fine State-house, standing on high ground overlooking M. city, also 12 churches, 4 daily newspapers, a large flour-mill, several machine-shops and foundries, &c. Within 60 miles of M. are extensive coal and iron deposits. Pop. (1870) 10,588.

Montgomery, a district in the Punjaub, British India, lying between Lahore and Mooltan, in the *doab* of the Sutlej and the Creanaub. Area, 5573 sq. miles; pop. (1868) 359,437. No rain falls, but the country is irrigated by an indigenous system of canals and Persian wheels. The staple crop is wheat, and dates, oranges, and pomegranates abound. The towns are Kamaliah and Pakpattan. The name is derived from *Sir Henry M.*, a distinguished administrator of the Punjaub under the Lawrences, and like them of Irish origin.

Montgomery, Alexander, a Scottish poet of James VI.'s time, born at Hazelhead Castle, Ayrshire, seems to have been an officer in the guard of the Regent Morton. What services he rendered the king cannot be ascertained; but from 1582 he enjoyed a pension of five hundred marks per annum. In 1586 he got royal licence to travel for five years on the Continent; and it is certain he was confined for a time in some foreign prison. The dates of his compositions are unknown. Three short poems are quoted in Bannatyne's MS. (1568). His most famous poem, *The Cherrie and the Slae*, a long love allegory—virtue represented by the cherry, vice by the sloe—was first printed by Waldegrave in 1597. For the whole of his compositions see the edition prepared by Laing, with memoirs by Irving (ed. 1821). It is probable that M. survived at least till 1605, when his *Mindes Melodie* was printed by Charteris.

Montgomery, James, an English poet of Scottish origin, was born at Irvine, Ayrshire, November 4, 1771. His father, the Rev. John M., a Moravian missionary, went in 1783 to preach the gospel to the slaves in the W. Indies, and died at Barbadoes in 1791. Young M. was meanwhile being educated at the Moravian Seminary of Fulneck, near Leeds. He began the world as a grocer's shop-boy. After much wandering, he started a newspaper in Sheffield (1794), but as editor of the *Iris* was twice fined and imprisoned for what were regarded as offences against Government. Those were the dark days of a triumphant and cruel Toryism. While incarcerated in York Castle he wrote *Prison Amusements, by Paul Positive* (1797). It may be noticed that the persecution which encircled him with a gentle halo of martyrdom contributed to the popularity of his subsequent writings. They were received with a cordiality to which their intrinsic merits did not entitle them. Some of his hymns and shorter pieces, however, exhibit the qualities of true poetry, and are embued with a purity of Christian sentiment that has never been surpassed. M. died at Sheffield, 30th April 1854. His chief works are *The Wanderer of Switzerland* (1806; 9th ed. 1822), *The West Indies* (1809), *The World before the Flood* (1813), *Greenland* (1819),

The Christian Psalmodist, or Hymns Selected and Original (1825), *Prose by a Poet* (1824), *The Pelican Island* (1827). His complete works appeared in 1855. See his *Memoirs* by Holland and Everett (6 vols. 1854–56), and *Life and Times*, by Ellis (1864).

Montgomeryshire, a county of Wales, England, is bounded N. by Denbigh, S. by Radnor, W. by Merioneth and Cardigan, and E. by Shropshire. Area, 485,351 sq. miles; pop. (1870) 67,633. It is almost entirely mountainous, of Silurian formation, and belongs to the basin of the Severn, except a small part in the extreme W., which is drained by the Dovey. The chief heights are Cader Berwyn, on the N. boundary, 2563 feet high, and Rhydo Hywel, in the Kerry Hills in the S., 1895 feet. Plinlimmon is partly in M., but its summit, 2463 feet, is just within Cardiganshire. Affluents of the Severn that water M. are Vyrnwy, Tanat, and Rhin; the Wye rises in the S. of the county. The valleys are fertile and woody, but a great part of the surface consists of moorland sheepwalks. The sheep are celebrated, as are also the 'Merlins,' a pure breed of Welsh ponies. In 1876 there were 53,268 acres under corn crops, 12,314 under green crops, 30,456 in clover, sanfoin, and grasses in rotation, and 148,890 in permanent pasture, exclusive of mountains and heath. M. had (1876), 13,885 horses, 64,474 cattle, 353,604 sheep, and 22,164 pigs. The chief crops are wheat, oats, barley, potatoes, and turnips. Slate is the principal mineral product, and flannel the staple of manufacture. M. is the capital, and other towns are Welshpool, Newtown, and Llanidloes. The county sends one member to Parliament. M. was anciently part of Powysland, and is traversed by Offa's celebrated 'dyke.'

Month is strictly the period of the moon's revolution round the earth. The ordinary lunar M., or lunation, or synodical M., is the time in which the moon goes through all her phases, as from new moon to new moon. Its mean value is 29·530589 days. It is longer than the sidereal M., or time the moon takes to pass through the twelve signs of the zodiac, since in virtue of the earth's circumsolar motion the moon has always to advance through several degrees before coming to its former position relatively to the earth and sun. The mean value of the sidereal M. is 27·321661 days, and is the true period of revolution. For *Calendar M.* see CALENDAR.

Montholon, Charles Tristran, Marquis de, born at Paris in 1782, became a midshipman when ten, at eighteen entered the army, and, rising rapidly, played a distinguished part in the campaigns of Italy, Austria, Prussia, and Poland. After Wagram Napoleon made him Comte, and attached him to his person. During the first restoration M., when all his relatives and friends paid court to the Bourbons, remained faithful to his master, whom he again joined as aide-de-camp, acting in that capacity at Waterloo. He attended Napoleon to the end at St. Helena, performing the duties of private secretary, and preparing, along with General Gourgaud, *Mémoires pour servir à l'Histoire de France sous Napoléon, écrits à Sainte Hélène sous sa Dictée* (1823). Lending countenance to the schemes of Louis Napoleon in 1840, he was condemned to twenty years' imprisonment, but afterwards pardoned. In England he published *Récits de la Captivité de Napoléon à Sainte Hélène* (1847). He also wrote *De l'Armée Française* (1834), and *Fragments Religieux inédits de Napoleon, recueillis à Sainte Hélène* (1841). He died on 21st August 1853.

Mon'ti, Vincen'zo, an Italian poet of the Classicist school, was born at Fusignano, near Ravenna, February 19, 1754, and studied at Faenza and Ferrara. Coming to Rome in 1778, he became secretary to Luigi Braschi, nephew of Pio VI., and in rivalry with Alfieri produced the tragedies of *Aristodemo* (1787) and *Manfredi* (1788). His next and greatest work, *Basvilliana* (1793), applauds the murder of Hugo de Basville, the agent of the French Republic, and denounces in Dantesque language the Reign of Terror. Yet on the French occupation of Italy M. became secretary of the Cisalpine Republic, and taking refuge in Paris from the invasion of Suwarrow, there composed his *Cantica* on the death of Mascheroni (1800), in which Louis XVI., the 'innocent lamb' of the preceding epic, figures as 'a pitiless tyrant.' He returned to Italy shortly after Marengo, and became Professor of Eloquence at Pavia, and in 1805 historiographer to the newly-founded kingdom of Italy. Napoleon's fall M. signalised by an ode in honour of the return of Astræa, of Justice, that is, in the person of Franz I. He died at Milan, October 13, 1827. A complete edition of his works appeared under the title *Prosa e Poesie* (5 vols. Flor. 1847). See Bozzoli, *Ragionamento della Vita e delle Opere di M.* (Fer. 1837).

Montill'a, a town of Spain, province of Cordova, 23 miles S.E. of the city of Cordova, on the line of railway connecting that city with Malaga. It has linen and earthenware manufactures, and the neighbouring country known as Campina yields grain, oil, and superior wine. Pop. 12,100.

Montjoie St. Denis (from La Montjoie de St. Denis, an eminence near Paris, where St. Denis suffered martyrdom), the war-cry of the French during the middle ages. Montjoie thence became the title of the King-of-arms in France, and was also the name of an order of chivalry instituted in the 12th c. by Pope Alexander III. to combat the Saracens.

Montlu'çon, a town of France, department of Allier, on the right bank of the Cher, 45 miles S.W. of Moulins by rail. It has a Romano-Byzantine church (St. Pierre), another (Notre Dame) dating from the 14th c., manufactures of iron-wares, fine mirrors, leather, chemicals, &c. The famous mineral baths of Néris are 10 miles S.E. of M. Pop. (1872) 21,247.

Montmorency first appears in French history in 958 as the name of a château, whose proprietor, Burchard, founded the family. In 1100 we find the lord of M. disputing with Louis VI. for the plains of St. Denis, and afterwards taken prisoner at the battle of Brenneville. **Matthieu de M.** accompanied Philippe-Auguste on his crusade of 1190. In 1492 was born **Anne**, who became the first Duc de M., a marshal and a constable of France. He was the centre of the 'high Catholic party,' and acted as their 'secular arm.' Over François I. he had for a time great influence, and was taken prisoner with him at the battle of Pavia. He formed one of the 'black court' of Henri II., and during the Italian war took Metz by guile. Though he led an army against Karl V., the sluggishness with which he carried on war in Picardy, and his skilless conduct at the battle of St. Quentin, lost him his influence, which declined still more on the death of the king and the consequent rise of the Guises. His detestation of the Huguenots, and his financial interests drew him to the side of that family, and in 1561 he became a member of the Triumvirate. Against the Huguenots he operated with success in the wars of 1562–67, but died of a wound received at the battle of St. Denis, November 12, 1567. He has been described as 'a brutal devotee, the typical fanatic of ignorance and reaction.'—The traditions of the house were maintained by his sons **François** (born 1530, died 1579) and **Henri** (born 1534, died 1614), each of whom was in turn Duc de M.—**Henry II.**, son of the latter, and fourth Duc de M., born at Chantilly, 31st April 1575, became an admiral in his seventeenth year, routed the Huguenots in Languedoc, was appointed commander-in-chief of the French army in Piedmont, 1630, and rose to be a maréchal. His brilliant career was brought to a close at the block, 30th October 1632, on account of his treasonable alliance with Gaston, Duc d'Orleans. The last scion of the house who attained political eminence was **Matthieu, Duc de M.** (born 10th July 1776), who, escaping destruction at the Revolution, lived to become Foreign Minister under Louis XVIII. He died at Paris, 24th March 1826. See Sismondi's *Histoire des Français* (vols. iii., v., vi., xv.–xxii.); and Kitchin's *History of France* (vol. ii. 1877).

Monto'ro, a town of Spain, province of Cordova, 25 miles E. by N. of Cordova city, with which it is connected by rail. It lies on a steep ridge on the left bank of the Guadalquivir, which is here crossed by a lofty four-arched bridge. Olive oil is largely manufactured, and woollen and earthenware industries exist. Pop. 10,500.

Montpe'lier, the capital of Vermont, United States, on the Onion River, 205 miles N.N.W. of Boston by rail. It has several churches, a Methodist Seminary and Female College, two banks, and five weekly newspapers. The State Capitol at M. is one of the finest in the U.S. There is a considerable general trade. Pop. (1870) 3023.

Montpell'ier, a town in S. France, department of Hérault, on the river Lez, 9 miles from the Golfe du Lion by the Grave Canal, and 30½ miles S.W. of Nismes by rail. It is a picturesque

town, built on a high hill standing in a plain covered with fruit-gardens and country-houses, and commanding a beautiful view towards the sea, Mont Ventoux, and the Pyrenees. M. has a large esplanade shaded with trees, a triumphal arch, called the Porte de Peyrou (1691–92), leading to the Corinthian colonnades of the Place de Peyrou, from which extends for 1¾ miles an aqueduct, built 1753–66; a fine hospital, a bourse, palais de justice, and cathedral of St. Peter; a university (1196), with a famous school of medicine founded in the 12th c. by Arabian physicians, and a library of 50,000 vols. and 600 MSS.; a botanical garden (the oldest in France); an observatory, and a town library of 30,000 vols. There are also twenty-one churches (one Reformed), the Fabre picture gallery, and numerous educational and charitable institutions. M. has large and various industries. It manufactures corks, candles, soap (especially in the neighbouring Villodève, to £400,000 yearly), silks, woollens, liqueurs, chemicals, and has a trade in brandy, wine, liqueurs, silk-stuffs, and articles of luxury. Pop. (1872) 57,727.

Montreal, a city of the Dominion of Canada, in the province of Quebec, 200 miles N.E. of Lake Ontario, 180 S.W. of Quebec, and 335 N. of New York. It stands on an island of the same name, 30 miles long by 10 broad, formed by the confluence of the Ottawa with the St. Lawrence, which is here spanned by the tubular Victoria Bridge of the Grand Trunk Railway (1854–59), with 24 piers 60 feet high, and a total length of 9184 feet. Behind the city rises the wooded Mont Royal (750 feet), so named by Cartier, and whence comes the modern name of M. Of 64 churches the finest are the Catholic parish church of Notre Dame (1824–29), with six towers, two of them rising to 213 feet; and the Anglican Christ Church Cathedral, with its spire 224 feet high. Besides the M'Gill University (founded 1811) and University of Bishop's College (1853), the Catholic Montreal College (1773), and St. Mary's College (1852), the College of Physicians and École de Médicine, there are 32 educational institutions. M. has 8 daily, 9 weekly, and 13 other newspapers and periodicals. The harbour, 90 miles above the influence of the tide, and generally frozen over from December to April, extends for 3 miles, and can now admit ships of 1800 tons burden. It is lined for one mile with limestone wharfs. In 1873 there entered 422 vessels, of 307,453 tons; and cleared 527, of 354,911 tons. The value of imports in the same year was $44,320,646; and of exports (grain, timber, furs, fish, &c.), $19,679,118; while the customs revenue for 1870 amounted to $4,128,052. By the Grand Trunk, Megantic, Intercolonial, and other railways, M. is connected with every part of Canada and the United States; and the Allan mail steamers ply weekly between Liverpool and M. in summer, and Liverpool and Portland during the winter months. M. is at once the commercial capital and the metropolitan see of the Dominion, and till the reduction of the troops in 1871 was the military headquarters of British N. America. It returns three members to the Dominion House of Representatives, and three to the Quebec Legislature. Pop. (1871) 107,225, of whom 77,980 were Roman Catholics, chiefly French Canadians. Jacques Cartier discovered in September 1534 an Indian village, Hochelago, near the site of which thirty-five French settlers founded the town of Ville Marie or M., May 13, 1642. Captured by 17,000 English under General Amherst, September 8, 1760, M. witnessed the rising of the 'Sons of Liberty' (1837), was the seat of Government (1844–49), and in 1875 was the scene of a serious bread riot and disturbances arising from the refusal of the Catholic authorities to inter Joseph Guibord, a member of the proscribed L'Institut Canadien, in consecrated ground.

Montrose' (Gael. *Monrois*, 'the marshy peninsula'), a seaport and royal burgh of Scotland, in Forfarshire, situated on a peninsula at the mouth of the S. Esk, which here expands into an almost land-locked basin, 35 miles N.W. of Dundee by rail. It is a thriving seat of the linen industry, and has one of the best harbours on the E. coast of Scotland, there being 18 feet of water on the bar at lowest tides. The chief buildings are the town-hall, the parish church (1791), and the Royal Lunatic Asylum (1868), erected at a cost of £30,000. There are statues of Sir Robert Peel and of Joseph Hume, who was born here in 1777. Between the town and the sea extensive links or downs extend to the N. M. Basin, which forms a sort of roadstead to the port, 7 miles in circumference, is shallow, and partly left dry at low tide. The channel by which the waters find exit is impeded by the island of Rossie or Inchbrayock, and is crossed from M. by a handsome suspension-bridge, 432 feet long, constructed (1828–29) at a cost of £20,000. Communication with the mainland in the S. is completed by a small drawbridge. In 1870 the Board of Trade erected the Scurdyness Lighthouse (cost £2700) at the mouth of the river, with a light visible for 20 miles. M. has (1877) four large flax-spinning mills, employing over 2000 hands. Shipbuilding has greatly decreased of late years, but there is a considerable industry in timber-sawing. In 1876, there entered and cleared the port 790 vessels of 114,562 tons. M., with Arbroath, Forfar, and Bervie, sends one member to Parliament. Pop. (1871) 15,720. Chartered by David I., M. is the port from which Sir James Douglas sailed for the Holy Land with the heart of Bruce in 1330. The famous Marquis of M. was born here in 1612. M. was the first place in Scotland where the Greek language was taught, and its educational reputation has been well sustained by its modern academy.

Montrose, James Graham, First Marquis of, son of John, fourth Earl of Montrose and Lady Margaret Ruthven, was born, it is believed, in the town of Montrose in 1612, went to the University of St. Andrews in 1627, and married Magdalene Carnegie, daughter of Lord Carnegie of Kinnaird, about three years afterwards. After a residence at Kinnaird Castle he sought a larger experience of life, when he attained his majority, by travel. In France, his passion for arms induced him to enlist as captain in the domestic service of Louis XIII. He appeared at the English court in 1636, but for some reason now unknown Charles I. overlooked or even offended him. The result was that M., returning to Scotland in the following year, threw himself with enthusiasm into the Covenanting cause, and his name heads a project for a 'contribution' in February 1638. In the same year he was appointed chairman of a committee which proceeded to Aberdeen in order to force the people to sign the Covenant. But the adherents to the Covenant being few, M. put himself at the head of a small army carrying the ensign, *For Religion, the Covenant, and the Country*, and in May 1639, though no plundering was allowed, he levied an impost of 10,000 marks from the people of Aberdeen. Returning to Aberdeen later on in the year, he found the Cavalier leaders dispersed, and determined to destroy their strongholds, beginning with the Tower of Gight, but owing to false information and the approach of the Earl of Aboyne, he retreated to Edinburgh. On the 15th of June at the Raid of Stonehaven, and on the 19th at the Bridge of Dee, he again overcame the Cavaliers and established the Covenant. The same autumn M. met the king at Berwick, and though on the 20th August 1640 he led a contingent of the Covenanting army across the Tweed at Coldstream against the royal forces, some said 'that on this occasion the exhibition of ardour was but a mask to hide treachery.' And it is certain that he had already been in correspondence with the king. M. was therefore ordered to be committed to Edinburgh Castle (24th July 1641) on the charge of furthering the 'Cumbernauld Band,' a covenant which was supposed to thwart the cause of the original one. An inquiry into that and an allegation that M. plotted against the life of Argyll, ended in his imprisonment till 1642, after which he joined the cause of the king. The year 1644–45 represents the most brilliant period of M.'s career. It was his duty to raise the Highlands, so that the Scotch army in England should be recalled. Making his way in disguise to Blair Atholl, he unfurled his standard and sent round the 'fiery cross.' With 1200 Irishmen and the fighting men of the clans who had rallied round him, he advanced to Perth and routed the mob who came out to meet him at Tippermuir (September 1, 1644). He then marched N. to Aberdeen, met the Covenanting army W. of the city, and after two hours' fighting dispersed it. In winter, being reinforced by Macdonald of Kolkitto, M. made a swift and successful raid upon Argyll and drove him from Inverary, defeated him at Inverlochy (February 2, 1645), pillaged Elgin and Banffshire, and (April 3) entered Dundee in triumph, winning victories during the next two months at Auldearn and Alford, and on August 6th at Kilsyth. M. was now appointed Viceroy of Scotland, but in travelling to recruit his army from the Borders, he was surprised at Philiphaugh by a powerful body of cavalry under David Leslie, and utterly crushed. M. escaped from the field with a few followers. A new effort to arouse the clans failed, and Charles in the same year withdrew

M.'s commission as lieutenant-general, and (3d September 1646) he sailed for Norway. Being urged in Holland by the Prince of Wales (Charles II.) to fight for the royal cause, he planned an invasion of Scotland, reached the Orkneys with 1700 men (March 1650), passed to the mainland, but evoked no enthusiasm, and at Invercarron, on the northern border of Ross-shire, was defeated by Colonel Strachan. Shortly after, he was captured by Macleod of Assynt, sent to Edinburgh and executed, 25th May 1650. M. was a man of taste and learning as well as a warrior by natural genius. His victories were often softened by clemency, and his own death was glorified by an exhibition of unflinching manliness. See Burton's *History of Scotland* (vols. vi. and vii.); and Mark Napier's *Memoirs of the Marquis of M.* (2 vols. Edinb. 1856).

Monts-de-Pieté (Ital. *Monti di Pietà, i.e.*, 'charity-banks'), institutions for lending small sums of money to the poor at low interest on movable property deposited as security. The first of these was founded at Perugia in 1440 by the exertions of a Franciscan friar named Barnaba di Terni, with the object of protecting the poor from the avidity of the Jewish money-lenders. The good resulting from its gratuitous loans gained the praises of the clergy, and led to the establishment of Monts-de-Pieté in Orvieto (1445), Viterbo (1471), Bologna (1475), Parma (1488), Padua (1491), Florence (1492), Milan (1496), Turin (1519), and Rome (1539). They gradually extended to other countries. The first in Germany was founded at Nürnberg in 1498, in Holland at Amsterdam in 1578, in Belgium at Brussels in 1618, and in France at Avignon in 1577. The M.-de-P. of France, suppressed during the first Revolution, were re-established in 1805, and re-organised in 1852. They are 44 in number, annually receive pledges representing a value of two million pounds, and can dispose of a capital equal to one and a half millions. Four of them lend gratuitously, the others at from 4 to 12 per cent. Of these 24 devote their profits to increasing their capital, and 13 to the funds of hospitals.

Montserr'at (Lat. *Mons serratus*), a mountain in N.E. Spain, province of Catalonia, 25 miles N.W. of Barcelona. It consists of breccia-like rocks of Tertian age, resting on cretaceous formations, and rises from rich, green country, an isolated ridge 4060 feet high, stretching from E. to W. Its sides are everywhere cleft by deep ravines covered with evergreen shrubs and trees. On the W. side it falls perpendicularly to the river Lobregat, in walls 985 to 2130 feet high, topped with fantastic peaks. The view from the highest summit takes in all Catalonia. Seen from Barcelona, M. seems a tabular colossus whose crest is split into numberless peaks like the edge of a saw (*serra*). Legend tells that it was so riven at the Crucifixion. Twelve of the highest summits bear traces of hermits' dwellings; and on the E. side, at a height of 1350 feet, is a partly-ruined Benedictine monastery, which was the centre of the Carlist insurrection in 1827.

Montserrat, an island in the W. Indies, one of the Lesser Antilles, belonging to Britain, 33 miles N.W. of Guadaloupe, and 28 S.W. of Antigua. Area 47 sq. miles; pop. (1871) 8693. Only one-third of the surface is under cultivation. The exports are sugar, rum, molasses, cotton, arrow-root, and tamarinds. In 1874 the revenue of M. was £5106; expenditure, £5497; the total tonnage of vessels entered and cleared was 13,289 tons (British, 12,171 tons); the value of total imports £23,958 (from the United Kingdom, £7095), and exports £33,079 (to the United Kingdom, £30,926, of which sugar was £23,508). The chief town is Plymouth, on the S. coast.

Mon'za, a town of Italy, in the province of Milan, on the Lambro, 8 miles N.E. of Milan by rail. The *Modicia* of Theodoric, who built a *palatium* here, M. has a cathedral, erected in the 14th c. by Campione on the site of the basilica of Theodelinda (595), which contains the tomb of that Lombard queen, and the Iron Crown (q. v), restored by the Austrians in 1866. Other buildings are the Church of the Madonna di Tirano, containing frescoes by Luini and Ferrari, the Lyceum, the Broletto or Town-Hall, once the residence of Friedrich Barbarossa, and the Palazzo Imperiale, with a park 9 miles in circumference, and the finest gardens in Italy. There are manufactures of cloth, hats, and leather. Pop. (1874) 25,288.

Mood'y, Dwight Lyman, born at Northfield, Massachusetts, February 5, 1837, worked as a farm labourer till he was seventeen, and in 1856 came to Chicago. Here he opened a Sunday School for 1000 children, and became pastor of a Congregational church, and here, in 1871, he was joined by **Ira David Sankey**, who, born at Edinburgh, Pennsylvania, August 28, 1840, had been in business at New Castle since 1853. Coming to Great Britain in 1873, the two held a series of gigantic revival meetings at Edinburgh, Glasgow, Dublin, London, and other cities, M. preaching, and S. singing the well-known hymns that go by his name. Their first audience at the Agricultural Hall, Islington, was estimated at upwards of 21,000, and the total expenses of the mission amounted to £28,396, of which a deficit of £138 was left by public contributions. Since their return to America (1875) they have continued their evangelistic work at Chicago, New York, and other places.

Mooltan' (*Múltán*), the chief town of the division and district of the same name, in the Punjaub, British India, 3 miles from the left bank of the Chenab, and 164 miles S.W. of Lahore. Pop. (1868) with suburbs, 56,826. It is an ancient city, which has suffered much in war. The neighbourhood is covered with ruins, and to the N. is the magnificent shrine of the Mohammedan martyr, Sham Tabrezi. In 1818 M. was captured from the Afghans by Runjeet Singh, who is said to have acquired a booty of four millions sterling. In the second Sikh War (1848-49) M. was bombarded and captured (Jan. 1849) by General Whish, and the fort subsequently destroyed. An obelisk preserves the memory of those who fell in the Sutlej campaigns. M. is a great centre of trade. It is at present the terminus of the Scinde, Punjaub, and Delhi Railway, and the point of departure for the Indus flotilla, under the management of the same railway company. The local trade in 1873-74 was estimated at £314,436 for imports, and £193,871 for exports. In 1874 the flotilla steamers carried to and from M. upwards of 16,000 tons, valued at more than one million sterling. In 1876-77 European piece-goods to the value of £45,000 were imported by rail from Calcutta. There are special manufactures of carpets, silks, and silver vases.—The *district* of M. lies between the Chenab and Sutlej rivers, and borders on the native state of Bhawulpore. Area 5927 sq. miles; pop. (1868) 471,563. There are thirty-nine canals, with an aggregate length of 632 miles, of which only 11 miles have been added since the commencement of English rule. They irrigate 250,000 acres, and are repaired by statute labour. By their means the crops were saved during the drought of 1877. The staple crop is wheat; fruits and vegetables are also abundant. See Sir H. Edwardes' *Year on the Punjaub Frontier*.

Moon, The, is the nearest heavenly body to our earth, round which it revolves at a mean distance of 238,800 miles, in an elliptic orbit of mean eccentricity ·0549. It shines solely by reflected light, derived chiefly from the sun. Consequently the amount of surface which is visible to us depends upon the relative positions of the sun, earth, and M. At full M., when the M. and sun are in opposition, *i.e.*, on opposite sides of the earth, the whole illuminated hemisphere is seen. At new M. again, when sun and M. are in conjunction, the illuminated hemisphere is wholly turned from us, and therefore there is nothing seen. In certain circumstances, however, the dark body of the M. is seen projected on the bright disk of the sun, occasioning a solar eclipse (see ECLIPSES). Such a phenomenon would occur at every new M. if the M. revolved in the plane of the ecliptic. In virtue, however, of the inclination of the plane of its orbit to the ecliptic (the mean value is 5° 8′ 47″·9), our satellite is usually out of the line of the earth's radius vector, and eclipses only occur when it happens to be at or near its nodes or points at which its orbit intersects the ecliptic. The two nodes diametrically opposite each other are constantly changing their position, completing a single revolution in 6793·391 days; and they must be within a certain definite distance from the positions of new or full M. before a solar or lunar eclipse can take place. Shortly after new M., our satellite is seen as a thin crescent setting in the W. very soon after the sun. Frequently, however, the dark body of the M. is faintly illuminated by light reflected from the earth, giving rise to the familiar phenomenon popularly known as the 'old M. in the new M.'s arms.' On each successive night the visible crescent increases, and the time of setting gets later, until after a week's time it has reached the *half-M.* phase—the end of its first quarter. In another week's time it attains *full M.*—the end of the second quarter—after which it diminishes through its decreasing phases, rising before the sun at intervals which

gradually grow shorter and shorter till the time of new M. comes round again. It takes a mean period of 29·530589 days to complete this cycle, which is the *synodical month* or *lunation* (see MONTH). The time of the M.'s rotation on its axis is the same as its mean sidereal revolution round the earth—27·321661 days. Consequently the same face is always presented towards the earth; and we never see the other hemisphere, except when certain irregularities of motion permit us to catch a glimpse of the thin strips that lie just round the visible edge (see LIBRATION). Other lunar inequalities are discussed under LUNAR THEORY. The M. is 2165 miles in diameter, has a mean density of 3·37 (that of water being 1), and has a mass $\frac{1}{75}$th part of the earth's. Under the telescope the surface of the M. presents a very diversified appearance. Plains, mountain chains, ridges, craters, valleys, clefts, and faults are plainly recognisable. There is no positive evidence of the existence of water or an atmosphere, nor sign of life of any kind. Recently, however, speculation has been rife as to the possibility of the M. being the habitat of living creatures. Though the eminent astronomers Beer and Mädler regarded the surface of the M. as not liable to any physical changes, recent observations by Schröter, Webb, Birt, and others, indicate changes of aspect too marked to be explained solely as due to differences of illumination. Neison in his recent work (*The Moon and the Condition and Configuration of its Surface*, 1876), follows out Mattieu Williams' suggestion of the universal atmosphere, condensed by gravitation on the surfaces of the various members of the solar system. The condensation will of course depend upon the mass of the body; and calculation gives to the M. an atmosphere whose pressure does not exceed $\frac{1}{1000}$th part of that of our earth's. This extreme rarity may account for the absence of any positive evidence, such as the refraction of stellar light during occultation of a star; and it suggests a reason why water is not visible. The pressure is not sufficient to permit of the existence of water in the fluid state. It may, however, be present in the solid or gaseous state. Some observers, indeed, have described peculiar blue-tinted appearances on the line of separation between light and darkness, which bear resemblances to glaciers. As the sun's heat gets stronger with advance of the lunar day, these glaciers may be volatilised into vapour, to re-condense when the long night comes round again. Life may in such circumstances be possible—the animals hibernating through fourteen days of darkness, enclosed in a shell of ice. There seems no doubt, however, that at one time the M. was the seat of extensive volcanic action. The average height of the mountains is 5 miles; the craters and circular ranges, a marked feature of the M., vary in diameter from a few hundred feet to fifty or sixty miles; while the clefts, the most perplexing of all lunar features, attain a length of 300 miles. The explanation of the physical origin of these is still far from complete, since in our earth we have no truly analogous appearances to guide us. The coincidence in time between the periods of axial rotation and orbital revolution has been explained as due to the retarding effect of tidal friction at a time when the surface of the moon was molten. From observations of one of Jupiter's satellites, this same peculiarity is *supposed* to extend to all satellites, and to have been produced by the same cause. Under TIDES, an important part of the mutual action of the earth and M. is considered. Of late years, much interest has been revived in the M., and photography has rendered invaluable service to the delineation of its surface. Excepting Neison's book above mentioned, which is a valuable compendium of recent observations, the latest work on the subject is *The Moon considered as a Planet, a World, and a Satellite*, by Nasmyth and Carpenter (1874).

Moon, Mountains of the (Arab. *Jebel-el-Komr*), from the days of Ptolemy supposed to be a lofty range crossing the continent of Africa from E. to W. in the region of the equator, has been identified by Beke with the southern continuation of the Abyssinian system, which traverses the country of the Gallas and Sudheli, passing the equator half-way between the coast and the great central caves. To the S. of the equator it rises in the great peaks of Kenia and Kilimandjaro, with heights estimated at 12,000 and 20,000 feet respectively.

Moon-Blindness, or Noctur'nal Amauro'sis, is a disease which, though rare in this country, is by no means uncommon in warm climates, and more especially among seamen. The first attack generally excites great alarm, being unaccompanied with any premonitory or constitutional symptoms. M.-B. probably depends on some peculiar state of the retina, rendering the eye insensible except to light of a certain degree of intensity. The disease is generally curable.

Moon'shee (*Munshi*) a word of Arabic derivation, meaning a 'writer or secretary.' It is universally applied by Europeans in India to teachers and interpreters of Persian or Hindustani.

Moonsiff (*Munsif*), a word of Arabic derivation, meaning 'equitable or just.' It is used throughout India for the native judge in the lowest civil courts of first instance, whose limit of jurisdiction varies in the different Provinces.

Moon'stone. See FELSPAR.

Moore, John, M.D., the son of an Episcopalian clergyman, was born at Stirling, 1730, studied medicine at Glasgow University, and in 1747 obtained an appointment in one of the military hospitals in Flanders. After the Peace of Aix-la-Chapelle he went to Paris as surgeon in the household of the English Ambassador, Lord Albemarle. Two years later he returned to Scotland, and commenced practice in Glasgow. He afterwards accompanied the Duke of Hamilton on a continental tour, and on his return settled in London, where he published *A View of Society and Manners in France, Switzerland, and Germany* (1779), followed by *A View of Society and Manners in Italy* (1781). In 1789 appeared his once popular novel *Zeluco*, and in 1795 *A View of the Causes and Progress of the French Revolution*. This was followed by the novels *Edward* and *Mordaunt* (1800), which now lie buried in oblivion. His last work was an edition of Smollett, with a memoir. M. died at London, 20th Feb. 1802. Anderson edited his works in 7 vols. with memoir (Edinb. 1820.) —**Sir John M.**, a celebrated and popular general, the son of the preceding, was born in Glasgow, November 13, 1761. In 1776 he joined the 1st Regiment of Foot, of which he became lieutenant-colonel in 1790. He distinguished himself at Corsica in 1794, acted as brigadier-general in the W. Indies in 1795, and was subsequently appointed governor of St. Lucie. M. assisted in suppressing the Irish Rebellion in 1797, took part in the ill-fated expedition to Holland in 1799, and served in Egypt in 1800. He was second in command in Sicily in 1802; after which he was charged with an abortive expedition to Sweden. In 1808 M. received the command in chief of the army sent to Portugal to aid the Spanish resistance to the French. He pushed forward from Salamanca on 12th December with 25,000 men to attack Soult's army, and had defeated the enemy's cavalry at Sahagun, when he learned that Madrid had fallen, and that Napoleon was advancing against him with greatly superior forces, while Soult menaced him from another point. Thereupon, across the snows of a mountainous region, M. made a masterly retreat of 200 miles to Coruña, which he reached January 13, 1809. There he embarked his sick and artillery, and without cannon defeated Soult's army, January 16th. He died on the field from a cannon-shot. Monuments are erected to his memory in St. Paul's Cathedral and at Glasgow. Ever foremost in the post of danger, M. was severely wounded on many a well-fought field. His dauntless intrepidity inspired his soldiers with affectionate enthusiasm. Called on to lead one forlorn hope after another, his patience never wearied and his courage never failed. See J. C. Moore's *Life of Sir J. M.* (2 vols. 1834), and Napier's *History of the War in the Peninsula* (1832).

Moore, Thomas, was born of Roman Catholic parents in humble circumstances, at Dublin, 28th May 1779. His first teacher was Samuel Whyte, who also taught Sheridan. Early noted as a good actor and mimic, M. contributed verses to the *Dublin Magazine* when fourteen, and in 1798 took the degree of B.A. at Trinity, having acquired more than a fair reputation as a classical scholar. At this period of his life, he was an ardent democrat and Irish 'patriot'—in verse. Having gone to London to study law in the Middle Temple, he published by subscription a translation of Anacreon's odes, and soon forgot the woes of his country in a whirl of dissipation. In 1801 he put forth the *Poetical Works of the late Thomas Little, Esq.*, which were well received, though reviewers fell foul of their occasional indelicacy. Lord Moira appointed M. registrar to the Admiralty in Bermuda, whither he repaired in 1804; but finding a good climate could not be enjoyed on a poor salary he returned in three months, travelling through America, and on his arrival in London, published his *Odes and Epistles*. He next engaged in a con-

genial and patriotic task, furnishing appropriate songs to the most beautiful of his country's national airs. The *Irish Melodies* appeared at intervals between 1807 and 1834. M. was now one of the idols of society, so little and rosy in appearance that he could only be likened to Cupid, so witty a versifier that his newspaper squibs were city talk, and a morning's work earned a small income, so good a story-teller and musician that he made the lords he loved so dearly laugh and cry by turns of an evening. In 1812 appeared *Intercepted Letters, or The Twopenny Post Bag, by Thomas Brown, jun.*, in which his light and laughing satire attains its most delicate piquancy. Five years later he published *Lalla Rookh*, a gorgeous Eastern romance which dazzled the public for a season, but is now fast becoming unreadable, in spite of its various lore and glittering fancies. It lacks passion, pathos, and the shaping spirit of imagination. *The Fudge Family in Paris* (1818) was once amusing. In 1819 he visited Lord Byron at Venice, and formed the friendship which led to his editing *The Letters and Journals of Lord Byron, with Notices of his Life* (1830), a work full of interest, but too copious, and too lenient in its criticism. Of his later works the most elaborate are *The Loves of the Angels* (1823), *The Life of Sheridan* (1825), *The Epicurean* (1827), *Life and Death of Lord Edward Fitzgerald* (1831), *Travels of an Irish Gentleman in Search of a Religion* (1833), and *History of Ireland* (1835). Literature proved lucrative to M., but he remained a spendthrift to the end of life. In 1835 a pension of £300 a year was conferred on him, and in 1850 his wife received another £100. M. died at Sloperton Cottage, near Devizes, February 26, 1852. Most of his work is passing away, and will soon be forgotten; but his *Irish Melodies* are imperishable. They are not all good; many are even trivial and poor, but the finer ones have a radiant grace and vivacity of sentiment, a starry sparkle of wit, and a faultless finish of diction that must yield a perpetual pleasure. See his *Memoirs, Journals, and Correspondence*, edited by Lord John Russell, in 8 vols. (Lond. 1852–56); and *M.'s Hitherto Uncollected Writings*, edited by R. H. Shepherd (Lond. 1877).

Moor'fowl, a name given to the Red Grouse or Red Ptarmigan (*Lagopus Scoticus*), a bird belonging to the order *Rassores*, and to the family *Tetraonidæ*. The M. appears to be confined in its distribution to Britain. It is of a chestnut-brown colour, variegated with black, the under parts being light-red. The legs and toes are feathered. The eye is surmounted by a crescentic patch of scarlet-coloured skin. The average length of this bird is 16 inches. Its nest is placed on the ground, the eggs numbering from ten to fifteen.

Moor'hen. See GALLINULE.

Moorings (Dutch, *marren*, 'to fasten;' Fr. *amarrer; cf.* Eng. *marline*, and Lat. *mora*, 'delay'), the apparatus to which a ship is fastened when stationed in a harbour. This either consists of two anchors fixed in nearly opposite directions, by one or both of which the vessel may *ride*, or of weights (called *mooring-blocks*) connected by chains sunk in the harbour.

Moorish Architecture. See SARACENIC ARCHITECTURE.

Moors (the *Maurousioi* of Greek, and *Mauri* of Latin writers), an African race, akin to the Numidians, who inhabited Mauritania (q. v.), and have their modern descendants in the Amazirghi (*cf. Masues* in Herod. iv. 191) branch of the Berbers. They figure first in history in the Punic and Jugurthine Wars, and sided with Genseric, the Vandal invader of Northern Africa (429 A.D.). Having shared in the reduction of the Vandal kingdom by Belisarius (533), the M. were next conquered and converted to Islam by the Arabs (698). Many of them followed their conquerors into Spain (709), and others were invited over to co-operate against the Christians (1091). In 1225 was founded the Moorish kingdom of Granada (q. v.), the capital of which, according to a 14th c. chronicler, had a pop. of 200,000. On the capture of that city in 1492, such of the M. as refused to accept baptism were expelled from Spain, while the remnant that complied—known as *Christianos Moriscos*, or simply *Moriscos*—were driven by cruel persecutions to revolt (1568–70), and were finally banished by Philip III. in 1609.

The terms *Moor* and *Moorish* have also been used as synonymous with *Arab*, *Saracen*, or even *Mohammedan*. Hence '*morris* dance' and 'nine men's *morris*' in English; the frequent occurrence in France of such words as Forêt des Maures, Mont Maure, &c.; and Colebrooke's application of the term '*M.* language' to Hindustani.

Moorshed'abad (*Múrshidábád*, 'the city of the priest,' originally called *Maksudabad*), the principal town in the district of the same name, Bengal, British India, mostly situated on the left bank of the Bhagirutti, the first offshoot of the Ganges, 124 miles N. of Calcutta. Pop. (1872) 46,182. The last Mohammedan capital of Bengal, from 1704 to 1772, and still the residence of the Nawab, whose palace, erected in 1840, at a cost of £160,000, in the Italian style, and most handsomely furnished, is conspicuous from the river. It is now a decaying city, but was described by Lord Clive in 1759 as being as extensive, populous, and rich as London. The buildings are mean, except the palace, the Imambara, and the Nizamut College. The manufactures are ivory carving, gold and silver embroidery, silk-weaving, musical instruments, and pipes. The city is called after the Nawab Moorshed Cooly Khan, its second founder, and it was for some years the British capital of Bengal, before the offices of government were fixed at Calcutta. The Nawab Moorshed, sometimes known as Jaffier Khan, was the most skilful of all the administrators of Bengal under the Moguls. By birth a Brahmin, he was brought up as a slave in Persia, and exhibited the characteristics of a renegade. He ruled from 1704 to 1725. The present Nawab of M., whose family enjoy a pension of £150,000 a year, resides in England near Brighton.—The *district* of M., which lies between the river Ganges and the hills of Beerbhum, and is bisected by the Bhagirutti, has an area of 2578 sq. miles; pop. (1872) 1,353,626. The crops are rice, pulses, and wheat; silk and indigo are declining manufactures. The towns are Berhampore, the civil and military headquarters; Cossimbazar, now a ruinous swamp, but the former site of many European factories; and the marts of Jungipur, Jiagunge, and Dhulian. The trade by river and rail is considerable, and is in the hands of Jain merchants. In the year 1876–77 the exports were valued at more than a million sterling, chiefly silk, rice, pulses, wheat, indigo, and oil-seeds; the imports at £740,000, chiefly piece-goods, salt, sugar, and tobacco.

Mooruk' (*Casnarnis Bennettii*), a species of Cassowary (q. v.), discovered by Devlin about 1857, and described by Dr. Bennett. It occurs in New Britain. Its height is 3 feet or more, and its colour is reddish, mixed with black. The naked skin of the neck has irridescent hues. The head has a hard, black, and shining horn-plate. Each foot has three toes, the claw of the inner toe being three times the length of the others. The voice is described as a whistling sound. The wing has four spinous processes, while the nearly-related cassowary has five. The M. becomes very tame in captivity, and appears to possess a high degree of intelligence.

Mop'lahs, a tribe of Mohammedans on the Malabar or W. coast of S. India, numbering about 600,000. They are an Arab race, recruited by converts from Hinduism during the persecution of Hyder Ali and Tippu. Hardworking cultivators and enterprising traders, they are liable to serious outbreaks of religious fanaticism. In 1855 the Collector of Madura was murdered, and again in 1873 nine fanatics rushed upon the bayonets of a detachment of European troops, who are always stationed in the district.

Mo'ra (*M. excelsa*) is a gigantic timber-tree of British Guiana and Trinidad, belonging to the *Cæsalpiniæ* sub-order of *Leguminosæ*. The tough and close-grained wood is imported for ship-building purposes, for which it is admirably adapted. The bark is astringent and suitable for tanning, and the large seeds are used by the Indians for food in times of scarcity.

Mora'ceæ, a natural order of dicotyledonous trees, shrubs, and herbs, sometimes climbers, having a milky juice, and closely related to the Nettle family. The greater number of species are those of the genus *Ficus*—the fig, india-rubber, banyan, &c., and another important member of the order is *Maclura tinctoria*, the Fustic.

Morad'abad (*Múrádábád*), the chief town of the district of the same name in the N.W. Provinces, British India, on the right bank of the Ramgunga river, and a newly opened station on the Oude and Rohilcund railway, 100 miles N.E. of Delhi, and 838 N.W. of Calcutta. Pop. (1872) 62,417. The cantonments lie W. of the town. During the Mutiny of 1857, dis-

cipline and order were preserved for some time by the personal exertions of the Judge; and finally, after the outbreak at Bareilly, the Europeans safely escaped either to Meerut or Nyni Tal. The *district* of M., which is bounded N. by the hills of Kumaon, has an area of 2272 sq. miles; pop. (1872) 1,122,437. It is irrigated by small canals; the crops are wheat, millets, rice, Indian corn, sugar-cane, and cotton. Oil-seeds, sugar, and raw cotton are exported by rail, and piece-goods imported.

Moraine'. See GLACIERS.

Morali'ties. See MYSTERIES, MIRACLE PLAYS and MORALITIES.

Mor'als. See ETHICS.

Mora'no, the anc. *Muranum*, a town of S. Italy, province of Cosenza, on the W. side of Monte Pollino, 35 miles N. of Cosenza, near a ruined town and castle; has silk and cotton industries. Pop. (1874) 8910.

Morat' (Ger. *Morten*), a Swiss town in Freiburg, on the Lake of M., which is 6 miles long and 3 wide, and is connected by the River Broye with the Lake of Neuchâtel, 7 miles distant to the W. It is a wealthy town, and its narrow arcaded streets are overshadowed by an old castle which, with a garrison of 15,000 Bernese, resisted for ten days the artillery of Charles of Burgundy. The famous battle of M., the bloodiest of the three contests, in which the Duke lost his 'Gut, Muth, and Blut,' was fought 22d June 1476. The Bernese, with allies from the Rhine cities, numbered 34,000, or 6000 less than the enemy; yet the Burgundians were defeated with a loss of 15,000 men, and of all their ammunition and baggage. A marble obelisk, 65 feet high, was raised on the battlefield in 1822.

Moratin, Leandro Fernandez de, a Spanish poet and dramatist, the son of Nicolas Fernandez de M., also a dramatist (1737-1780), was born at Madrid, March 10, 1760. His amusing comedy, *El Viejo y la niña*, was first acted in 1790. From 1792 to 1794 he travelled throughout Europe for the purposes of dramatic study. After his return to Spain he produced *El Baron* (1803), *La Mogigata* (1804), *El si de las Niñas* (1806, one of his best plays), several other comedies, translations from Shakespeare and Molière, and *Lection Poetica*, satirical pieces. The fear of the Inquisition induced him to abandon writing for the stage, and he thereupon began his great historical work, *Orígenes del Teatro Español*. M. became chief of the Royal Library under Joseph Bonaparte. On the return of Ferdinand in 1814, he fled to Paris, where he died, 21st June 1828. M. is called the 'Spanish Molière,' but the flattering phrase excites a smile. His *Obras Completas* were published at Madrid (6 vols. 1830-31); a good edition by Revadeneyra in 1848. A French translation appeared in 1855. See *Modern Poets and Poetry of Spain*, by James Kennedy (Lond. 1852).

Mora'va (Slav. 'border river,' Ger. *March*, the Roman *Marus*), the chief river of Moravia, to which country it gives name. It rises in the Schneeberg, on the S. frontier of Silesia, flows in a southerly direction, receives the Thes, Oskava, Taya, &c., and joins the Danube 25 miles below Vienna after a course of 212 miles, of which only 50 are navigable. The boundary between Lower Austria and Hungary in its lower course, its valley has been the scene of many battles, including Aspern, Wagram, and Essling.—Another M. (*Marchus*), nearly 200 miles long, rises in Bulgaria, flows N. through Servia, and joins the Danube 45 miles below Belgrad.

Mora'via (Ger. *Mähren*), a crown-land of Austria, is bounded N. by Silesia and Bohemia, W. by Bohemia, S. by Lower Austria, and E. by Galicia and Hungary. Area, 8583 sq. miles; pop. (1869), 2,017,274. M. lies in the angle formed by the separation of the Carpathians and the Sudetic range, and is enclosed on the W. by a lofty plateau. It descends from the N.E. in three mountainous terraces, respectively 2000, 1500, and 1100 feet high, till it reaches the open plains in the S.W., watered by the Morava and its affluents. M. is singularly fertile and well cultivated, the rich valleys and plains yielding abundance of grain, beet-root (11,545,973 cwts. in 1871), hops, hemp, flax, fruit, and wine (3,273,147 gallons). Of the surface one-half is arable, one-fourth under forest, one-tenth in pasture, and one-twelfth occupied by gardens. There is a considerable mining industry in the mountain districts, and the principal minerals are iron, coal, graphite, and meerschaum. A large proportion of the inhabitants are engaged in the rearing of horses (in 1872, 118,469), cattle (537,305), sheep (323,503), goats (541,536), swine (161,419), bees (68,865 hives), geese and ducks (14,000,000), and hens (7,000,000), and there are manufactures of beet-sugar, linens, cottons, woollens, tobacco, glass, and machinery. The inhabitants are Czechs and Poles, to the number of 1,500,000; the Germans amount to 519,400. In the S. there is a colony of some 1580 Croats. All the people are Roman Catholics, with the exception of 53,000 Protestants and 42,000 Jews. Olmütz was formerly the seat of a university, and Brünn has a technical institute. Brünn is the capital, and other towns are Olmütz, Iglau, Zwittau, and Prossnitz. M. has an important transit trade, which is carried on over excellent roads and extensive railways.

History.—An independent Slavic kingdom in the 9th c. and named from the river Morava (Slav. 'border river'), M. originally included the N. part of Hungary. It rose to its greatest power under Zwentibold, who, however, was defeated and deprived of part of his territory by the Magyars under Arpad in 894. The land was Christianised by Cyril, made tributary to Bohemia 1029, and raised into a markgrafdom by Friedrich I. in 1182. By succession it passed with Bohemia to Austria after the death of Ludwig II. at the battle of Mohacz, 1526. It has been a separate crown-land since 1849. See the works of Wolny (6 vols. Brünn, 1835-40), Koristka (Vien. 1861), and Dudik (5 vols. Brünn, 1860-71).

Mora'vians, properly Moravian Brethren. The name of 'Brethren of the Law of Christ' was assumed by certain followers of John Huss (q. v.), belonging especially to the Taborites (q. v.), who were found in Moravia and Bohemia in the 15th c. In 1467 they formed themselves into a sect under the name of the 'United Brethren,' being known by the name of the Moravian and Bohemian 'Brethren' respectively. In the beginning of the 16th c. they numbered 200,000, but in 1627 they were driven from both countries and took refuge in Poland, Saxony, and Prussia. The modern sect of M. B. was founded by Count Zinzendorf, a Saxon nobleman, who had been educated chiefly among the Pietists of Halle, and had the desire to realise the idea of his godfather Shener and found a church within the Church. With this object he founded a colony on his estate of Berthelsdorf in Upper Lusatia, June 1722, and appointed a zealous young Pietist, J. A. Rothe, as pastor of the parish. The nucleus of the settlement was Christian David, one of the old Hussite Moravians, and two brothers, Augustin and Jakob Neisser, with their families, who built the first houses of a village which received the name of Herrnhut ('Watch of the Lord'), and increased so fast that in ten years after it contained 600 inhabitants. At first the settlement was simply a community of Lutheran Pietists, but about 1727 disputes arose among them as to Election and the Lord's Supper, while some of them began to forsake the parish church and hold separate services in a hall in the village. A reconciliation having taken place, the name of the old M. B.—'United Brethren'—was adopted, as well as their plan of forming an organised ministry, namely of choosing 'elders' by lot. A few years after (1734) David Nitschmann was chosen by lot and consecrated a bishop by D. E. Jablonsky, Chaplain to the King of Prussia, and Senior Bishop of the dispersed Brethren.

In 1736 Zinzendorf was banished from Saxony for 'teaching false doctrine and disseminating dangerous principles,' and he spent the rest of his life in establishing throughout Europe settlements similar to the original one, and organising the mission work of his sect. At the end of 1873, the whole number of M. in Germany was 69,139; in Great Britain 5548; in the rest of Europe, 7771; in N. America, 11,375; and their total number, including all missions, was 95,924. Their chief settlements in England are Fulneck near Leeds, Fairfield near Manchester, and Ockbrook near Derby. Their theological position is that of the Evangelical Lutherans, or very nearly that of the Evangelicals in the Church of England. See Hagenbach's *German Rationalism* (Clark, Edinb. 1865), and the *Moravian Manual*, published at Bethlehem, U.S.

Mor'ay (Celtic, 'the land on the sea-coast'), the former name of a county in the N. of Scotland, now called Elginshire (q. v.) from its capital.

Moray Firth, an inlet of the North Sea, in the N.E. of Scotland, extending for about 60 miles between the counties Ross and Cromarty, on the N.W., and Inverness and Elgin on the S.E. Its extreme width from Tarbetness to Burghead is 15 miles, and its depth 20 fathoms. It is continued S. by Inverness Firth, and W. from Inverness by Loch Beauly, which receives the River Beauly. Its N. shore is indented by the narrow Cromarty Firth, 20 miles long. Inverness Firth is the N. terminus of the Caledonian Canal. The name M. F. is sometimes applied to the greater inlet stretching from Wick to Fraserburgh, and including M. F. proper and Dornoch Firth. M. F. has good herring and haddock fisheries.

Mor'bid Appe'tite may consist of an excessive and irresistible desire for food which is natural and healthy, for unusual articles of diet, or for such articles as are positively injurious or revolting. Excessive appetite is occasionally characteristic of certain forms of disease, and it may be developed after recovery from acute and exhausting diseases. Chloretic and hysterical women have frequently an inordinate desire for such articles as chalk and lime, and abnormal appetite is common to women in the earlier stages of pregnancy. Unnatural appetite, or the desire to devour articles which are not food, and which are utterly revolting, is sometimes to be met with in pregnancy, and is common among the insane.

Mor'bihan (Celt. 'little sea'), a maritime department of France, is bounded N. by Côtes-du-Nord, E. by Ille-et-Vilaine, S.E. by Loire-Inferieure, S.W. by the Bay of Biscay, and W. by Finistère. Area, 2623 sq. miles; pop. (1872) 490,352. The coast-line, broken by five bays and by the promontory of Quiberon, is fringed by numerous islands, of which Belleisle (q. v.) is the largest. Heath-clad offshoots of the Montagnes-Noires, rising in the N. to 590 feet, and sloping gradually southwards into vast fertile plains, give rise to the Oust, Blavet, and other streams. The climate is moist and temperate, and the soil, though badly cultivated, yields abundance of corn, flax, hemp, and fruits, 905 sq. miles being under crops, and 1058 heath and pasture, while 9,700,000 gallons of cider are made annually. Cattle-rearing, pilchard fisheries, the manufacture of cloth and linen, and iron-mining, are the chief industries. Two branch lines of railway and one canal traverse the department, the principal towns of which are Vannes and L'Orient.

Mor'dants. See DYEING.

Mor'daunt, Charles, Earl of Peterborough, son of Lord Mordaunt, was born in 1658, served in the navy under Admirals Torrington and Narborough, and forsook it for the army, in which, at the siege of Tangiers, he gained some credit. After the Revolution of 1688, in which he was an ardent supporter of the Prince of Orange, M. gained a place in the Treasury, and was made Earl of Monmouth. In 1697 he succeeded to the earldom of Peterborough. It was not till 1705 that he found his true sphere of action, when he was nominated Commander-in-Chief of the English and Dutch soldiers sent to assist the Arch-Duke Karl of Austria, who was struggling for the Spanish crown. He occupied Valencia without striking a blow, and would have marched to Madrid had he been allowed. After besieging Barcelona for three weeks, he captured the fortress of Monjuich, and, with a small band of men, forced the town to capitulate. He set the Catalans against the Castilians, and chased Count Las Torres into the mountains, returning in triumph to Valencia (February 1706). With 3000 men he harassed a Spanish army which had gone to the rescue of Barcelona, and compelled a French fleet which had appeared before the town to withdraw. Once more M. wished to make a rapid march on Madrid. His counsels being for a second time rejected he retired to Genoa, but the good-fortune of the Austrians then forsook them. In January 1707 he again joined them as a simple volunteer, but was recalled to England, received a Parliamentary recognition of his services (January 1711), performed diplomatic services in Italy, Austria, and Sicily, became governor of Minorca, and, under George I., was appointed Commander-in-Chief of the naval forces. He died at Lisbon, 25th October 1735. M. was on intimate terms with Swift, Pope, and Berkeley, and wrote some indifferent trifles in prose and verse. He was a rash, showy, courageous man, surprisingly fertile in ingenious expedients that perplexed his slower-witted adversaries, and altogether one of the most unique and interesting characters of his age. See Lord Mahon's *IVar of Succession in Spain*; Macaulay's *History of England*, and Eliot Warburton's *Memoir of C. M., Earl of Peterborough and Monmouth, with Selections from his Correspondence* (Lond. 2 vols. 1853).

More, Hannah, an English authoress, was born at Stapleton, 2d February 1745, and kept a school at Bristol for some time. Her first work was a pastoral drama entitled *The Search after Happiness* (1773). Her literary life was long and successful. She died at Clifton, 7th September 1833. Of her many works these are the best:—*Sacred Dramas* (1782), *An Estimate of the Religion of the Fashionable World* (1791), *Strictures on the Modern System of Female Education* (1799), *Celebs in Search of a Wife* (1809), *Practical Piety* (1811). H. M. was an excellent, pious, and sensible lady; but she always wrote books with a moral, and occasionally the moral is the best of them. Her poetry is still less read now than her prose. A complete edition of her works in 11 vols. appeared in 1853. See Roberts' *Memoirs of the Life and Correspondence of Mrs. H. M.* (Lond. 4 vols. 1834). Her *Letters* to Zachary Macaulay were published in 1860.

More, Henry, born at Grantham, Lincolnshire, October 12, 1614, was educated at Eton, afterwards studying at Christ's College, Cambridge, where he obtained a fellowship. Early abandoning the Calvinism in which he had been reared, he gave himself up to mysticism, studying in particular the writings of the Neoplatonists. In 1642 he published *Psychodia Platonica, or a Platonical Song of the Soul*, containing much subtle thought clothed in poetry never better than Bunyan's. He likewise published *The Threefold Cabbala*, an explanation of the first chapters of Genesis, *The Mystery of Godliness*, *The Mystery of Iniquity*, *A Discourse on the Immortality of the Soul*, *Medela Mundi*, or *Cure of the World*, and other books of less importance. He was the last of those in England who embraced the Renaissance Platonism of Italy. His philosophy attempted to make matter contingent, metaphysics being with him the science of incorporeal existence. His ethics, like those of all Platonists, were high toned; practically, he was benevolent to a fault, and although displaying an amusing amount of naïve egotism, his writings imbue the reader with sincere admiration and respect for their author. He translated his works into Latin in 1679. Refusing tempting offers of church and university preferment, he lived the life of a recluse, and died 1st September 1687. See his *Life*, by Ward, (Lond. 4th ed. 1712), and Vaughan's *Hours with the Mystics* (Lond. 1856).

More, Sir Thomas, only son of Sir John M., a judge of King's Bench, was born in Milk Street, London, 1478. He was sent to St. Anthony's School, in Threadneedle Street, and thence passed as a page into the household of Cardinal Morton, a generous patron, who discovered his rare gifts, predicted his future fame, and sent him to Oxford in 1497. He entered Canterbury, now included in Christ's College, learned Greek of Grocyn and Linacre, made lifelong friends of Erasmus, Latimer, and others, and proceeded to London with the reputation of great scholarship and refinement. At Lincoln's Inn he studied law; and during this period of his youth he seems to have become somewhat fanatical in his religous observances, wearing hair shirts, scourging himself on Fridays, and subjecting himself to other penances of the utmost severity. He recovered, however, at sight of a Miss Colt, in Essex, whom he married, soon after entering Parliament and being called to the bar. M. was rapidly attaining distinction as a lawyer and a politician when his effective opposition to the marriage-grant of the Princess Margaret lost him the favour of Henry VII., and almost brought about his expulsion from the country. But the son's smile succeeded the father's frown. Henry VIII. pressed him with favours. In 1514–15 he was employed in two embassies to the Netherlands; in 1516 he became a Privy Councillor; in 1521 Knight and Treasurer of Exchequer; in 1523 Speaker of the House of Commons; in 1525 Chancellor of the duchy of Lancaster; and in 1529 successor to the disgraced Wolsey as Lord Chancellor. By this time he had written the *History of the Life and Death of King Edward V.*, *and of the Usurpation of Richard III.*, probably founded on Morton's data (1509, printed in 1557), and *Utopia*, published in Latin, first at Louvain (1516), next at Basel (1518), and in the English translation of Robinson in 1551. In this *Utopia* (the name is Greek for 'nowhere;' in his letters he sometimes Latinises it, as *Nusquama*), M. discourses of an ideal state with ideal

laws. The book is a loosely-built romance, after the pattern of Plato's *Republic*, wherein much is plainly fantastic and chimerical, and much plausible and sensible: under all its extravagances there runs a current of earnestly suggestive, philosophic, catholic thought, strangely contrasting with the politics of the day, and even with M.'s own conduct in one particular. The last chapter, 'on the religion of the Utopians,' is the first word in behalf of the great doctrine of Toleration to be found in the English or any other tongue; but his bitter hostility to the Reformers—Tyndale especially—productive of *The Dialogue* (1529), *The Supplication of Souls* (1529), &c., is not in keeping with the wise and gentle liberality of his immortal book, and is the only shadow on his lofty character. It may be noticed by way of extenuation, that the *Utopia* was published before the Reformation had begun, and when good men still thought of purifying the Church without the violent remedy of secession. To M. the policy of Luther and his coadjutors seemed revolutionary and anarchic. Even in the passage where the religion of the Utopians is discussed, he uses language which shows his aversion to violent and unbridled speech; and there was much in the demeanour and speech of the early Protestants to lead M. to suppose that he was suppressing treason rather than strangling liberty. It is marvellous to note how many things M. says are practised only in Utopia, which have since been extended to Great Britain and other civilised countries. Admirers of the Ballot Act, *e.g.*, may find it in Bk. ii. chap. 3. Altogether one is struck with the prescient or prophetic character of M.'s politics. In 1532 the reason of M.'s appointment as chancellor became apparent. Henry desired him to give his approval of Catherine's divorce. M. delayed answer, but foreseeing only trouble in his office, resigned the seals, returning to the securer joys of home and family with the childlike simplicity and unaffected lowliness which made his nature so lovable. His first wife had died, and for the benefit of his three daughters and his son he had married a shrewish widow—*nec bella nec puella*, he writes himself. Nevertheless Erasmus and others speak with admiration of the happiness, virtue, and piety which the example of the master caused to reign in the household. In 1534 an Act was passed securing the crown to the issue of Anne Boleyn. M.'s assent to this was asked; he refused it, and was lodged in the Tower, where he lay for a year. He was tried in 1535, and on the 6th of July was beheaded, his wonted jest being ready even for the executioner, 'You will never get credit by beheading me, my neck is so short.' Amid an age of notables M. stands forth as the man of staunchest principle, purest morals, sincerest piety—a perfect English statesman and scholar. His last male descendant was a Thomas M., who died in 1795, while his family finally became extinct in 1815 by the death of Lady Ellenborough. M.'s collected works, Latin and English, were published at Louvain in 1556–57. The best translation of *Utopia* is Bishop Burnet's; there is an exact reprint of Robinson's by Arber. See *The Life of Sir Thomas M.*, by his son-in-law, William Roper, first printed in 1716, and that by Sir J. Mackintosh (Lond. 1830).

More'a, the modern name of the ancient Peloponnesus (q. v.), the physical features of which have been already described under GREECE. Area 8288 sq. miles; pop. (1870) 645,389. The etymology of the name M. has been much disputed, those who, like Fallmerayer, hold the Slavonic origin of the Modern Greeks deriving it from the Slav. *more*, 'sea;' Salverte referring it to a transposition of the letters of *Romea*; and the popular notion explaining it by the resemblance of the outline of the peninsula to the leaf of the mulberry (Gr. *moron*).

Moreau', **Jean Victor**, a famous French general, was born at Morlaix, in Brittany, 11th August 1763, educated for the law at Rennes, forsook his studies to join the army; returned to jurisprudence once more, but on 10th September 1791, owing to his democratic leanings, was appointed chief of the 1st battalion of Ille-et-Vilaine, with which he joined the army of the N. under Dumouriez. By the 25th Germinal 1794, M. had been appointed general of division, through the influence of Pichegru, who gave him a corps with which he operated successfully in Flanders. It was during his triumphs in this campaign that his father was brought to the scaffold at Paris, owing to a suspicion of his plotting with the detested *émigrés*. In 1795 M. succeeded Pichegru as the head of the army of the N., and in 1796 superseded him in the command of the army on the Rhine and Moselle. During the same year he defeated the Austrians under General Wurmser, checked the Archduke Karl, and being menaced by a force vastly more numerous than his own, retired fighting towards the Rhine, and effected one of the most masterly retreats on record. After a temporary retirement, produced by a misunderstanding with the Directory, and having achieved some fine victories in Italy, M. once more commanded the army of the Rhine (1800), routed the Austrians over and over again, gained the battle of Hochstadt, and signed the armistice of Presdorff. On the 3d of December 1800, he won the victory of Hohenlinden over the Archduke Johann, and was marching towards Vienna when the armistice of Steyer stayed him. His military glory became at this point too great for the forbearance of Napoleon, who had little difficulty, by means of spies, in finding him guilty of treasonable speeches. And it is certain that M., off the field, was easily influenced from the outside to criticise severely the government of the First Consul. Not only so, but it has been proved that he participated to a certain extent in the royalist plots of Cadoudal and Pichegru. The result was that he was arrested, and condemned to imprisonment (10th June 1804), which was commuted to a period of exile. For years he lived in America, returned to join the allies in 1813, and was shot with a cannon-ball (August 27th) at Raecknitz, his death-bed being surrounded by the emperors of Austria and Russia, and the king of Prussia. He died, 2d September, at Laun in Bohemia, and though he conscientiously arrayed himself against Napoleon, his country remembers him with pride as the second greatest of the revolutionary generals. See Thiers' *Histoire de la Révolution* and *Histoire du Consulat et de l'Empire*; and Beauchamps' *Vie politique, militaire, et privée du Général M.* (Par. 1814).

Morecambe Bay (Celtic, 'the bend of the sea'), on the N.W. coast of England, separates the main part of Lancashire from the outlying portion of Furness. It receives the Kent, Keer, and Lune, and is very shallow, a vast expanse of sand being exposed at low tide. It is 12 miles broad from Piel to Fleetwood, and extends inland for 15 miles.

Moreen', a stout worsted cloth watered like Moire (q. v.), whence its name. It is much used for curtains.

Morel' is the popular name of *Morchella*, a genus of *Fungi* belonging to the family *Ascomycetes*, division *Discomycetes*, of De Barry's arrangement, and to the order *Elvellacei* of English authors. The common M. (*M. esculenta*) is a well-known edible fungus sold in the shops. It may be cooked in a variety of ways when fresh, forming a very palatable dish, or may be dried and kept in reserve for flavouring purposes. In growth it attains a height of 3 or 4 inches, half consisting of a smooth white cylindrical hollow stem, surmounted by a pileus or cap of variable conical to cylindrical shape, attached by its base to the stem, and having its surface covered with deep pits. In parts of Europe and Asia it is plentiful, forming a profitable article of collection for the German peasantry; in Britain it is rather uncommon. The place of growth is usually woods, showing a marked preference for ground where fires have been made, as in charcoal burning. The half-free M. (*M. semilibera*) is also an esculent species, found under hedges in different parts of Britain. In it the conical pileus is not fully attached to the stem as in the common M.

More'lia, capital of the State of Michoacan, Mexico, delightfully situated among the mountains, 6350 feet above the sea, and 130 miles N.W. of Mexico, was founded by the Spaniards in 1541, and called Valladolid till 1828, when it was renamed from the revolutionary chief Morelos, who as well as Iturbide was born here. It is the seat of an archbishop (since 1863), and has a beautiful cathedral (built 1745), a college, a splendid arched aqueduct for the supply of water, and a large cotton factory (since 1868), with 2500 spindles and 78 looms. Pop. 30,000.

Moreton Bay, an indentation on the coast of Queensland, 65 miles long and 20 broad. It is shut in by Moreton and Stradbroke Islands, and affords safe anchorage to vessels of any size and number. Five rivers—the Arrowsmith, Logan, Brisbane, Pine, and Caboolture—fall into M. B., and are navigable by vessels of moderate size. M. B. is the gate of a vast district of great fertility.

Moreton Bay Chestnut, in Botany, the tree *Castanospermum Australe*, belonging to the natural order *Leguminosæ*. It is a native of Queensland, and is a handsome tree of rapid growth, attaining an average height of 85 feet, and producing beautiful red and yellow flowers. The pods contain edible seeds resembling the chestnut, whence its popular name. The wood is of small value.

Moreton Bay Pine, in Botany, the tree *Araucaria Cunninghamii* (natural order *Coniferæ*). It is indigenous to Queensland, where it is very abundant, and is much valued on account of its beautiful and serviceable timber. It attains a height of from 150 to 200 feet, and grows in the form of a pyramid. A clear white resin exudes from the trunk and hangs down in crystals resembling icicles, the masses thus formed being sometimes 3 feet long, and from 6 to 12 inches broad.

Mor'gan, Lady (*née* Sidney Owenson), the daughter of an actor, was born at Dublin about 1786, published a volume of poems when fourteen, and put forth three novels, *St. Clair* (1804), *The Novice of St. Dominick* (1805), *The Wild Irish Girl* (1806). She married Sir Thomas Charles Morgan in 1812. Besides a small host of dashing, humorous, interesting, withal silly novels, she wrote *France* (1817–18), *Italy* (1821), *Life and Times of Salvator Rosa* (1823), *Woman and Her Master* (1840), &c. Lady M. died in London, 13th April 1859. Her works were collected in 1855. See her *Autobiography, Diary, and Correspondence* (1862; 2d ed. 1863); and W. J. Fitzpatrick's *Lady M.*, &c. (1860).

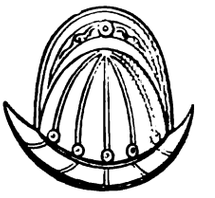
Morganat'ic Marr'iages (*Matrimonium ad morganaticum*, or *ad legem salicam*, German, *Morganatische Ehe*). Members of the royal families of Germany can only intermarry with those of 'Ebenbürtigkeit,' or equal birth-rank. A prince may, however, contract a left-handed or morganatic marriage with a woman of inferior status, which does not raise her to his own rank, while it gives legitimacy, though not right of succession, to his children. Such marriages are common enough not only among the princely but the noble houses of Germany. One of the most celebrated was that of King Friedrich Wilhelm III. of Prussia with the Countess Augusta von Harrach, whom he created Princess of Liegnitz. Princes of the blood royal of Great Britain, if under twenty-five years of age, must obtain the approval of the sovereign to their marriages, or if over twenty-five, the consent of Parliament, otherwise the connection is of a morganatic nature. The term seems to be derived from the old Gothic word *morgjan*, 'limited,' not as some imagine from *morgengabe*, 'morning-gift' or 'dowry,' the only privilege obtained by the wife.

Morgar'ten, a mountain pass in the Swiss canton of Zug, between the M. Hills and Lake Egerie. Eight years after the expulsion of the Austrian governors, Leopold returned at the head of a splendid army to subdue the forest cantons, and was here defeated (15th November 1315) by the Swiss, who had hardly one-twelfth of his numbers.

Mor'ghen, Raffaelo Sanzio, was born at Florence, June 19, 1758. He came out as an artist in the Roman school of Volpato, and in 1793 was engaged by the Grand Duke of Tuscany to teach engraving at Florence. Among his earliest prints were the 'Madonna della Seggiola,' and Raffaele's 'Transfiguration,' a copy of which now fetches more than £20. Perhaps his most famous work was the engraving of Da Vinci's 'Last Supper,' an undertaking in which he succeeded especially because in that picture the rendering of aerial effect—in which he always failed—was not severely taxed. He died April 8, 1833. In all he engraved 73 portraits, 47 religious and 44 historical and mythological pieces, 24 views and landscapes, and 13 vignettes, &c. His pupil Palmerini published a catalogue of his works with a biographical memoir in 1824.

Morgue, La, a public building in Paris, on the *Quai de Marché Neuf*, where the bodies of persons found dead are exposed for identification. The bodies lie thus for three days, and the number placed in the M. is about 300 annually. The word *M.* originally meant merely the outer court or vestibule of a prison. The name is now commonly applied to dead-houses in other cities.

Mo'rion (Fr.; from Ital. *morione*, Span. *morro*, 'round'), a headpiece of iron or steel, of Spanish origin, and commonly worn by German, French, and Italian foot-soldiers in the 16th c. It was surmounted by a high crest, and the rim, being turned up and pointed at the front and back, had a crescent form at the side, as shown in the cut.



Morion.

Mor'ison, Robert, a Scotch botanist, was born in Aberdeen in 1620, and studied at the university of his native town. During the civil war he fought in the Royal army, and was wounded at the Bridge of Dee. He afterwards went to France, and took the degree of M.D. at Angers, and was appointed botanist to the Duc d'Orleans at Blois. He became botanist to Charles II. in 1660, with the charge of the Botanic Garden at Oxford. He died in London, November 10, 1683. He taught a new classification of plants in his chief work, *Plantarum Historia Universalis Oxoniensis* (2 vols. published 1676–99).

Morisо'nians. See EVANGELICAL UNION.

Mor'land, George, an English painter, born in London 26th June 1763, sold his drawings at the age of six, and at sixteen was a finished artist and a sad blackguard—thanks to the education of a greedy father. He painted with great freedom and inimitable humour. His subjects were usually animals, occasionally rural landscapes and interiors. The two he especially affected were a litter of pigs and a pothouse parlour. He died a palsied drunkard in a sponging-house in Eyre Street, 29th October 1804.

Mor'itz, Duke, and afterwards Elector of Saxony, eldest son of Duke Heinrich the Pious of Saxony, born 21st March 1521 at Freiberg, joined the Protestant party in 1539, married (1541) Agnes, daughter of Philipp, Landgraf of Hessen, and the same year succeeded his father in the government of the ducal part of Saxony. He at first supported the Schmalkaldic League against Duke Heinrich of Brunswick, but when it came (1546) to an open rupture with the Emperor he sided with the latter, who in a secret treaty promised him the lands and title of his cousin, the Elector Johann Friedrich. These he obtained after the overthrow and capture of the Elector at Mühlberg in 1547. But as Karl V. persisted in keeping his father-in-law a prisoner, and appeared to be striving to make the imperial power a political and ecclesiastical absolutism in Germany, M. besieged Magdeburg as a pretext to collect an army, and forming a secret league (1551) with Henri II. of France, suddenly fell upon Karl, and extorted from him the Peace of Passau (31st July 1552). The next year M. attacked the Markgraf Albrecht of Brandenburg, who would not recognise the Passau treaty, and gained a decisive victory at Sievershausen (9th July 1553), but died two days after of a wound. M. was an able ruler, but of an ambition that left little choice to his conscience of the means to increase his power. He was a reformer in home affairs, employing the confiscated estates of monasteries to found the three 'Fürstenschulen,' and to better endow the University of Leipsic. He left only a daughter, Anna, who (1561) married Prince William I. of Orange. See Langenn, *M. Herzog und Kurfürst von Sachsen* (2 vols. Leips. 1841).

Moritz, Graf von Sachsen, better known as Marshal Saxe, born at Goslar, 28th October 1696, was the illegitimate son of King August II., Elector of Saxony, and Marie Aurora Gräfin von Königsmark. He began his career (1709) in Flanders under Eugene and Marlborough, entered the French service in 1720, and in 1726 was made Duke of Courland. In the war of the Polish Succession, M. decided the victory in the battle of Ettlingen (1734), took Philippsburg, Prag, and Eger (1741), and seized the lines at Lauterburg. Being appointed Marshal of France in 1744, he conducted the campaign in Flanders, gained the victory of Fontenoy (11th May 1745), was again victorious at Raucoux, and took Bergen-op-Zoom (1747), and Maastricht (1748). After the Peace of Aachen (1748) he lived at his castle of Chambord till his death, 30th November 1750. In 1776 Louis XV. erected over his grave, in the Protestant church

of St. Thomas at Strassburg, a magnificent monument by Pigalle. From an illegitimate son of M. was descended the Marquise Dudevant ('George Sand'). His *Reveries Militaires* (best ed. 1757) contain many original views on the art of war. See M.'s *Lettres et Mémoires* (1794), and the biographies by Taillandier (1865), Weltzien (1867), and Weber (2d ed. 1870).

Morits, Prince of Orange, and Graf von Nassau, son of Prince William I. of Orange, was born 14th November 1567 at Dillenburg, and, after his father's murder in 1584, was chosen Commander-in-Chief and Stadtholder of the Provinces of the Netherlands. He resembled his father in prudence, persistency, and military skill, wrested from the Spaniards forty towns and gained three victories before the truce of 1609 stopped hostilities. M. strove to make himself an absolute ruler by taking advantage of the disputes between the Arminians and the Gomarists, the latter of whom he zealously supported; but was at length forced to abandon his ambitious plans. He died at the Hague, unmarried, 23d April 1625.

Morlaix (Celt. 'the place on the sea-shore'), or **Montroules** (Med. Lat. *Mons Relaxus*), a river-port of France, in the department of Finistère, stands at the confluence of the Jarlot and Keffleut, 5½ miles from the sea, and 35 miles E.N.E. of Brest by rail. The two hills on which the town is built are linked by a splendid railway viaduct 210 feet high; and the chief buildings are the churches of St. Mathieu, St. Melaine, and St. Martin-des-Champs. The Château du Taureau, commanding the harbour, which intersects the town, is bordered by fine quays and promenades. M. is mainly frequented by coasters, and has manufactures of cloth, oil, and tobacco, and a trade in lead, linen, corn, &c. Pop. (1872) 11,536.

Morley, Henry, born in London, 1822, educated at Neuwied and King's College, London, and practised as surgeon at Madeley in Shropshire (1844–48); was a schoolmaster for two years at Liscard, Liverpool, and in 1851 settled in London as a journalist, writing for *Household Words* and the *Examiner*. Of the latter he became editor. In 1865 he was appointed Professor of English Language and Literature at University College, and in 1870 was appointed Examiner in English Language, Literature, and History to the University of London. M. has a richly cultivated mind, fine sympathies, a clear perception of literary beauty, and a vigorous critical faculty. Among his numerous writings may be noted *How to Make Home Unhealthy* (1850); *A Defence of Ignorance* (1851); *Life of Palissy the Potter* (1852); *Life of Jerome Cardan* (1854); *Life of Cornelius Agrippa* (1856); *Memoirs of Bartholomew Fair* (1859; new ed. 1874); *Fairy Tales* (1859–60; new ed. 1877); *Journal of a London Playgoer* (1866); *Tables of English Literature* (1870); *Clement Marot and other Essays* (2 vols. 1871); his useful *First Sketch of English Literature*, in its 3d edition; the skeleton of a larger work in progress entitled, *English Writers*, the first three parts of which have been already published, embracing *The Celts and the Anglo-Saxons; From the Conquest to Chaucer*; and *From Chaucer to Dunbar*. His latest work is *Illustrations of English Religion* (1877).

Morley, John, born at Blackburn, Lancashire, in 1838, was educated at Cheltenham, and entered Lincoln College, Oxford, where he took the degree of B.A. in 1859. He succeeded Lewes as editor of the *Fortnightly Review* in 1867. He has written *Edmund Burke, a Historical Study* (1867); *Critical Miscellanies* (1871); *Voltaire* (1871); *Rousseau* (1873); *On Compromise* (1874); *Critical Miscellanies* (2d series, 1877). For some time past M. has been making a strong impression on that section of society which thinks. He has a brilliant, lucid, and powerful intellect; he grasps the characteristics of an age or an individual with vivid insight, and describes them with a keenness, precision, and pungency that have the charm of rhetoric without its taint. Rationalistic, yet sympathetic, he resembles his departed master, John Stuart Mill, in the vigour of his logic, the catholicity of his culture, and his almost poetic enthusiasm for the progress of the race. Mark Pattison (*Academy*, October 13, 1877) says that in the course of the last few years M. has 'risen out of the class of brilliant periodical essayists into the higher class of the very few who influence opinion.'

Mor'mons is the name given to a sect calling themselves 'The Church of Jesus Christ of Latter-Day Saints,' which was founded in 1830 by Joseph Smith, and whose head-quarters is at Utah, United States. Joseph Smith (born 23d December 1805, at Sharon, Vermont, U. S.), at fourteen began to have 'visions' of God the Father, and the Son, who told him that the religious sects then existing were all in error. In 1823 he had another vision, in which a glorious personage told him that the time had now come for the Gospel to be fully preached, and gave him directions where he should find, buried in the earth, some gold plates inscribed with the writings of the ancient prophets. He found the plates in the place indicated, although they were not fully entrusted to his keeping till three years after (1827). According to his description they were of fine gold, 8 inches by 7, and bound together by three rings, passing through the whole at one edge, into a volume 6 inches thick. Along with the plates, besides a breastplate and a sword, he found a pair of spectacles, with two three-cornered diamonds fixed in the glasses. This was the Urim and Thummim, by means of which the small characters inscribed on the plates could be interpreted. These, according to the authority of the book itself, were in the 'Reformed Egyptian' language. Only eleven persons besides Smith were ever privileged to see the plates, which, with all the other articles, were returned to the angel, and never seen more. In 1827 Smith told his story to a farmer in Palmyra, New York, named Harris, who agreed to support him while translating his plates. The translation was dictated to Harris, and afterwards to a schoolmaster, Oliver Cowdery, by Smith, who sat behind a curtain, and was finished in 1829. While engaged in this work, Smith and Cowdery had a vision. John the Baptist appeared to them, and in the name of Jesus Christ consecrated them priests of the order of Aaron, and commanded them to baptize each other. When they had done this 'the Holy Ghost fell on them, and the spirit of prophecy was granted them.'

In 1830 the Church of Christ was started at La Fayette, New York, with six members, who, when they had ordained each other, received the gift of prophecy from the Holy Ghost. Several spectators were converted and baptized, and at the first Conference (June 1830) thirty members were present. Missionaries were now sent through the States, and gained many converts, of whom the most notable were Brigham Young, two brothers Pratt, and Rigdon. This success, however, excited hostility on the part of unbelievers. Judicial proceedings were taken against Smith for fraud and imposition, and when he was acquitted, he and his friends were threatened with violence. To avoid this they removed in 1831 to Kirtland, Ohio, and not long after a party of about 1200 settled in Jackson County, Missouri, calling the place 'Zion, the New Jerusalem, where Christ would shortly reign in person.' But trouble was again brewing for the Saints in both settlements. It began to be rumoured that they practised communism in their goods and wives. Their newspapers published abolitionist views, and declared that all unbelievers would soon be rooted out of the State. In this way popular indignation was greatly excited against them. In March 1832 Smith and Rigdon had been tarred and feathered by a mob. Those in Missouri were so harassed that they abandoned their homes in the middle of winter (1833–34) and removed to Liberty, Clay County. It was at this time that the presidency of three (Smith being first, and Rigdon second), and the high court of twelve apostles were established as the ruling authorities of the Church, and the formal title of 'the Church of Jesus Christ of Latter-Day Saints' was adopted (May 1834). From this time the M. remained unmolested for nearly four years. In the autumn of 1837, however, the business which Smith carried on in Kirtland failed, and the bank which formed part of it stopped payment. Smith and Rigdon were indicted for swindling, and to avoid being arrested fled to Missouri. Here, owing to internal dissensions, Harris, Cowdery, Rigdon, and some others of the first M. were expelled from the Church, although Rigdon was soon readmitted. And now prosecution from without began anew. But by this time the M. were strong enough to retaliate, and regular warfare ensued. The State militia was called out to keep the peace, and the M. were driven, with much suffering and some loss of life, across the Mississippi into Illinois (1838), whither they were followed by the President and other leading men who had been arrested and sentenced to be shot, and then allowed to escape. Here a new settlement was formed called Nauvoo [Heb. (*sic*) 'beautiful'], at which they soon numbered 15,000. In 1840 a charter of incorporation was obtained. The corporation assumed an independent jurisdiction, and a militia

consisting of all able-bodied men was organised. In 1844 Smith, who was now absolute ruler, both in temporal and spiritual matters, over 20,000 persons, offered himself as a candidate for the presidency of the United States; but this only roused more hostility against him. For some time, too, he had been cautiously teaching polygamy under the guise of a theory regarding 'spiritual wives;' indeed he had had a revelation on the subject in 1843, although it was not published till afterwards. But now the unbelievers started a newspaper in Nauvoo itself, the first number of which contained the affidavits of sixteen women that Smith or other prominent M. had attempted to seduce them. The M. destroyed the office of the paper, and resisted the warrants procured against them therefor; and the whole neighbourhood rose in arms against them. To avoid a general massacre, Smith and some others surrendered themselves to the governor of the State, who had promised them safety and a fair trial, and were lodged in prison at Carthage. But a rumour having got abroad that the governor wished their escape, 200 men disguised as Indians broke into the prison (June 27, 1844), and shot Smith and his brother dead, wounding the rest.

On the death of Smith, Brigham Young was elected President by the twelve apostles. But persecution by the unbelievers still continued, and an exploring party, headed by the President, set out (Feb. 1846) to seek a new home in the far West. In September the city of Nauvoo was burned by an armed mob after several days' siege, and the remnant of the M. driven across the Mississippi into Iowa, where the exploring party had halted. They now left Iowa for the valley of the Great Salt Lake, enduring incredible hardships on the march and during the succeeding winter (1848–49). The new city which quickly sprang up received the name of Deseret (Ref. Egyptian! 'honey-bee'). In 1850 the district was admitted into the United States as a territory, under the name of Utah, and Brigham Young was named the first governor. Differences soon arose with the officers appointed by the President of the States, and in 1854 and 1856 they had all to flee to Washington. In 1857 troops were sent to enforce obedience, with whom the M. had several skirmishes. In 1860 the troops were withdrawn, but in 1862 a permanent camp was formed near the city to overawe the M. In 1871 some of the leading M. were indicted for bigamy. In the first case tried the defendant was convicted; but on an appeal the proceedings were quashed, which the M. ascribed to a special interposition of Providence. Brigham Young has just died (1877), and the twelve apostles have had a revelation (Sept. 4th) instructing them to preside over the Church without a new President.

The exact numbers of the M. it is impossible to estimate. The population of Utah in 1872, when the fourth unsuccessful attempt was made to obtain admission as a State of the Union, was 105,000, although, of course, a certain proportion of these were Gentiles. But there are few countries in the world where the M. have not tried to gain converts. A large proportion of those they have gained, however, have come from Britain and Denmark, because in every other country the missionaries have been prevented preaching, or even expelled. 'Of late years,' it has been asserted by a good authority, 'the immigration into Utah from the European missions has varied from 1000 to 4000 annually.'

The principal sacred books of the M., besides the Bible, are three: First, the *Book of Mormon*, translated by Smith from the gold plates, published in 1830, and styled *An Account written by the hand of Mormon upon Plates taken from the Plates of Nephi. Translated by Joseph Smith.* It contains what professes to be a history of the American Continent, from its first colonisation after the dispersion from Babel, down to the year A.D 420, when Morom, the last of the Nephite prophets, buried his plates in the hill of Cumorah. The account given of the book by unbelievers is that it was written about 1809 by a preacher of an obscure sect named Spalding, who had been led by the discovery of some remains of an extinct race to write a romance connecting the race both with the Israelites and the American Indians, and that Smith obtained by some means a copy of Spalding's M.S., which had never been published, and made such alterations on it as suited him. Another sacred book, which is the chief authority on doctrine, is *The Book of Doctrine and Covenants of the Church of Jesus Christ of Latter-Day Saints, selected from the Revelations of God, by Joseph Smith* (published 1833). The third is *The Pearl of Great Price* (Liverp. 1851), which is a selection from the revelations, translations, and narrations of Joseph Smith. Mormon theology is a medley of doctrines and superstitions borrowed from many sources, there being indeed points of resemblance between it and almost every form of religion that ever prevailed in the world—Pantheism, Dualism, Judaism, Christianity—both orthodox and heretical—Mohammedanism, &c. The chief items of the popular creed, as generally preached, are faith in Smith and his successors, repentance, baptism for the remission of sins, reverence for the Bible and the other sacred (Mormon) books, the payment of tithes, absolute obedience to the president and the priesthood. The great peculiarity of the sect is the practice of polygamy, which, however, is a recent innovation condemned by the *Book of Mormon*. It was in 1843 that Smith had a revelation on the subject, but it was not till 1852 that the Sacred Law of Marriage was published or put in practice. M. are popularly known simply as men with a number of wives, and it is on the practice of polygamy that the existence of the sect will greatly depend. At any rate it seems probable that they will soon have to choose between giving it up or leaving Utah. There is a party among the M., including the near relatives of Joseph Smith, who are anti-polygamists, and who affirm that Brigham Young, and not the founder himself, introduced the doctrine and practice of polygamy. But they have not yet ventured to 'split the Church' on the point. Besides the books already mentioned, see a *Compendium of the Faith and Doctrines of the Church of Jesus Christ*, &c. (Liverp. 1857); *Edinburgh Review*, No. 202; G. A. Smith's *Rise, Progress, and Travels of the Church of Jesus Christ*, &c.; H. Dixon's *New America* (1867).

Mormyr'idæ, a family of Teleostean fishes related to the pikes (*Esocidæ*). The body is long, the tail slender, and the mouth small. The gill-opening is a mere slit. Its best-known member is the *Mormyrus oxyrchynchus*, or sharp-nosed mormyrus of the Nile.

Mor'ny, Charles Auguste Louis Joseph, Comte de, understood to have been the son of Queen Hortense by the Comte de Flahault, was born in Paris, 23d October 1811, educated at the Collège Bourbon, entered the army and served with some distinction in Africa. In 1837 Queen Hortense left him an annuity of 40,000 francs, in 1838 he forsook the army, devoted himself to the production of sugar from beet-root, and published a well-informed treatise, *Question des Sucres*. M. was returned to the Assembly (1842), and spoke with capacity on questions of industry. He was one of the chief actors in the *coup d'état* of 1851, and, as Minister of the Interior, countersigned all the first proclamations and decrees. He was appointed President of the *Corps Législatif* in 1854, and in 1856–57 represented France at St. Petersburg, where he married a rich princess (Trubetskoi). M. was one of the heaviest speculators in stocks and shares. He died at Paris, March 10, 1865. In his *Histoire d'un Crime* (October 1877), Victor Hugo writes of M. as a deadly free-liver, 'possessing all the frivolity consistent with assassination, without conscience, irreproachably elegant, infamous, and amiable; at most a perfect duke. Such was this malefactor.'

Morocc'o (Fr. *Maroc*, Arab. *Maghrib-el-Aksa*, 'the extreme west'), a sultanate in the N.W. corner of Africa, forming part of the seaboard of the Mediterranean and Atlantic, and extending from the province of Oran, Algeria, in the N.E. to the river Sakiet-el-Hamra in the S.W., a distance of 840 miles in a straight line, and inland from the seaport of Mogadore, on the Atlantic, to the eastern limits of the plateau of Teïmart, a distance of 800 miles. Area estimated at 268,920 sq. miles; pop. (according to Rohlfs) at 6,000,000, but by others at only 2,750,000. M. is traversed in a direction nearly W.S.W. by the parallel ranges of the higher Atlas Mountains, which culminate some 50 miles S.E. of M. city in Jebel Miltzin, 11,500 feet high, and terminate in Cape Ghir, 60 miles S. of Mogadore, sending off to the S. several lower ranges. An irregular and wide-spread mountain range is continued from Algeria along the coast to the Strait of Gibraltar, and this wild region, known as the Rif, is occupied by predatory tribes, who owe a merely nominal allegiance to the sultan. In the Rif are the two Spanish ports of Ceuta and Melilla. The sultanate includes the three former kingdoms of Fez, Maghrib, and Tafilet, the districts of Sus and Draa in the extreme S., and an outlying desert portion, comprising Gurara, Tuat, Tidikelt, and the plateau of Tedmait. The oasis of Tuat is of great importance as a resting-place for

the caravans trading to Murzuk and Timbuktu. From the Atlas Mountains a wide, fertile plain, intersected by various low mountain ranges, stretches towards the Atlantic coast, and here are the chief centres of population. The rivers are invaluable for irrigation, but none of them are navigable. The great plain is watered by the Sebu, Bu-Regreg, Ummer-Rebia, and Tensift. Other rivers of M. are the Muluja, which flows from the Atlas Mountains through the N.E. district of Angad to the Mediterranean, the Draa forming part of the S. boundary, and the Saura and its affluents watering the country to the S.E. of the Atlas Mountains and the district of Tuat, and eventually losing itself in the Sahara. A great part of the interior of M. is entirely unknown to Europeans. The mountains nowhere reach the level of perpetual snow, but the higher peaks of the Atlas are white as late as April, while the lower slopes are clad with luxuriant forests of oak, pine, cedar, and other kinds of valuable timber-trees. In the great western plain the climate is remarkably temperate and equal, the temperature ranging from about 40° to 90° F. The districts along the margin of the Sahara suffer from droughts, and are swept by scorching winds. Agriculture is carried on in a very primitive way; the use of manure, for instance, being almost unknown. Among the products are wheat, maize, rice, sugar, cotton, tobacco, peas and beans, saffron, grapes, oranges, almonds, figs, and dates. The live stock consists mainly of large herds of cattle, horses of a small but spirited breed, and the goats whose skins furnish the famous M. leather. Lions and panthers infest the forests, and other wild animals are the hyæna, jackal, and wild boar, and on the skirts of the Sahara, the ostrich and gazelle. Serpents, scorpions, and lizards are common, and the country is frequently visited by the scourge of locusts. Of the inhabitants it is estimated that some three-fourths are Moors, who generally reside in towns, and are frequently men of somewhat superior education. The agriculturists are mostly Berbers, and cattle-rearing is chiefly in the hands of nomad Arabs. The Jews are estimated at 340,000, while the number of Christians is said not to exceed 500. The Berbers and the kindred race of the Shellouhs live in the valleys and uplands of the Atlas Mountains, the former towards the E. in the region of Fez, the latter towards the Atlantic. Negroes are held as slaves, and the Bohari, a black tribe, have furnished the *élite* of the Sultan's body-guard for generations. Besides the turbulent inhabitants of the Rîf, there are two lawless coast tribes—namely, the Zimours, who live in the forest of Maimora, between Mehideyeh and Salee, and the Zyars, who occupy the S. and S.W. of Rabat. The Zyars carry pillage to the very gates of Rabat, and caravans from that place to Dar-el-Baida are constantly driven to the shelter of the many *Kasbas* or strongholds built by Government along the route. Over all M. green tea is esteemed a greater luxury than even coffee, and a prevalent habit is the smoking of kief, the pernicious Indian hemp. The manufactures include M. leather, carpets, shawls (*haiks*), flint-lock guns beautifully inlaid with gold and silver, leather-dyes, coloured tiles, and elegant water-jars. Since the conclusion of a treaty of commerce with Great Britain in 1856 the foreign trade has increased considerably. In 1875 the total exports amounted in value to £1,561,312, and the imports to £1,011,588; the exports to Great Britain to £711,294, and imports from Great Britain to £342,420. The chief port is Tangier, and others are Mogadore, Mazagan, Rabat, Lariche, Dar-el-Baida, and Saffi. There are two capitals, M. and Fez, the principal towns of the interior. M. is divided into twenty-eight provinces, each under a *kaid*, who is military commander as well as absolute governor. The Sultan, a purely despotic ruler, is head of the religion, which is a form of Mohammedanism differing from that of Turkey and Persia by the adoption as a text-book or code of Sidi Beccari's commentary on the Koran. Extortion is universal, and there is not a printing press in the country. Part of the region conquered by the Arabs in the 7th c., M. was included in Barbary till the 15th c. The kingdom of Fez was founded in 787, and that of M. not till 1058. The two states were united in the beginning of the 17th c., and the present dynasty was founded in 1648. The slavery of Christians was prohibited in 1814, and piracy was abolished in 1817. See Augustin's *Marokko* (Pesth, 1845), Renou's *Empire de Maroc* (Par. 1846), Rohlf's *Land und Volk in Afrika* (Brem. 1870), and *Mein erster Aufenthalt in Marokko* (Brem. 1873), Leared's *M. and the Moors* (Lond. 1876), and C. F. Tyrwhitt Drake's *Literary Remains* (Lond. 1877).

Morocco (Arab. *Marrakesh*), one of the capitals of the sultanate of M., lies in a plain near the N. base of the Atlas Mountains, at a height of 1500 feet above the sea, near the river Tensift, and 130 E. of its port of Mogadore. It is girt by a wall 23 feet high, and 7½ miles in circuit, is supplied with water by aqueducts of ancient construction, and contains some 20 mosques and several large bazaars. The palace of the sultan, outside the walls, is a magnificent building. Great part of the town is in ruins, but there is still considerable industry, especially in the manufacture of red and yellow M. leather. Pop. 50,000, of whom 6000 are Jews. M. was founded in 1072, and became famous as a seat of learning in the 13th c. The Moors of Spain frequently sent their children here to be educated, and during the height of its prosperity the town is said to have had 700,000 inhabitants.

Mo'ron, a town of Spain, province of Seville, 36 miles S.E. of the city of Seville, with which it is connected with rail. It contains the remains of a strong Moorish castle, and is noted for its lime, which is used for many ornamental purposes. Pop. 10,500.

Mor'peth, a market-town of Northumberland, England, on the Wansbeck, 17 miles N.N.W. of Newcastle by the Great Northern Railway. It has a town-hall (1714) designed by Vanburgh, a parish church of the 14th c., a free grammar-school founded in 1552, and transferred to a new building in 1859, a large gaol, erected at a cost of £80,000, and the Northumberland Pauper Lunatic Asylum (1858–59), which cost £39,000. Some flannel is made, and there are rope-yards, iron and brass founderies, tanneries, breweries, brick and tile works, &c. In the vicinity are stone quarries. The great cattle market formerly held here has been removed to Newcastle. M. sends one member to Parliament. Pop. (1871) of town, 4517; of parliamentary borough, 30,239.

Mor'pheus (Gr. the 'fashioner' or 'moulder'), in classic mythology was the son of *Hypnos* ('sleep') and the god of dreams. He was so called, because he shapes or forms the dreams of the sleeper.

Mor'phia or **Morphine'** ($C_{17}H_{19}NO_3$), the chief active principle of opium, was discovered by Sertürner 1804. It, and the many other alkaloids present in opium occur in combination with sulphuric or meconic acid ($H_3C_7HO_7$). To obtain M. separate, a strong infusion of opium is mixed with calcium chloride, when calcium meconate, with much of the colouring matter, is precipitated, and the hydrochlorates, chiefly of M. and Codeine (q. v.) are left in solution. These are crystallised by evaporation, decolorised with animal charcoal, and redissolved; and from this purified solution M. is precipitated by ammonia. It is further purified by crystallisation from alcohol, being deposited as white rectangular prisms. The chief features of M. are its bitter taste, alkaline reaction, and narcotic poisonous properties. It is sparingly soluble in cold water, and is usually identified by the deep blue colour it gives with neutral ferric salts, and the golden yellow compound it forms with nitric acid.

Medicinal Preparations and Properties of M.—The preparations of M. possess the anodyne and soporific powers of opium; but they act more agreeably, and are less likely to produce headache and nausea, being less exciting and stimulating. *Acetate* of M. is given in doses of from ¼ to ½ a grain, and a solution is used for hypodermic injection. It is also prepared as a liquor, and is given in doses of from 10 to 60 minims. The *Hydrochlorate* and its liquor are administered in the same doses, and also in the form of *Suppository* and as lozenges, and of the latter one or two may be taken occasionally for cough. Each lozenge contains ⅛ grain of *Hydrochlorate* of M.

Morphol'ogy, the department of biological science charged with the investigation of the *form* and *structure* of living beings. M., as now understood, includes (1) *Anatomy*, or the science investigating the structure of the adult being; (2) *Development*, which traces the history of its evolution from the egg, and its progress towards maturity; and (3) *Taxonomy* or *Classification*, which deals with the arrangement and relationship of the beings whose structure has been ascertained. The science of *Functions* or *Physiology* is the companion science of M.

Morrellgunge, a town and port in the district of Jessore, Bengal, British India, 96 miles E. of Calcutta, situated in the

Sunderbunds on a creek of the Haringhata river, one of the larger mouths of the Ganges. It was founded in 1850 by Messrs Morrell, who took a lease from Government, and have reclaimed 20,000 acres from the primeval jungle. M. was declared a port, and buoyed by Government in 1869. It can be visited safely by large ships. Rice is the great export.

Morr'is, Rev. Richard, one of the best English scholars of the age, was born at Bermondsey, Southwark, September 8, 1833, and educated at St. John's College, Battersea. In 1869 he became lecturer on English literature in King's College School, and in 1871 was made curate of Christ's Church, Camberwell. He was elected President of the Philological Society in 1874, and in the same year received the honorary degree of M.A. from the University of Oxford. No man has done more—perhaps none so much—to make English a liberal and learned study. The influence of his work is beginning to be felt in every great public school in England and Scotland; and when the inevitable day has arrived in which men will admit that their native tongue is not only the base, but the crown of linguistic study, to which other languages, whether superstitiously called 'classical' or stupidly named 'modern,' are merely ancillary, the great merit of M.'s labours will be amply acknowledged. Besides editing Hampole's *Pricke of Conscience*, *Early English Alliterative Poems*, *Sir Gawayne and the Green Knight*, *The Story of Genesis and Exodus*, *The Ayenbite of Inwyt*, *Old English Homilies* (2d series), *Cursor Mundi*, *Specimens of Early English*, *Chaucer's Poetical Works*, *Selections from the Canterbury Tales*, &c., he has written *The Etymology of Local Names* (1857), *Historical Outlines of English Accidence* (1872), *Elementary Lessons in Historical English Grammar* (1874), and *Primer of English Grammar* (1875).

Morris, William, an English poet, born in 1834, is the son of a wealthy merchant, and was educated at Forest School, Walthamstow, Marlborough College, and Exeter College, Oxford. He studied painting, but early devoted his attention to house decoration, a business he has been engaged in since. M. has written *Defence of Guinevere* (1858), *Life and Death of Jason* (1867), *The Earthly Paradise* (4 vols. 1863–71), *Love is Enough* (1873), *Translation of Virgil's Æncid* (1876), *The Story of Sigurd the Volsung and the Fall of the Niblungs* (1876). Through all his poems, especially the *Earthly Paradise*, there breathes a voluptuous indolence, and shines a glamour of sensuous delight that palls on the appetite for very richness.

Morrisa'nia, a town of Westchester county, New York, U.S., on the Harlem River, is connected with New York by rail and by a fine suspension-bridge. Attached to the county and city of New York in 1874, it has twenty churches, many schools, an academy and convent, and is a favourite residence of the business men of the great city. Pop. (1870) 19,699.

Morr'is-Dance, or **Morrice-Dance** (corrupted from *Moresco*, or *Moorish-dance*), a fantastic dance common in the middle ages, which is said to have been originally derived from the Moors, and was introduced into England probably from France or Flanders, under the early Tudor kings. In England it was long an important element of holiday amusement, and it still lingers on here and there in country districts. In the M.-D. the hobby-horse, or a dragon, with Robin Hood, Maid Marian, Friar Tuck, The Fool, and the Queen of the May were the chief characters represented. Bells were fastened to the feet of the performers.

Morr'ison, Robert, D.D., the first Protestant missionary to China and an accomplished Chinese scholar, was the son of a lastmaker, and was born at Morpeth, January 5, 1782. He was trained at the Independent College, Hoxton, and at the College of the London Missionary Society at Gosport. After devoting much time to the study of Chinese, he was sent to Canton in 1807, where he combined zealous missionary labours with the duties of translator to the East India Company's factory. In 1812 he published *Horæ Sinicæ* (translations from popular Chinese writings), in 1814 a translation of the New Testament into Chinese, in 1819 of the Old Testament, in 1822 his great *Chinese Dictionary* in 6 vols., and in 1825 *The Chinese Miscellany*. M. accompanied Lord Amherst to Pekin as interpreter in 1817, and paid a visit to England in 1824–26. He died at Macao, August 1, 1834. His widow published in 1839 *Memoirs of the Life and Labours of Robert M.* See also Medhurst's *China, its State and Prospects.*—**John Robert M.,** son of the preceding (born 1814, died 1843), was a member of the Legislative Assembly of Hong Kong, and author of a useful manual, *The Chinese Commercial Guide.*

Morr'istown, capital of Morris county, New Jersey, U.S., on the Whippany River, 31 miles W. of New York by rail. It has eight churches, the Speedwell Ironworks and stores, a public park, and three weekly newspapers, and is much visited by New-Yorkers during summer. Pop. (1870) 4398.

Morse, or **Wal'rus** (*Trichecus Rosmarus*), a genus of carnivorous mammalia represented by a single species, inhabiting the Arctic seas. This animal is included with the seals in the division *Pinnipedia*, or that in which the feet are converted into swimming paddles. Its chief characters are found in the disposition of the teeth. There are six upper and four lower incisors, but these are said by Owen to disappear while the animal is still young, with the exception of the outermost pair of the upper jaw. The canine teeth of the upper jaw form tusks, which may measure 15 or 16 inches in length, and are used by the animal to aid it in climbing upon the ice. Three molar teeth of simple form occur on each side of the upper jaw, and four molars on each side of the lower jaw. Some regard the foremost lower molar as a canine. The head is large and the muzzle prominent, the upper lip being provided with large bristles. The M. is not polygamous, like the seals, one male mating with one female only. The average length of the M. is about 12 or 13 feet, but specimens of 15 feet are by no means uncommon. The black skin is sparsely covered with dark brown or blackish hairs. These animals produce but one young at a birth, and both parents appear to regard their progeny with care and affection. They progress on land with a clumsy gait, but when alarmed contrive to move towards the sea with considerable speed. When brought to bay they defend themselves courageously with their long tusks. They are found in large herds, numbering several thousands in some cases. They are hunted for the sake of the skin, the fat, and especially the ivory of the tusks, which is very close-grained and white. The Eskimo value the M. exceedingly for the number of useful products obtained from all parts of its frame. Fossil remains of the M. occur in a fragmentary state in deposits of the Tertiary age. The name 'M.' is derived from the Russian *Morss; Walrus* is the Ger. *wallross*, 'whale horse'; and *Rosmarus*, its specific appellation, comes from the Norwegian *Rosmar*, meaning 'sea-horse.'

Morse, Samuel Finlay Breese, one of the inventors of the electric telegraph, was born at Charlestown, Massachusetts, April 27, 1791. He studied art in London, 1811–15, after which he settled in America as a portrait painter. In 1835 he exhibited his telegraph at work at New York, and the admirable ingenuity and simplicity of his system attracted widespread attention. Its first adoption on a large scale was between Washington and Baltimore in 1844, and thereafter it became universal throughout the States and in a great part of Europe. It was introduced into Germany in 1851, and in 1857 several European states presented the inventor with a purse of 400,000 francs. The system is the alternate magnetising and unmagnetising of a bar, which causes a point to mark dots and scores on a travelling slip of paper. M. died in New York, April 2, 1872. See his Life by S. J. Prince, D.D. (New York, 1875).—**Sidney Edwards M.** (1794–1871), brother of the preceding, a journalist and geographer, invented a system of printing maps, called by him cerography.

Morshansk', a town of Russia, government of Tambov, on the Tzna, an affluent of the Oka, 250 miles S.E. of Moscow by rail. It has manufactures of cloth, soap, and tallow, and considerable trade in corn and cattle. Pop. (1870) 19,504.

Mortal'ity, Laws of. The L. of M. are ascertained by analysing and collating statistics of life and death, the value of the deductions being in relation to the accuracy and extent of the data. While accuracy of registration is an essential condition, the greater the number of facts registered affords us the more certain means of arriving at correct deductions. In the early part of the 17th c., John Graunt of London published his *Natural and Political Observations on the Bills of Mortality*, and in 1693 Dr. Halley published the celebrated Breslau tables of

mortality, preceded, however, by the investigations of Pascal in France, and De Wit in Holland. In 1713 Bernouilli's work was published, and in 1742 Dr. Price published his tables of mortality for London. In 1746, M. Deparcieux published his *Essai sur les Probabilités de la Vie Humaine*, in which, from computations based upon the registers of different religious houses, he showed for the first time that female life is superior to male. In 1770, Dr. Price published his *Observations and Reversionary Payments*. The tables most generally used by assurance and annuity offices in this country are the following :—I. The Northampton Tables (Dr. Price's), based upon the register of burials in the parish of All Saint's, Northampton, 1735–80. II. The New Northampton Tables, numbers 1 and 2, constructed by Dr. Farr. No. 1 was deduced from a comparison of the deaths during 1838–44 with the census returns of 1841. No. 2 is based upon the deaths alone, in Northampton, during the 7 years 1838–44, and agrees almost exactly with that of Dr. Price; the mean duration of life, according to the two tables, respectively being 24·88 and 25·18 years, while according to No. 1 New Northampton it is 37·5 years. III. The Carlisle Tables, constructed from observations made by Dr. Heysham at Carlisle, 1780–87. IV. The Government Tables, computed by Mr. Finlaison on the lives of 22,000 nominees for Government annuities. V. The English Tables, Nos. 1 and 2, the former being deduced from the living by the census of 1841, and from the deaths at corresponding ages in the same year; and the latter from the living in 1841, and from the deaths in the seven years 1838–44. Both are based on the recorded ages of 15,913,148 living persons, and No. 2 on 2,436,648 deaths. The observations were taken on the plan recommended by Professor De Morgan and Mr. Griffith Davies, and probably give the results of the average mortality of England more correctly than those previously published. VI. The Experience Tables, Nos. 1 and 2. The tables, No. 1, were prepared by a committee of eminent actuaries, on the data afforded by the combined experience of 17 life-assurance offices, the labours of the committee having extended from 1838 till 1843. The data were derived from 83,905 policies, of which 40,616 were distinguished by denoting the sex of the lives assured, and by classing them into town, country, and Irish assurances. The Experience Tables, No 2, sometimes called the Twenty Office Experience Tables, were commenced in 1862 and completed in 1869. In 1864, about 20,000 cards were issued to 20 offices, English and Scotch, requiring the following details, the oldest office being the London Assurance (1720). The particulars required on the English card were—policy number, life, British, Irish, or foreign, healthy or diseased, year of entry, year of exit, age at entry, age at exit, mode of exit, cause of death, and remarks. The Scotch card distinguished between the English and Scotch lives. The date to which the observations were carried was generally to the end of 1863, and the total number of entries, 160,426, was regarded as sufficient to allow of several valuable classes of tables to be formed. The four great divisions into which the data was reduced were the following :—(1.) Healthy lives, male; (2.) healthy lives, female; (3.) diseased lives, male and female; (4.) lives exposed to extra risk from climate, occupation, &c. The following table shows the numbers living at decennial periods out of 10,000 entering each class at age 10 :—

Age.	Living out of 10,000. Entering at Age 10.				Carlisle Tables.	Experience Tables, No. 2.
	Healthy Males.	Healthy Females.	Healthy Males and Females Combined.	Diseased Males and Females Combined.		
10	10,000	10,000	10,000	10,000	10,000	10,000
20	9,616	9,408	9,554	9,679	9,427	9,327
30	8,987	8,519	8,904	8,548	8,734	8,629
40	8,223	7,574	8,128	7,544	7,856	7,865
50	7,274	6,620	7,183	6,426	6,806	6,952
60	5,898	5,525	5,847	4,832	5,639	5,597
70	3,793	3,799	3,805	2,785	3,717	3,584
80	1,392	1,464	1,411	898	1,475	1,329
90	150	186	159	57	220	132

The above table shows that at the age of forty the diseased lives and the healthy female lives show nearly the same decrement; but after that age the diseased lives rapidly diminish by death, whilst the healthy female lives are almost exactly the same as the healthy males.

The following table shows the *expectation* of life in each class, at decennial ages, in comparison with that shown by other well-known tables :—

Age.	Healthy Males.	Healthy Females.	Healthy Males and Females Combined.	Northampton.	Carlisle.	Davies, Equitable.	English, No. 2.	Experience, No. 2.
10	50·3	48·2	45·6	39·7	48·8	48·8	47·4	48·4
20	42·1	40·9	36·8	33·4	41·5	41·0	40·3	41·5
30	34·7	34·6	31·0	28·2	34·3	33·9	33·6	34·5
40	27·4	28·2	24·5	23·0	27·6	27·4	27·1	27·3
50	20·3	21·6	18·3	17·9	21·1	20·8	20·5	20·2
60	13·8	14·9	12·6	13·2	14·3	15·0	14·0	13·8
70	8·5	9·1	8·2	8·6	9·2	9·8	8·7	8·5
80	4·7	5·6	5·0	4·7	5·5	5·3	5·0	4·9
90	2·4	3·3	4·1	2·4	3·3	2·6	2·7	2·1

From the above table it will be seen that the improvement in the latter part of female life is such that though at the age of ten the female expectation is only 48·2, whilst that of healthy males is 50·3, yet at age 30 the expectation is nearly the same for both sexes; and after that age the female expectation is considerably higher at all ages. The following table shows the annual mortality, per estimate, at the chief quinquennial periods of life.

HEALTHY LIVES—MALE AND FEMALE COMBINED.

Age.	Exp. No. 2, unadjusted.	Exp. No. 1.	Carlisle.
15 to 19	·54	·72	·68
20 ,, 24	·71	·75	·70
25 ,, 29	·73	·80	·82
30 ,, 34	·85	·88	1·01
35 ,, 39	·97	·97	1·09
40 ,, 44	1·09	1·10	1·41
45 ,, 49	1·36	1·36	1·44
50 ,, 54	1·78	1·80	1·52
55 ,, 59	2·35	2·48	2·20
60 ,, 64	3·38	3·52	3·68
65 ,, 69	4·90	5·14	4·45
70 ,, 74	7·23	7·54	6·97
75 ,, 79	10·92	11·03	10·54
80 ,, 84	15·44	16·01	13·86
85 ,, 89	22·50	23·46	19·92
90 ,, 94	29·65	37·23	28·61

The mortality experience of the leading offices of the United States is now in process of being collected and compiled, under the superintendence of a committee of the Chamber of Life Insurance. See *The Insurance Cyclopædia*, by Cornelius Walford, London and New York, vol. iii., 1874, *et seq.*, and the *Assurance Magazine*.

Mor'tar, a short piece of ordnance of large calibre for discharging shells at an angle of 45° or thereby, in siege operations. It owes its name to a resemblance in form to the vessel called a mortar (Lat. *mortarium*), in which solid substances are pounded. The M., invented in the 14th century, was the earliest of European firearms. It was built up of longitudinal bars of wrought iron, hooped and strengthened with iron bands, without trunnions, while blocks of wood, hollowed out, served as a bed to fire it from. Afterwards the M. was cast with trunnions, an improvement that enabled it to rest firmly and steadily in its bed, and facilitated its elevation to any angle. Several sizes of mortars, for land or sea, are in use in the British service. The largest M. in the sea service is 13 in. calibre, 64 in. long, and 5 tons in weight. The 13-in. M., for land service, weighs 36 cwt., and measures 40 in. in length. The other sizes in use are 10 in. and 8 in. calibre. Land-service mortars are mounted on travelling carriages, which, deprived of their wheels, form steady M. beds. A 36-in. M., designed in 1858 by Mr. Mallet, to throw a shell weighing 2481 lbs., may be seen at Woolwich Arsenal.

Mortars used for cementing building stones together, and for plastering walls, are of two kinds—1, those which, like ordinary mortar, set and harden by exposure to the air; and 2, those that set and harden without the assistance of the atmosphere and indurate under water, hence termed *hydraulic* M. Ordinary building mortar is made of common or rich lime, mixed with pit or river sand or fine gravel, in the proportion of 3 parts of sand to 1 part of lime, and moistened with water to form a paste. The pure limestone is first calcined to expel carbonic acid, and the product, called quicklime, is *slaked* with water, which causes a violent evolution of heat, and a crumbling to a bulky powder of the hydrated lime. Ordinary M. harden on account of the absorption of carbonic acid from the atmosphere; in fact, the lime tends to revert to its original condition of a carbonate. For internal plaster work, as of walls and ceilings, the addition of tanyard hair is made to ordinary mortar to cause it to adhere to the laths. Silica and alumina are essential components of the stones used for making hydraulic mortar. Impure limestones containing clay (silica and alumina, admixed with oxide of iron), magnesia, and other substances, slake with different degrees of readiness and energy, and the slower and less violent the action, the better is the lime adapted for building under water. *Eminently hydraulic limes* are obtained from limestone containing from 20 to 30 per cent. of clay and other impurities, and M. prepared from them set in 3 days, and become hard in 1 month. Limestones with 12 to 20 per cent. of impurities yield *hydraulic limes;* while limes of *feeble hydraulicity* are procured from limestones containing from 8 to 12 per cent. Hydraulic limestones, found chiefly in the Lias and Lower Chalk formations, are not abundant in Great Britain. Their calcination and the slaking of the resulting limes require to be carefully conducted. Fine clean sand (1½ to 2 parts to 1 of lime) is added to form the mortar. Hydraulic lime is prepared artificially on a large scale by mixing clay with rich lime, and calcining the mixture. The proportions depend on the purity of the ingredients; but 1 part of dry clay to 4 parts of rich unslaked lime (or 7 parts of carbonate of lime), may be taken as a fair proportion. Pozzuolana and trass—volcanic products—containing much silica and alumina, were formerly much used in England instead of clay. The setting under water of hydraulic M. is due to the formation of hydrated silicates of lime and alumina, the silicic acid having during calcination been so modified that it subsequently unites with the lime.

Hydraulic Cements, popularly so called, are prepared chiefly from argillo-calcareous nodules, in which a larger proportion of clay is present than in hydraulic limes. The stones are calcined, ground to powder, and mixed with water without slaking, and the resulting cements harden quickly in water without admixture of any substance. Of English cements of this kind, the varieties known as Parkers' (Roman), Medina, and Atkinson's enjoy a high reputation. The stones from which they are made are found at Harwich, Sheppey, Yorkshire, Isle of Wight, &c.

Portland Cement (named from its resemblance in colour to Portland stone), is an artificial hydraulic lime prepared from chalk (75 to 80 per cent.) and diluvial clay (20 to 25 per cent), obtained in the Thames and other river basins. The ingredients are ground under water, and the sediment is dried, calcined, and reduced to powder. Portland cement is the strongest hydraulic mortar known, and from it concrete is largely made.

Selenitic Mortar or Cement, recently invented and largely used in plaster work, consists of hydraulic lime, anhydrous gypsum, and sand. The gypsum (sulphate of lime) promotes the setting of the mortar, and enables repeated coats of plaster to be applied within from twenty-four to forty-eight hours. Plaster of Paris (q. v.) is the basis of several other cements used for internal decoration of dwellings. Keene's cement is prepared by saturating plaster of Paris with an alum solution; the plaster is then dried, recalcined, and ground. In Parian cement the plaster is soaked in a borax solution, and in Martin's, in pearl ash.

Mastics are oleaginous cements, compounded of brick-dust, clay, litharge, or other materials, with oil. They are seldom used in bulk, being chiefly applied to the exposed joints of masonry.

Mort d'Arthur, The, is one of the romances of the Arthurian series. (See ARTHUR.) Up to the time of Geoffrey of Monmouth (12th c.) no author mentions the death, very few even the life, of the British warrior-prince. Nennius leaves him victorious after a succession of battles, but in the Chronicle of Geoffrey (Lib. xi. cap. ii.) occurs the following curious passage:—'And even the renowned King Arthur himself was mortally wounded; and being carried thence to the isle of Avallon to be cured of his wounds, he gave up the Crown of Britain to his kinsman Constantine, the son of Cador, Duke of Cornwall, in the five hundred and forty-second year of our Lord's incarnation.' This is perhaps the nucleus of the splendid romance of the mediæval poets, which exists in various forms and in several languages, French, English, German, &c. One English version of the 15th c., from an MS. in the Harleian Library, was printed by the Roxburghe Club in 1819, and another by Mr. Halliwell from an MS. in the library of Lincoln Cathedral in 1847. Sir Thomas Malory's prose version is only a compilation, but executed with such quaint simplicity and pathetic power that Tennyson in his magnificent reproduction, which has familiarised Englishmen with the legend of Arthur's death, has often availed himself of the very words of the ancient knight.

Mort'gage is in English law a pledge of land or other real property, in security of a loan. The borrower is called the mortgagor; the lender is called the mortgagee. A M. is often effected by merely depositing the title-deeds of a property; and, if a memorandum accompanies the deposit stating its object, equity will consider it a M.; and should occasion arise will give a decree for sale of the property. When no explanatory writing accompanies the deposit, the lender can only apply to a court of law for his money, retaining the title-deeds till he is paid. It has become the practice of late years to insert in a deed of M. an absolute power of sale, in case of breach of the condition of the deed.

If any person mortgage his estate a second time, and do not inform the postponed mortgagee in writing of the prior M. and of every incumbrance which he has voluntarily brought upon the estate, the postponed mortgagee holds the estate as a purchaser free from the *Equity of Redemption* (q. v.). The rule of equity is that a second mortgagee, who has the title-deeds, not having had notice of a prior incumbrance, shall be preferred; because the negligence of the first mortgagee in lending the money without taking the title-deeds enables the mortgagor to commit a fraud. It is settled law that if a third mortgagee, who at the date of his M. had no notice of the second, purchase the first M., even pending a bill filed by the second to redeem the first, both the first and third shall be paid out of the estate, before any share of it can be appropriated to the second. The reason given for this is that the third by thus obtaining the legal estate has both law and equity on his side, which supersede the mere equity of the second. 3 and 4 Vict. c. 55, amended by 8 and 9 Vict. c. 56, enables the owners of settled estates to defray by M. the expense of draining them. For Scotch law, see bond.

Mortifica'tion, in Medicine. See GANGRENE.

Mortification, a term of Scotch law denoting a gift of land for charitable or public use. It is usually conveyed to trustees to be held by them *blench* or in *Feu* (q. v.).

Mor'tis Cau'sa Deed is, in Scotch law, a deed to take effect on the death of the maker. In Scotland, heritage (or real estate) cannot be conveyed by will. The usual mode of devise is therefore by deed of conveyance in the usual form, reserving the liferent of the maker, who keeps possession of the deed until his death. See DELIVERY OF A DEED.

Mort'main, Statutes of. These are English statutes passed to prevent priests frightening dying persons into conveying their lands for charitable or ecclesiastical purposes. The statute 9 Geo. II. c. 36 enacts that to be valid such a conveyance must be made twelve months before the death of the donor, before two witnesses, and be enrolled in the Court of Chancery within six months after execution. The deed must bear to have immediate effect, and must reserve no interest to the donor. The Act applies only to land in England.

Mor'ton, a family that sprang from the Douglasses. James Douglas, Lord of Dalkeith, was created a peer in 1458 by the title of Lord Aberdour and Earl of Morton. James, third Earl, having no male issue, entailed the family estates and honours to his son-in-law, James Douglas of Pittendreich, who became chancellor under Mary, succeeded Murray as Regent, and after showing himself a true statesman in sagacity and bravery, but a cruel soldier, a corrupt judge, a hypocrite, and a profligate, was beheaded at Edinburgh, 2d June 1581, by the

Maiden, an instrument he had himself introduced to use. The earldom then reverted to John, Lord Maxwell, who, when the Act of Indemnity was passed in 1585, was created Earl of Nithsdale, while the Morton title devolved upon Archibald Douglas, eighth Earl of Angus. The eighth Earl of Morton was Sir William Douglas of Lochleven. William, eleventh Earl, died without issue, and the honours passed to his uncle, Sir James Douglas of Smithfield. George, eighteenth Earl, was made a peer of Great Britain in 1791, as Baron Douglas of Lochleven, but as he died childless the British barony expired, his cousin, George Sholto Douglas, becoming Earl of Morton. His son, Sholto John Douglas, present Earl of Morton, a representative Scotch lord, was born April 13, 1818, married, first, Helen, daughter of James Watson, Esq. of Saughton, 24th January 1844; and, secondly, Alice Aline Carolina, daughter of the Earl of Durham, 7th July 1853. He succeeded his father, 31st March 1858.

Morton, Henry, born at New York, December 11, 1836, graduated at the University of Pennsylvania (1857), and was successively appointed Professor of Chemistry at the Philadelphia Dental College (1863), secretary of the Pennsylvanian Franklin Institute (1864), Professor of Chemistry in the University of Pennsylvania (1869), and President of the Stevens' Institute of Technology at Hoboken, New Jersey (1870). Besides sixteen *Lectures on Light* (1867), which excited considerable attention in the learned world, M. is author of numerous able papers in the *Chemical News*, *Philosophical Magazine*, and other scientific journals.

Morton, John, was probably born at Milborne St. Andrew, in Dorsetshire, about 1420, and proceeded from Cerne Abbey to Balliol College, Oxford, where he graduated LL.D., and became principal of Peckwater Inn (1453). Introduced by Cardinal Bourchier to Henry VI., he had been made a privy councillor, rector of Bloxworth, chancellor of Cornwall, and subdean of Lincoln (1450). He was present on the Lancastrian side at the battles of Towton and Barnet, but after the defeat of Tewkesbury (1471) gave in his adhesion to Edward IV., and by him was appointed Master of the Rolls (1472), and Bishop of Ely (1479), with a host of minor preferments. Edward's death, however, was followed (June 13, 1483) by the famous 'strawberry scene' of Shakespeare's *Richard III.*, and by M.'s imprisonment in Brecknock Castle. Escaping to Ely, he passed over to Flanders, and there received the news of the victory of Bosworth (1485). On his return to England his attainder was reversed, and he was created lord chancellor and archbishop of Canterbury (1486), a cardinal (1493), and chancellor of Oxford (1494). He died at Knowle, in his native county, October 12, 1500. An eminent lawyer, with a prodigious memory, full of energy, but of polished manners, cursed with a besetting sin of avarice, yet princely in bestowing—such is the character that may be gathered from his life, and from the first book of the *Utopia* of Sir Thomas More, who was page in his household (1494–97). See vol. v. of Hook's *Lives of the Archbishops of Canterbury* (Lond. 1867).

Morton, Samuel George, an American ethnologist and craniologist, born at Philadelphia, January 26, 1799, graduated in medicine at the University of Pennsylvania (1820), and of Edinburgh (1823); was appointed Professor of Anatomy in Pennsylvania Medical College (1839–43), and President of the Academy of Natural Sciences (1840); and died at Philadelphia, May 15, 1851. M. was author of *Human Anatomy* (1839), *Crania Americana* (1839), and *Crania Ægyptica* (1844), besides a host of papers on ethnology, chemistry, geology, &c. In the *Types of Mankind*, published by Nott and Gliddon in 1854, which is partly made up of selections and adaptations from M.'s unpublished papers, there is an appreciative *Notice of the Life and Scientific Labours of M.* by Dr. Henry S. Patterson.

Mor'tuaries, in England, are customary gifts claimed in many parishes by the incumbent on the death of his parishioners.

Mosa'ic (Fr. *mosaïque*, from Ital. *musaico*, Lat. *musivum*, Gr. *mouseion*, 'the temple of the Muses,' which was finely decorated), a name used to denote several varieties of decorative work, all produced by embedding together fragments or small pieces of variously coloured hard material so arranged as to produce any predetermined geometrical or pictorial pattern. M. work and inlaying approach closely to each other, but in the case of the latter, accurately cut pieces of the inlaying substance are fitted in, and occupy entirely a definite portion of any design or figure. The applications of M. work are varied, and the materials employed embrace coloured marbles and other stones, precious stones, glass, and pottery. M. is employed for pavements and floors, for the decoration of walls of churches, and public and private buildings, and, in its minute fine forms, for decorating small pieces of furniture, brooches, studs, and for other similar purposes. The work is of very ancient origin, having been practised by the early Assyrian and Egyptian races. It passed into Greece, whence it was carried to Rome, where about the beginning of the Christian era it attained great prominence and perfection. At a very early period it became a favourite means of producing decorative pictures for ornamenting the walls of churches, whence the art became peculiarly associated with Byzantine architecture, a relation which continues to the present day in the prominence of M. work in the Russian and Eastern churches. Modern M. work, leaving out of account simple tessellated or M. pavements, embraces the production of large works in glass tesseræ for wall decorations, chiefly carried on in Venice and St. Petersburg, and the fabrication of minute work in fine coloured and precious stones—known as Roman and Florentine mosaics. In the atelier of a M. artist the glass employed embraces many thousands of different shades, and the copying of a work of art in M. demands the greatest care, patience, and skill; but once fabricated, the M. picture is practically imperishable.

Mosaic Wool, a method of producing imitation tapestry and complex pictorial effects in wool for rugs, sofa-covers, hangings, &c., introduced and some time worked by Messrs. Crossley of Halifax. It consisted of assorting bundles of woollen yarn so that when cut across, the ends of the yarn showed the desired pattern. The cut ends of such assorted bundles were caused to adhere to a stout backing by means of a solution of indiarubber and when shorn across so as to leave any requisite depth of pile, the pattern of course came out on the surface. It is now entirely superseded by other processes. See CARPET.

Mosay'lima ('Little Muslim') was a contemporary and rival of Mohammed, belonging to the Arab tribe of the Bani Hanifah, who was known as a religious teacher before the latter had assumed his mission. In the 9th year of the Hejrah he headed an embassy which had been sent by his tribe to Mohammed, and professed himself a Muslim. But the next year he set up for a prophet himself, and published revelations in imitation of the Koran. Having gained a considerable body of adherents from his tribe, he sent a request to Mohammed that he would share his power with him, to which it is said that Mohammed returned an insulting refusal. On the other hand there is no doubt that Mohammed made considerable concessions to M., and recent investigators think there is reason to believe that he intended at his death to nominate him his successor, having secretly done so before. After Mohammed's death (11 A.H.) Abu Bekr sent an army to crush M., and a battle was fought in which M. was slain and his army defeated, whereupon his adherents submitted and embraced Mohammedanism. See Muir's *Mahomet* (new ed. 1877).

Mosch'eles, Ignaz, pianist and composer, was born of Jewish parents at Prague, 30th May 1794. He was a precocious child, and at the age of eleven was the best pianist in his native city. In Vienna he studied under Albrechtsberger and Salieri. After a professional tour over all Europe, he took up his residence in London in 1820, where he was for more than twenty years professor in the Royal Academy of Music and conductor of the Philharmonic Concerts. He translated Schindler's *Life of Beethoven* into English in 1841. At Mendelssohn's suggestion he accepted the musical professorship in the Conservatoire at Leipsic in 1846. He died 10th March 1870. M. published many beautiful concertos, sonatas, fantasias, and studies. He was unrivalled as a pianist in his own pure classic style. See *Aus Moscheles' Leben*, by his widow, 2 vols. (Leips. 1872–73), translated into English by A. D. Coleridge (Lond. 1873).

Mos'cow (Russ. *Moskwá*, Ger. *Moskau*), the former capital of Russia, and now the chief commercial and industrial city of the empire, is situated in a fertile plain surrounded by low hills, on the rivers Moskva and Jausa (frozen over from 20th November to 15th April), 400 miles S.E. of St. Petersburg by rail. From the Sparrow Hills to the S. the city has a singularly picturesque

appearance, with its gilt domes, coloured spires, and greenhouse-roofs, its old Byzantine buildings contrasting with modern Renaissance structures, its crowded, dingy quarters intersected by Parisian boulevards, and alternating with green, open spaces, where the inhabitants lead a country life. Although the streets have been laid out on a preconceived plan, and although a few have been Europeanised, there is an almost total absence of anything like paving, and, strictly speaking, there is no street architecture,—no regularly-built terraces, crescents, or squares; the greatest incongruity prevails, and wretched hovels rise by the side of splendid palaces. But M. as the great commercial capital of Russia is rapidly improving and increasing. As the heart of Russian tradition 'it treasures the ancient churches, with the tombs of grand princes and holy martyrs, the palace in which the Tsars of Muscovy lived, the Kremlin, which resisted—not always successfully—the attacks of savage Tartars and heretical Poles, the venerable Icons that many a time protected the people from danger, the block of masonry from which on solemn occasions the Tsar and the Patriarch addressed the assembled multitude' (Mackenzie Wallace). The city, girt by a dam and moat, has a circumference of 23 miles, and consists of four distinct parts, exclusive of the six Slobodi or suburbs, which are extensive, and contain many mansions, monasteries, hospitals, &c. (1) The Kremlin, the core of the city, occupies an elevation on the N. bank of the Moskva, and is enclosed by a heavy stone wall surmounted by towers, dating from 1367. Here are the palaces of the Czar, the Patriarch, and the Holy Synod; the arsenal (1702), with its grand trophy of 875 cannons abandoned by Napoleon in 1812; the Cathedral of the Assumption (1325–1475), where the Czars are crowned, with its columns of porphyry and jasper, its floor paved with agates and cornelians, and its walls enriched with costly mosaics. Other notable buildings in the Kremlin are the Cathedral of St. Michael (1507, restored 1732), containing the tombs of all the Czars prior to Peter the Great; and the tower of Ivan Veliki, 270 feet high, supporting a gilded dome 37 feet high, and a peal of 32 bells. On a pedestal adjoining Ivan Veliki is the famous Czar Kolokol (king of bells), the largest bell in the world, weighing 193 tons. (2) Kitaigorod (*i.e.*, Chinese town), to the E. of the Kremlin, and surrounded by thick walls, is the oldest part of M., and the great seat of trade. Here the streets and markets are crowded with merchants from the Western capitals and the remote countries of the East. The chief buildings are two cathedrals of the Defence of the Virgin and of the Mother of the Saviour, and the great bazaar containing 6000 booths. (3) Bjelgorod (*i.e.*, 'white town' from the colour of its former walls, which have given place to boulevards) encircles the Kremlin and Kitaigorod on three sides, and comprises many of the finer streets. In this quarter are the palaces of the governor and many nobles, the university, the foundling hospital, the post-office, the theatres, and a celebrated drill-hall, 560–158 feet, affording scope for the movement of 2000 infantry, or 1000 cavalry. (4) Semljanoigorod ('earthen town,' from its having been formerly surrounded by an earthen wall) contains, besides schools and hospitals, many large factories, and is a great residence of the working classes. In 1868 M. was entered by 24 gates, and had 81 markets and squares, 11 fountains, 57 bridges, and 7 public gardens, 23 hospitals and medical charities, 27 other benevolent institutions for the reception of 65,000 persons. The places of worship amounted to 357, and of these 5 were cathedrals, 8 high churches, 3 Protestant, 2 Roman Catholic, and 2 Armenian. The university (founded in 1755) is attended by 1500 students, and has a library of 150,000 vols. There are 108 common schools for 20,000 children, and among the higher intellectual institutions are the museum, removed from St. Petersburg in 1861, and containing 150,000 vols., the ethnological museum, reflecting the life of the various countries of the empire, the Synodal library with its 900 Slav. MSS., an institute for Oriental languages (33 teachers and 200 students), a picture gallery, and military, dramatic, and art schools. M. is the centre of the Russian railway system, and is connected by water with the Baltic, the Black, the White, and the Caspian Seas. Its trade is chiefly in tea, corn, fur, hides, tallow, and metals. The greatest manufacturing city in Russia, its cotton, woollen, and silk factories, its dyeing, printing, and tanning works, its industries in silver, candles, iron-wares, &c., employ 9000 skilled workmen, 20,000 labourers, and 10,000 apprentices. The annual value of the industries is £4,300,000. Pop. in 1816, 166,515; in 1837, 348,562; and in 1871, 611,970. M. was founded in 1147, and was made the capital of Muscovy by Ivan I. in 1328. Thrice attacked by the Lithuanians (1368–72), it was sacked by Timur in 1381, and subsequently pillaged by the Tartars in 1451 and 1477. The massacre of Demetrius and his Polish adherents (the 'matins of M.') in 1606 was followed by the Polish occupation of the city, 1610–12. In 1812, M. had 252,609 inhabitants, but when it was entered (September 15) by Napoleon, he found it occupied by some 12,000, the fugitives having carried off all the treasure and valuables. A great fire, generally supposed to have been raised by order of the governor, Rostopchin, raged for seven days, and reduced a great part of the city to ashes, thus forcing the disastrous retreat of the French.—The *government* of M. is one-half cultivated and 38 per cent. under woods. It is the richest industrial part of Russia, containing as many as 75,313 artisans. Area, 12,552 sq. miles; pop. (1870) 1,678,784. See Schnitzler's *Moscou, Tableau Statistique, Géographique, Topographique, et Historique* (Peters. and Paris, 1834); Kohl's *Reise im Innern von Russland und Polen* (Dresd. and Leips. 1841); and Mackenzie Wallace's *Russia* (Lond. 1877).

Moselle', a name borne by *still* and *sparkling* wines made from grapes cultivated in the valley of the Moselle river. M. in its natural state is mild and acidulous, but the great bulk of it has an artificial 'muscatel' flavour imparted to it by admixture of a tincture of elder flowers, which also increases its alcoholic properties. Sparkling M., made at Koblenz, is esteemed for its peculiar bouquet, which is not unfrequently derived from the elder-flower.

Moselle (Lat. *mosella*), a river of France, and an affluent of the Rhine, rises in the Vosges, flows in a N.E. direction through Meurthe-et-Moselle, Luxemburg, and Rhenish Prussia, passing the towns Epinal, Metz, Thionville, Trier, &c., and joining the Rhine at Koblenz, after a sinuous course of 330 miles. The former *department* of M. was in part ceded to Germany after the late war, and in part taken to form the department Meurthe-et-Moselle (q. v.) in 1871.

Mo'ses (a name which has been variously explained as Coptic, 'saved from the water;' Heb. 'the drawer out,' *i.e.*, 'the leader, deliverer;' Egypt. 'the child,' &c.), the great Jewish lawgiver, was born in Egypt at the time when the Hebrews were subjected to a most oppressive slavery by the Egyptians. His parents, who belonged to the tribe of Levi, were Amram and Jochebed, whose whole family were M., a brother Aaron, three years older (Ex. vii. 7), and a sister Miriam, the eldest. Preserved by the devotion of his mother from immediate destruction at his birth, a fate which the Egyptians at the time imposed upon all the male offspring of the Hebrews, and next saved by an Egyptian princess from the Nile, on which he had been placed in a basket of papyrus when she could no longer conceal him, M. was brought up at Pharaoh's court (Ex. ii.), and 'was learned in all the wisdom of the Egyptians' (Acts vii. 22). For all that, his heart was ever with his oppressed brethren, and when grown to manhood (forty years of age, Acts vii. 23) he one day killed an Egyptian overseer who was beating a Hebrew, and finding that his deed was known he fled to the desert in the neighbourhood of Mount Sinai. There he became acquainted with a Sheykh (prince and priest), named Jethro, of one of the Midianite tribes inhabiting the region at that time, and marrying one of his daughters (Zipporah), spent other forty years of his life (Acts vii. 30) tending his father-in-law's flocks. At the end of that time Jehovah appeared to him in a burning bush, and commissioned him, under a promise of his support, to go to the help of his suffering brethren (Ex. iii.). Accompanied by his brother Aaron, who met him on the way, M. returned to Egypt and demanded that the Hebrews should be permitted to go out to the desert and celebrate a festival in honour of their God. This demand only brought more burdensome tasks and greater suffering upon them; and the permission was only granted after ten plagues had been inflicted on the land by the hand of M. (iv. 12). There is a remarkable likeness between these plagues and certain natural phenomena that occur in the country. Travellers tell us that the water of the Nile sometimes acquires a red colour and an offensive smell; that after its overflowing frogs often cover the fields in vast numbers; that gnats and great stinging flies breed in swarms in the deposited mud, and grasshoppers in countless numbers destroy the fields; that sometimes great damage is done by a hail-storm; and that there is a wind in the spring which sometimes raises such a quantity of fine sand from the

desert into the air that there is continuous darkness for some days. In the last of the plagues there is reflected, as it were, the conflict between the religions of the two nations. According to the religion of the Hebrews the first-born of man and beast belonged to Jehovah, and had either to be redeemed or offered to him. This notion of sacrifice was foreign to the Egyptian religion, and in the plague it was expressed that the unredeemed first-born of the Egyptians had to die.

When the people were at last permitted to depart (see EXODUS), M. led them out into the desert, across the Red Sea, and on to the peninsula of Sinai, where he received from the hand and mouth of God on the mountain, and gave to the people, a system of moral, political, and ceremonial law. Leaving Sinai he led them to the borders of Canaan, and then acted as their ruler and judge during the thirty-eight years for which they were doomed to wander in the desert. He himself was not permitted to enter Canaan with the rest, because he had rebelled against Jehovah (Num. xx. 12, xxvii. 14; Deut. xxxii. 51; *cf.* Ps. cvi. 33); so he died and was buried on the east of the Jordan, 'in the land of Moab,' at the age of one hundred and twenty (Deut. xxxiv. 5-7). Thus far the Bible narrative regarding the bare incidents of his life; but the chief interest and importance attach to the consideration of the part he played as a prophet and religious reformer. He regarded himself as a mere instrument in the hand of Jehovah for the deliverance of his brethren. This may have been quite consistent with his own consciousness, but yet it is not sufficient to explain his history; his own character and training must also be taken into account, as in the case of all other reformers. The great peculiarity of the position of M. was, that being a Hebrew he was brought up at the Egyptian court, where he must have become well acquainted with the political, social, and religious life of the Egyptians. The Hebrews at the time had fallen into Polytheism (*cf.* Josh. xxiv. 14; Ezek. xx. 5-9, xxiii. 19, 21, 27), but still they continued to adore a Supreme Deity, who was conceived of as a severe, unapproachable being, 'a consuming fire' (Gen. xvii. 1, Exod. vi. 3; *El Shaddai*, 'God Almighty,' the terrible, destructive One, Deut. iv. 24). Now for M., pondering among the solitudes of Sinai, with the misery of his brethren ever gnawing at his heart, the question was, who could help them if not their God? And would that God support him if he should try to deliver them? In the burning bush, *which was not consumed*, the revelation is made to him that El Shaddai, the terrible, the severe, is also Jehovah, the gracious protector of his people; at the same time an assurance is given to M. that he would protect his servant when he set out to their help. A special feature of the work of M. was that he connected the observance of moral precepts entirely with religion. Morality, according to the Egyptians, was under the oversight of the gods—*e.g.*, Osiris was judge in the lower world; M. transplanted it to a still higher ground, and bound it up inseparably with religion. This, together with the new conception of Jehovah as above all other gods, and therefore to be worshipped alone (Exod. xx. 3), formed an epoch in the religious development of the Hebrews (see JEWS). That part of the law which is distinctively Mosaic is the Decalogue. Much of the mere ritual was undoubtedly derived from Egypt; other portions, *e.g.*, the regulation of slavery, of blood-feud, of clean and unclean food, &c., were similar to those in vogue among the other Semitic tribes; but it is only in the sublime creed of the great lawgiver that we find God recognised as the Creator and Sustainer of the Universe, and as the living Guardian and Ruler of men, to whom they owe perpetual fealty and worship. It is this which gives a perennial freshness to the story of M.'s life, and breathes through the record an inspiration which no criticism can challenge, and which is 'subject neither to eclipse nor wane.' See Stanley's *Jewish Church* (2d ed., Lond. 1877), and *M.* in Smith's *Dict. of the Bible* (1863); Brugsch's *Aus dem Orient* (Berl. 1865); Kuenen's *Religion of Israel* (Lond. 1874-75).

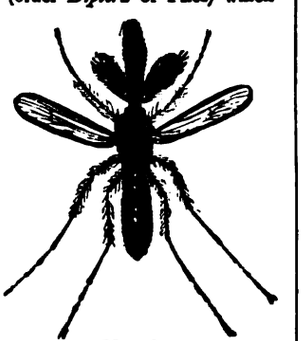
Mosheim, Johann Lorenz von, born at Lübeck, 9th October 1694, graduated at Kiel (1719), became Professor of Theology at Helmstedt (1723), and at Göttingen (1747), where he died, Chancellor of the University, 9th September 1755. A masterly preacher—his *Predigten* (6 vols. Hamb. 1725-39) are fine examples of the rules prescribed by him in *Anweisung erbaulich zu predigen* (Erlang. 1760)—and an earnest and able historian, M. published no less than 161 different works, many of which have been translated into various European languages from the original Latin in which they were generally composed. Of these may be mentioned *Institutiones Historiæ Ecclesiasticæ* (Helms. 1737-41; best Eng. trans. by Dr J. Murdock, 3 vols. New York, 1832), *Institutiones Historiæ Christianæ Majores* (Helms. 1739), *Versuch einer unparteiischen Ketzergeschichte* (2 vols. Helms. 1746-48), and *De Rebus Christianorum ante Constantinum Commentarii* (Helms. 1753). See F. Lucke's *Narratio de J. L. M.* (Gött. 1837).

Moak'wa, a river of European Russia, rises in the government of Smolensk, and has a winding course of 249 miles, first E. through the city of Moscow, then S.E. to the Oka, which it reaches below Kolomna, where, at the spring floods, it often rises 40 feet. Its greatest breadth is 525 feet (above Moscow 213). It is frozen from the beginning of November to the end of March. 1000 barges ply yearly on its waters. Its upper part is connected with the Volga by the M. Canal. Near its right bank, 70 miles W. by S. of Moscow, is Borodino (q. v.).

Mososau'rus, a genus of extinct lizards, of huge size, represented by species obtained from the cretaceous or chalk deposits. *M. Camperi*, from the Maestricht chalk, is a familiar example. *M. princeps* must have attained a length of 70 or 75 feet. The teeth were numerous, long, conical, and curved. They were not set in distinct sockets, but, as in existing lizards, were united by *anchylosis* or a bony union to the jaws. That the M. was of aquatic habits has been inferred from the shortness of the fore limbs and from the apparently flexible nature of the tail, while recent researches seem to show conclusively that the limbs were in the form of swimming-paddles. Allied genera are *Halisaurus*, *Leiodon*, and *Baptosaurus*; and in certain American examples of the group of *Mosasauroid* lizards, bony plates have been recognised.

Mosques (Ital. *moschea*, from Arab. *mesjid*), Mohammedan places of worship, are commonly rectangular buildings, surmounted by a dome (of Byzantine origin), and flanked by minarets (the Christian campaniles). In front, an open court contains a fountain for the prescribed ablutions; within, one sees neither altar nor benches, only a matted floor, with the *mimbar* or pulpit of the *imâm*, and the *kibleh* or niche on the Mecca side, towards which the faithful address their prayers. Lamps, arabesques, and verses of the Koran inscribed in golden letters are the only decorations of a mosque. Yet whole histories are often enshrined in its walls. As heathen temples had been converted into Christian churches, so these were in turn devoted by their Arab conquerors to the worship of Islam. Scrape off the whitewash that covers the walls of St. Sophia, the grandest of all M., and you would come to the icon of a saint or father of the Church. And so to-day in Spain or Hungary one sees churches that once were M., with, it may be, a cross on one minaret, on another a crescent.

Mosqui'to, the Spanish term for 'gnat,' applied to those species of the family *Culicidæ* (order *Diptera* or Flies) which have the mandibles and maxillæ or jaws of lancet-shape, adapted for piercing the skin of the animals they attack. The larvæ are active, and both larvæ and pupæ inhabit water. The genus *Culex*, to which many species of M. belong, has a wide range of distribution, being found in Arctic as well as tropical regions. The sharp bristle-like mouth-parts are plunged into the body of the prey, and the blood is rapidly withdrawn. The irritation of M. bites was believed by Westwood to depend on some fluid ejected by the animals into the tissues; but no poisonous secretions are known to exist. The W. Indian M. (*Culex Mosquito*) resembles the common gnat, and abounds in tropical America. *Anopheles quadrimaculatus* (Say) is a large species of M., distinguished by two spots of light colour on each wing. It bites severely, and is said to hibernate in houses. It certainly appears



Mosquito.

very early in spring. The M. is a dreadful pest in warm climates. Curtains of gauze and various other contrivances are used to protect sleepers from its attack.

Mosquito Coast or **Mosquitia**, an ill-defined territory of Central America, extending along the Caribbean Sea, and lying between Costa Rica, Nicaragua, and Honduras. Its area is estimated at from 15,000 to 36,000 sq. miles, and its pop. at 10,000. The country is a great plain, watered chiefly by the Segovia and Escondido, and yielding rice, maize, manioc, cocoa, ginger, sarsaparilla, &c. In the swampy parts there are dense forests of mahogany and other fine timber and dye-wood trees. The inhabitants, mostly aboriginal Indians, are directly ruled by a chief who calls himself king of Mosquitia. The M. C. was under British protection from 1660 to 1859, when it was ceded to Honduras. The country was handed over by Honduras to Nicaragua in 1860, and is now (1877) claimed by New Granada.

Moss'es (*Musci*) are an important and beautiful class of non-vascular cryptogamic plants, as a rule well marked by their peculiar habit and fruit. They are found in all parts of the world except the driest, ascending to mountain heights much beyond the limit of flowering plants, abounding in temperate perennially humid latitudes, and some among them growing immersed in water. In size they vary from almost microscopic to strong-stemmed species more than a foot high. The leaves are often narrow, of very thin or even membranous texture, and of simple structure. They are never lobed or divided, have a margin entire, or toothed, or sometimes thickened, and are without stomata. The colour is usually green, but in the Bog M. and a few others nearly white. They do not possess true roots, the nutriment being absorbed through root-hairs. Reproductive organs are of two kinds: the *capsule* containing minute spores produced from the fertilised female inflorescence (*archegonia*); and the *antheridea* or male inflorescence. The capsule (*theca* or *sporangium*) is lateral or terminal on the branches (*acrocarpous* or *pleurocarpous*), sessile, or on a fruit stalk (*seta*) of various shapes, indehiscent, or bursting by four valves at the sides, or most commonly by a transversely deciduous cap (*operculum*) covered by a deciduous *calyptra*. When the operculum falls the mouth of the capsule is exposed. The rim is naked or crowned with one to three concentric rows of teeth-like or cilia-like appendages in sets of four or a multiple of that number (*peristome*). These are often brightly coloured and are hydroscopic. *Spores* numerous, escaping under the control of the peristome from the mouth of the capsule, green, yellow, or brown in colour simple or combined, without external covering or markings. The antheridea are oblong or linear stalked membranous sacs, mixed with jointed filaments (*peraphyses*), surrounded by whorls of leaves (*perigonia*), either axillary or terminal on the stems or branches. The sacs have open mouths, and contain a multitude of cells, each with an enclosed spiral filament (*antherozoid*) endowed with motion. The spores on germination produce a green confervoid-like mass of threads on which the bud is developed from which the young plant arises. This individual, if a monœcious species produces bundles of archegonia and antheridea, and the former being fertilised by the latter gives rise to the capsule. If a dicœcious species, the female and male organs are produced on different individuals. In fewer cases the two organs are intermixed in the same inflorescence. Besides the reproduction by spores, M. are also propagated asexually by gemmæ and by stolons.

M. may be divided into *Sphagnaceæ*—Bog M. with two kinds of spores, and *Bryineæ*, True M. with one kind of spore. The latter subdivide into *Andreæaceæ*, where the ripe capsule opens by four longitudinal slits; *Phascaceæ*, in which the roundish capsule ruptures the calyptra laterally without rising it as a lid, and with no operculum; and *Bryaceæ*, in which the capsule is covered by a calyptra, and opens by throwing off an operculum. M. are not of much economic value, excepting that the different species of *Sphagnum* constitute a large portion of peat. The so-called Iceland Moss and Reindeer Moss are Lichens; the Irish Moss is a seaweed.

Mostar', capital of Herzegovina, 35 miles from the Adriatic coast, and 48 S.W. of Bosna-Serai, on the Narenta, which is spanned by a celebrated Roman bridge of a single arch 95 feet long. M. manufactures knives, sword-blades, fine silks, &c., and the vicinity produces excellent wine. Pop. 12,000.

Mo'sul, a town in the vilayet of Bagdad, Asiatic Turkey, on the right bank of the Tigris, opposite the ruins of Nineveh. Formerly the metropolis of the Mesopotamian Christians, and a place that supplied all Europe during the middle ages with fine cotton fabrics, it is now merely a station of the Eastern caravan trade. According to Marco Polo, M. gave its name to 'Muslins.' Pop. about 40,000, of whom some 15,000 are Christians, 1500 Jews, and the rest Mohammedans.

Motacill'a. See WAGTAIL.

Motett' (perhaps from Ital. *moto*, from its lively and varied character), originally a musical composition resembling the *Madrigal* (q. v.), but, later, one written for the Church. It preceded the *anthem* in the English Service.

Moth, the name given to such species of Lepidopterous insects as are nocturnal in habits; butterflies being in contradistinction named 'Diurnal' Lepidoptera (q. v.). This distinction, however, by no means holds good in all cases. Many moths fly about by day, and some are 'crepuscular,' *i.e.*, active during twilight. In the typical moths the antennæ are bristle-like, while they may be comb-like (*pectinate*), or provided with side processes. When in a state of rest the wings are deflexed or horizontal; those of the butterflies being erect in repose. The front margins of the hinder wings are provided with *retinacula* or spines, which are lodged in a hook on the lower surface of the front wings; this arrangement serving to bind the wings together, and to aid in strengthening them in flight. The chrysalides of moths are, as a rule, smooth externally, and are frequently enclosed in cocoons. The crepuscular lepidoptera have tapering antennæ, and the wings are horizontal or only slightly inclined when in a state of repose. Moths are generally more robust than butterflies, and their colours are less brilliant. The chest or thorax is usually shorter. Among the more notable species are the Silk-M. or *Bombyx*, the larvæ or caterpillars of which furnish silk; the Sphinx M., Death's-head M., Goat M., Leopard M., Plume M., &c.

Mother Carey's Chicken, the sailor's name for the Stormy Petrel (*Procellaria* or *Thalassidroma pelagica*), a natatorial or swimming bird, belonging to the family *Procellaridæ*. Its average length is 6 inches; its colour a sooty black, the edges of the tail-coverts being white. The petrel is found in the most stormy weather skipping rather than flying across the waves, keeping itself just above the surface of the sea. It breeds on northern coasts, laying but one egg of a white colour. The flesh is very oily, and it is said to be capable of ejecting an oily fluid from the mouth. 'M. C.'s goose' is the name given to the great black petrel (*P. gigantea*) of the Pacific Ocean.

Mother-of-Pearl is the brilliant internal or nacreous layer of certain shells belonging or closely allied to the oyster family. The principal varieties of the M.-of-P. shells of commerce are brought from Manilla, Singapore, Western Australia, and Sandwich Islands. The *Meleagrina margaritifera* is, from its size and thickness, the M.-of-P. shell *par excellence*. It is used for inlaying, and is formed into knife-handles, studs, buttons, boxes, and many other ornamental and useful articles. Several other shells displaying iridescent hues, as species of *Haliotis* and *Turbo*, have similar applications. The beautiful play of colours exhibited by M.-of-P. arises from a series of superficial microscopic furrows which decompose the light.

Moth'erwell, a town of Scotland, Lanarkshire, in the parishes of Hamilton and Dalziel, 15 miles E. by S. of Glasgow, and a junction on the main line of the Caledonian Railway. It is named from a celebrated 'Well of Our Lady,' and in its vicinity are extensive iron works and collieries. The West of Scotland Malleable Iron Work Company, the largest in Scotland, have their works here. A magnificent water supply, brought from 10 miles distant, was inaugurated on the 25th October 1877. Pop. (1871) 5852.

Motherwell, William, a Scottish poet and journalist, was born in Glasgow, 13th October 1797. From 1818 to 1830 he held the office of Sheriff-clerk Depute of Renfrewshire at Paisley, became editor of the *Paisley Advertiser* in 1828, and of the *Glasgow Courier* in 1830, both Tory newspapers, and threw himself into the keen political battles of the day with a passion which shortened his life. He died of apoplexy, November 1, 1835

M.'s first volume was the *Harp of Renfrewshire* (1819), containing sketches of local poets during three centuries. It was followed in 1827 by his *Minstrelsy Ancient and Modern* (new ed. 1874), a work of permanent value, and in 1832, *Narrative and Lyrical Poems.* Some of these deserve to be immortal. In fiery force of heathen pride, not unrelieved by tenderness, the *Sword Chaunt of Thorstein Raudi* has never been surpassed; while *Jeanie Morrison* is perhaps the sweetest reminiscence of love and youth in the Scottish dialect. An edition of M.'s poems with a memoir appeared at London in 1849, another in 1858, and a third at Glasgow in 1866.

Moth'erwort, so called, says Parkinson, from its being 'of wonderful helpe to women in the risings of the *mother*,' is the name still retained for *Leonurus cardiaca*, one of a small genus of *Labiatæ*. The plant is a native of Europe and portion of Asia, and is occasionally met with by hedge-sides and in waste places in Britain—generally near villages, and only existing as a remnant of old cultivation. The name M. has also been applied to *Artemisia vulgaris;* it, too, was formerly used as a herb in uterine diseases—a *matrumherba.*

Mo'tion, Laws of, as enunciated by Newton, are necessary and sufficient for the establishing of the whole of dynamical science. They are three in number, and must be regarded as being deductions from observation and experiment.

Law I.—*Every body continues in its state of rest or of uniform motion in a straight line, except in so far as it may be compelled by impressed forces to alter that state.* In the words 'uniform motion' we are at once introduced to the fundamental conceptions of space and time, and are furnished with a method for measuring such. See SPACE and TIME. Further, this law, in telling the conditions under which there is no external force, supplies a criterion by which we are able to judge of the presence of a force. Any acceleration which a moving body suffers, whether that acceleration be change of direction or change of rate of motion or change of both, indicates the existence of an external force; and the relation of this force to the change of motion which it produces is given with rigorous exactness in

Law II.—*Change of motion is proportional to the impressed force, and takes place in the direction of the straight line in which the force acts.* By quantity of motion is meant what we now call *momentum*, which is proportional to the mass and velocity conjointly; and by impressed force is meant *impulse*, which takes account not only of the intensity of the force, but also of the time during which the force acts. The impulse of a force is measured by the product of the time of action into its intensity if it is constant, or its mean intensity if it is variable. The second law may now be stated thus: The change of momentum of a body is numerically equal to the impulse which produces it, and is in the same direction. Since motion and rest are merely relative terms, we may for convenience suppose the body to be originally at rest, and measure the force by the momentum it produces in unit time. If we act upon different masses with the same force, the momenta produced must be the same; and hence the velocity generated is inversely as the mass. In this way we compare *masses.* If we act upon the same mass with different forces, the forces are equal to the momenta produced, *i.e.*, are directly proportional to the velocities generated. In this way we compare *forces.* Further, the second law evidently implies that if a number of forces act upon a given body, each produces exactly the same effect which it would have done had the others not been present. Consequently forces are to be compounded and resolved exactly as velocities, accelerations, momenta, and indeed all vector or directed quantities are. See VECTOR. These two laws supply us with exact methods for measuring the fundamental units of time, space, and mass, and the first direct derivatives of these, velocity, force, momentum, acceleration, &c. By them we can investigate the motion of a single particle under the action of given forces; but when there are mutual actions between two or more bodies, such as attraction, repulsion, pressure, &c., more is required for a complete investigation, and this is supplied by

Law III.—*To every action there is always an equal and opposite reaction; or, the mutual actions of any two bodies are always equal and oppositely directed.* The mutual action between two bodies, when viewed as a whole, is called *stress;* and action and reaction are simply opposite aspects of the same stress. Take, for instance, a mass resting on a horizontal plane. The stress is in this case a pressure. If we consider the plane only, the pressure we regard as acting downwards; and if we consider the mass alone the pressure acts upwards. Here we have the action of the mass upon the plane, and the reaction of the plane upon the mass; and these are equal in amount but opposite in direction. In the case of two bodies connected by a stretched string, the stress is of the nature of a tension, and the force acting upon either body is directed towards the other, and is the same in amount whichever body we consider. In cases of attraction and repulsion the same holds. The iron attracts the magnet just as the magnet attracts the iron, the changes in their respective momenta being equal and oppositely directed. In a scholium appended to this law, Newton extends the principle to quite a different order of quantities. The full meaning of this scholium was first noticed by Thomson and Tait, who thus translated it:—*If the action of an agent be measured by the product of its force into its velocity; and if similarly the reaction of the resistance be measured by the velocities of its several parts into their several forces, whether these arise from friction, cohesion, weight, or acceleration: action and reaction, in all combinations of machines, will be equal and opposite.* Here the forces of resistance against acceleration are reckoned as reactions equal and opposite to the actions which produce the acceleration; or the forces producing acceleration form with the reactions against acceleration an equilibrating set of forces. This is the statement of D'Alembert's principle, enunciated by him in 1742, and is thus an evident deduction from Newton's comments on the third law. But further, the product of a force into its velocity, *i. e.*, into the velocity of the point on which it acts, is simply the rate at which an agent works, so that Newton's scholium contains the complete statement of the modern theory of energy. He required only to have known what became of the work *lost* in friction to have been himself led to the discovery and explicit enunciation of the conservation principle. See DYNAMICS, ENERGY, KINETICS.

Motion in Plants. See IRRITABILITY, SPORE, MOVING PLANT.

Motive, the leading theme in a piece of music. A short musical subject.

Mot'ley, John Lothrop, a distinguished American historian and diplomatist, was born at Dorchester, Massachusetts, April 15, 1814, and educated at Harvard University and in Germany. His first literary efforts were in the direction of historical romance, but neither *Morton's Hope* (1839) nor *Merry Mount* (1849) was successful. Meanwhile he had been slowly developing, in certain critical essays, a power of grasping and appreciating historic events; and in 1849 he went to Europe to collect materials for a record of the great struggle of the Dutch against the power of Spain. After five years' industrious research in Holland and Germany, he published in 1856 *The Rise of the Dutch Republic*, a work not only of solid and accurate study, but of enthralling interest, marked by impassioned advocacy of civil and religious liberty, sympathy with an oppressed and struggling people, and enthusiasm for the Reformation. *The History of the United Netherlands* (1860–65) continued the narrative to the time of the Synod of Dort. Mr. Motley was Ambassador at Vienna 1861–67, and at London 1869–70. After a visit to America, he finally took up his residence in England in Nov. 1872. He published in 1874 *The Life and Death of John of Barneveld, with a view of the Primary Causes and Movements of the Thirty Years' War;* and he was engaged on a history of that gigantic conflict when he died at Kingston, Russel House, Dorsetshire, May 29, 1877.

Mot-Mot, a name given to various *Fissirostral* (*Insessores*) birds, from their peculiar cry. They inhabit tropical America and the adjacent regions. The beak is large, and has serrated edges; the tongue is provided with a number of filaments; the tail is wedge-shaped, and the two central feathers are prominent, long, and bare in the shafts for some distance from their tips. The general size is that of a magpie, and the plumage is brilliant. The Brazilian M.-M. (*Momotus Braziliensis*) is green above, the top of the head being black. The under parts are green with a crimson lustre, and there is a black spot on the breast. The M.-M. feeds on insects, and like the swallow, &c. captures its prey on the wing.

Mo'tor Nerve. See NERVE AIR.

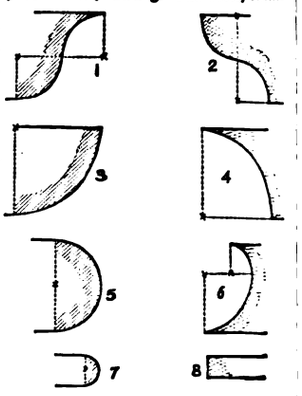
Motril', a town of Spain, province of Granada, 32 miles S. of the city of Granada, and about 3 miles from the Mediterranean shore. The rising ground behind is covered with vineries, and the inhabitants are engaged in agriculture or fishing. Pop. 12,850.

Mott'oes (Ital. *motto*, 'a word,' from Lat. *muttire*), in Heraldry, are words or sentences accompanying a badge or coat of arms, and usually inserted in a scroll. They may be punning, as that of the Holdens, *Teneo quia teneor* ('I hold because I am holden'); *Tost ou tard vienne*, of the house of Vienne; or *A tout venant beau jeu*, of the Sires de Beaujeu: veritable rebuses, as *M qui TM* ('aime qui t'aime') of the Kerkos family in Brittany: war-cries, as the ancient *Dieu et mon droit*, first assumed by Henry VI.: moral or religious sentiments, as *Etiamsi omnes ego non* ('though all, yet not I'); *Per ardua virtus*, &c.; or they may enshrine some historic fact, as the *Grip fast* of the Earls of Rothes, alluding to the rescue from drowning of Queen Margaret by Bartholomew Leslie.

Moufflon, the name usually given to certain species of Sheep (q.v.) of large size, such as the Argali (q.v.) (*Caprovis argali*) of Siberia, the Bighorn or Rocky Mountain sheep of California, and the Aoudad (*Ammotragus Tragelephas*) of N. Africa. The *Caprovis musimon* of Corsica, Sardinia, &c., is also called the M. or 'Musimon.' It attains the size of a small deer, and is brown above and white below. The horns are very large.

Mould, or **Moul'diness**, a name popularly given to the flocculent and thread-like *Fungi* which prey upon provisions, and a variety of other articles of daily use, as also on decomposing organic bodies. Two families of fungi are represented by the common moulds; and we may take as characteristic examples of these the *Mucor mucedo* among the *Physomycetes*, and *Aspergillus glaucus*, or 'blue M.', and *Penicillium crustaceum*, among the *Hyphomycetes*. In the latter the whole fungus, both the concealed part or *mycelium*, and that portion which is exposed to the atmosphere, the *aërial hyphæ*, consist of cells varying only in size and form. The only reproductive bodies are *conidia*—that is, ordinary cells of a spherical form produced at the ends of the aërial hyphæ and detached in succession. They are true spores. In *Mucor* the spores, instead of being naked exposed cells, are produced within special bodies known as *sporangia* or *asci*,—roundish heads borne at the extremity of thread-like stalks, which rise vertically from the hyphæ. The spores of M. have the property of retaining their vitality for a long period when dried, and from their extreme lightness are in this form disseminated with the greatest facility through the air. On reaching a nutrient substratum they germinate. Many of the moulds are capable of sustaining life when immersed in fluids, and Berkeley tells us that from their inherent power of appropriating what is nutritious and rejecting what is hurtful, they are often developed in solutions of poisonous metallic salts, which would be fatal to fungi in general. They are among the most destructive agents in the propagation of disease, and are a fruitful source of cutaneous disorders in man. Their agency in fermentation will be mentioned under article YEAST. Of the three species above mentioned, the first-named is extremely common on fruit, and is not destroyed in the process of preserve-making; the second occurs very commonly on a variety of decaying substances—as lard, bread, cheese; and the third is found on all sorts of decaying bodies. In the case of apples, pears, and other fruit becoming rotten, it is the work of one or more moulds (*e.g.*, *Mucor stolonifer* and *Botrytis cinerea*), that have obtained admission through a bruise or other defect in the skin of the fruit, and feed upon the cell-sap that escapes into the intercellular spaces. There are a number of other common species of moulds; and it may be remarked that the whole of the group form beautiful objects when viewed under the microscope. See MILDEW and VINEGAR PLANT.

Moul'dings are ornamental forms applied to edges or angles of masonry and joiner-work. Eight regular mouldings are recognised in Grecian and Roman architecture, and each individual member occupies the position it is adapted for, where its own graceful form is best displayed, while it contributes to the production of a beautiful and rich design. Grecian M. differ from Roman in being parts of conic sections, as the ellipsis and hyperbola, the Roman forms consisting of arcs of circles, which may be described with compasses as shown in the cut. 1. The *cyma* or *cyma recta* is used as a finishing and covering member. 2. The *cyma reversa*, *ogee*, or *talon*; and 3. The *ovolo*, *echinus*, or *quarter-round*, properly forms a support for other mouldings. 4. The *cavetto* or *hollow* finds its proper position as a crowning moulding. 5. The *torus*, or *half-round*, significant of strength, is found at the tops and bottoms of columns. 6. The *scotia* or *trochilos*, owing to its form, is usually placed in bases, and is effective in separating other members. 7. The *astragal* or *bead* is merely a small torus, and like it is used to bind parts together. 8. The *fillet* is introduced between curved M., and is often used as the crowning member of a cornice. All M. in classical buildings, except the cavetto and scotia, usually bear sculptured enrichments. Gothic M. consist of rounds, deep hollows, and right lines, which, though apparently arranged in hap-hazard fashion, produce a great variety of design.



Mouldings.

Moulins, a town of Central France, department of Allier, on the right bank of the river Allier (here crossed by a fine stone bridge of thirteen arches and 985 feet long), and 213¼ miles S.S.E. of Paris by rail. The houses are almost all built of brick. M. has a fine Gothic cathedral (still unfinished), a museum, a theatre, and a library of 12,000 volumes. A square tower, which was part of the old castle of the Bourbons, is now used as a prison. M. manufactures cutlery, leather, ropes, textiles, and hosiery, and has great trade in agricultural produce. It derives its name from the numerous corn-mills (Fr. '*moulins*') in its neighbourhood. Pop. (1872) 17,836.

Moulmein', a seaport in the district of Amherst, British Burmah, at the mouth of the Salwein, Gyne, and Attaran rivers, about 90 miles E. of Rangoon. Pop. (1872) 53,873. It was founded in 1826, after the first Burmese war, as a military station, but has now only a few native troops. In 1874–75, the exports were valued at £927,639 (chiefly teak and rice); the imports at £909,814 (chiefly piece-goods, stores, and treasure). It has regular steam communication with Rangoon, Calcutta, and Singapore. The rice is mostly consigned to the Straits and to Mauritius.

Moul'ting (from the same root as Fr. *muer*, Lat. *mutare*, 'to change') or **Ec'dysis** (Gr. 'a casting off'), is the throwing off, as a preliminary to the replacement, of external parts and coverings in animals. Thus birds 'moult' or 'cast' their feathers; serpents, newts, &c., shed their external skin or *Epidermis* (q. v.); crustaceans (*e.g.* lobsters and crabs) periodically cast their shells, and remain soft-bodied until the process of lime-deposition completes the new shell; and many insects and other Arthropoda (q. v.) in the course of their development shed their skin, especially in the larval state, many times in succession. In the insects and crustaceans the process of M. is intimately associated with the *growth* of the body. A crab or lobster can increase in size only when the skin is soft and after the shell has been shed, and so completely is the process of M. carried out in these animals, that even the horny inner lining of the stomach is cast off and replaced along with the 'shell.' Birds moult the feathers and acquire a new plumage, either through the production of absolutely new feathers, or by new growths being added to the existing plumage. The *hair* of mammalia is also periodically shed and renewed; and even hard and dense parts, if they only belong to the skin-structures, *e.g.*, the *antlers* of the deer, may be annually shed and reproduced.

Mound (Fr. *monde*, Lat. *mundus*, 'the world'), in Heraldry, a representation of a globe bearing a *cross pattée*, probably adopted by the Emperor Justinian, as a symbol of the subjugation of the world to the Cross.

Moun'tain is the name generally given to a well-marked elevation of the earth's surface. Popularly it is distinguished from *hill* as being applicable to elevations of greater dimensions; geologically, however, no line of distinction can be drawn between the two. Mountains rarely occur singly; they are generally in groups or systems. The most usual form which these groups assume is the chain, typical examples of which are found in the Rocky Mountains, Andes, and Alleghanies of America, the Apennines, Pyrenees, Carpathians, Urals, Caucasus, Himalayas, Tsian-shan, &c., of Europe and Asia, and the Atlas, Kong, and various coast ranges of Africa. There is no case of an extensive M. chain rising abruptly from a plain. It either forms on its one aspect an extended gradually sloping surface, or bounds an elevated plateau or table-land. Thus the Andes of S. America, whose western base is washed by the waves of the Pacific, gradually falls off on the E., forming the watershed of the Orinoco, Amazon, and La Plata. On the other hand, the Himalayas, whose southern slopes feed the tributaries of the Ganges and Indus, look northwards over the fertile plain of Thibet towards the great central plateau of Asia. An attempt to estimate the real breadth of M. chains is therefore as futile as useless. The vertical contour of a chain is exceedingly irregular, rising in various points into *peaks*, which are separated from each other by cols, valleys, or gorges. Frequently a chain consists of several parallel ridges, a configuration which characterises the Rocky Mountains, Andes, and especially the Alleghanies. The most lofty peaks of our globe occur among the Himalayas and the Andes of Peru, and this suggests the only sure generalisation which can be made in reference to the distribution of mountains, namely, that the highest land is found at or near the equator. The Alps of Europe, it is true, lie without the torrid zone, but there are very few cases of lofty summits in higher latitudes than the temperate zone. Siberia, Russia, and Labrador are singularly devoid of M. chains; and though the surface of Greenland appears to be much more diversified, the elevations are comparatively moderate. The influence which mountains exert upon climate is well-marked all over the world. They form the great watersheds, and determine the course of streams and rivers, thus indirectly influencing the internal commerce of a country. If sufficiently high they act also as a 'shed' to the clouds; so that that side which looks in the direction from which the moist winds come has in certain circumstances a totally different climate from localities distant only a few miles, but which are exposed to dry winds. Similarly, mountains in many cases afford protection from injurious winds. To this cause chiefly is due the suitability of many of the southern European towns as resorts for invalids during winter.

The formation of mountains is the result of hypogene or subterranean action; or, as in Scandinavia and the W. Highlands of Scotland, of surface denudation. By some the name M. is restricted to the former class; and the tendency of such ranges to form chains indicates that the primary systems at least have been the result of the wrinkling of the earth's surface due to cooling and contraction. According to Elie de Beaumont, they tend to form parts of great circles—these being the lines of least resistance, and therefore the lines along which rupture would take place. In volcanic action and earthquakes, we have the production of mountains on a small scale; and no doubt the same agencies were at work in past ages, and produced the present configuration. It is possible in many cases by a study of the distortion of contiguous strata, to fix the geological age of our mountains—or at least the age of the last great upheaval, for there is no reason to suppose that mountains have been the result of one intense eruption; opinion rather inclines to regard them as the final result of a succession of upheavals, which need not have been more violent than the present gradual rise of Scandinavia. Many ranges date probably from Miocene times, when volcanic action seems to have attained its maximum. Where the crust has once yielded to a ruptive stress there it will probably yield again; and hence the reason why earthquakes occur in certain definite localities, and are hardly known in others. The dynamics of M. formation are still little understood. The researches of Hopkins and Thomson, however, into the phenomena of stresses and tensions have explained some of the most fundamental characteristics of M. configuration.

Mountain Ash. See ROWAN.

Mountain or Carboniferous Limestone. See LIMESTONE.

Mountmell'ick (Irish Gael. *Montiaghmeelick*, 'the boggy ground'), a market-town of Ireland, in Queen's County, on the Owenass, a tributary of the Barrow, 6 miles S.W. of Portarlington. A Quaker colony, it has thriving manufactures of tweeds and friezes, besides breweries, tanneries, potteries, &c. Pop. (1871) 3316.

Mourne Mountains, a range in Ireland, county Down, separating the basins of the Newry and Lagan, and rising in Slieve Donard to a height of 2796 feet, and in Mount Eagle to 2084 feet. They are named from a certain *Mughdhorn* (Mourne), some of whose descendants settled here in the 12th c., but the original name of the mountains was *Beanna-Boirche* ('Boirche's Peaks').

Mouse (*Mus*), a genus of *Rodentia* (q. v.) included in the family *Muridæ* (q. v.) which also comprises the Rat (q. v.), Vole (q. v.), &c. It is represented by the Common M. (*M. musculus*), which is too well known to need any detailed description. This little creature is most prolific, and also presents variations of marked kind in colour and size. White mice are not uncommon, and piebald varieties are frequently produced. The usual colour is a greyish-brown, which in summer becomes darker. The harvest M. (*Mus messorius* or *Micromys minutus*) is also a well-known form, attaining a length of 5 inches, inclusive of the tail. Its colour is reddish-brown above and white below. The nest is constructed in a most ingenious manner on the stalks of grasses, and is formed of dried grass and fragments of like material. The ears of the harvest M. are shorter than those of the common M., and its head is of narrower proportions. The Barbary M. (*Mus Barbarus* or *Golunda Barbara*) is of a brown colour, and is marked by longitudinal stripes of orange yellow above, the under parts being white. The field M. is now regarded as belonging to a different genus from the ordinary M. The length of the short-tailed field M. is 5 inches, including the tail, and the colour is brown above and grey below. It is sometimes named the field vole, and appears occasionally (as in the S. of Scotland in 1876) in immense hordes, which commit great havoc among the crops. The long-tailed field M. is another species, also known as the bank vole or campagnol. The white-footed M. (*M. leucopus*) of America, and the *M. pumulus* of S. Europe are species allied to the common M.

Mouse-Ear Chickweed is the name given to a genus of *Caryophyllaceæ*, botanically called *Cerastium*, from some of the commonest species having a superficial resemblance to chickweed, but possessing soft oval leaves. There are in all about forty species, inhabitants of all temperate and cold regions. In Britain four are common, another (*C. arvense*) is not rare, and other three are confined to Alpine districts of the kingdom, one of them (*C. trigynum*) being limited to the borders of the Alpine and sub-Alpine rills and springs of the Scotch Highlands.

Mouth, the anterior aperture of the alimentary canal in animals. It may be surrounded by tentacles (as in Zoophytes and Polyzoa) and may have horny jaws or teeth (leech, cuttle-fishes, &c.), while in insects, crustaceans, &c., the jaws are modified limbs. The jaws of vertebrate animals, on the other hand, are invariably parts of the head. The M. in higher animals is bounded by the *lips*, and is usually provided with teeth. The hinder part of the M. is called the pharynx. The openings or apertures of the M. include the external opening, the apertures of the hinder nostrils, the œsophageal opening, or that of the gullet, and the openings of the Eustachian tubes. See EAR.

Malformations of the M. The most common of all the congenital deformities is *harelip*, which may be simple, double, or complicated. In *simple* harelip there is a cleft through the upper lip, on one side of the middle line, but no other deformity. The cleft is usually on the left side, and it generally extends from the nostril to the free edge of the lip. In *double* harelip there is a median tubercle, bounded on either side by clefts, one of which commonly reaches into the nostril, while the other does not. The incisive bone, which corresponds to the median tubercle, has generally four teeth, but their number varies. Harelip, either single or double, may be complicated with fissure of the palate, and in cases of double harelip the incisive bone often projects and appears to hang on to the end of the nose. Fissured palate is a malformation which often co-exists with hare-

lip, but also very often without it. There may be simple fissure of the soft palate, fissure of the soft and part of the hard palate, and complicated cleft, which generally extends through the whole mouth, from the red edge of the lip in front to the uvula behind. These deformities may all be either entirely removed or much improved by surgical operations, and as a general rule the operation should be performed during infancy or childhood.

Diseases of the M. are similar to those which occur in other parts of the body covered with mucous membrane, modified, however, by peculiarities of situation and exposure. The most common are the various forms of *Stomatitis* (q. v.), viz., simple erythema, diphtheritic exudation or eruption, and inflammation of the follicles of the mucous membrane. Ulcerative and gangrenous inflammation, usually called *Noma* in the returns of the Registrar-General, is described under *Cancrum Oris* (q. v.). The tongue is liable to acute inflammation, or Glossitis (q. v.), and to various forms of ulceration, as simple ulcers, mercurial ulcers, syphilitic ulcers, and other syphilitic lesions; and it may also be the seat of tumours and cancer. Inflammation of the tonsils, or *Tonsillitis* (q. v.) is a very common affection, and may exist in different degrees of intensity, as *angina mitior*, and *angina gravior*. See articles APHTHÆ; GUMS, DISEASES OF; THROAT, DISEASES OF; and TONGUE, DISEASES OF.

Move'able, a term of Scotch law equivalent to *Personal* in the law of England. See HERITABLE AND MOVEABLE; HEIR.

Move'ment, a continuous number of musical ideas forming a connected whole. A sonata or symphony is usually divided into several movements, which may take the form either of 'Movements of Development,' or 'Movements of Episode.'

Moving Plant (*Desmodium gyrans*), a leguminous plant, a native of the E. Indies, has received the above name from the constant motion of its leaflets. The leaves commonly consist of three leaflets, and the two small lateral ones are continuously on the move, rising to meet each other, and then retreating in a series of jerks. In a large plant the appearance is most curious, and has been compared to the working of a number of railway telegraph signals—hence the name 'telegraph plant' sometimes applied. The process goes on in a greater or less degree both during day and night, but is most vigorous in warm moist weather. The larger terminal leaflet also very gradually oscillates from the one side to the other, and through a horizontal to a depressed position. These movements (of which *D. gyroides* and *D. vespertilionis* also partake) have been referred to various causes; the determination still remains *sub judice*. It is not influenced by mechanical irritation as in the sensitive plant. The M. P. is often grown in hothouses, as are also other handsome species of the genus. Altogether it numbers about 140 species, chiefly Indian and tropical, African and American.

Mow (*Mau*), the principal town in the district of Jhansi, N.W. Provinces, British India, 205 miles W. of Allahabad. Pop. (1872) 16,428. It is a well-built town with many temples, and conducts an extensive trade. Exports, £140,000; imports, £110,000. The staple manufacture is coarse and fine cotton cloths, both white and dyed, which are sent to all parts of India. It is to be carefully distinguished from Mhow (q. v.).

Mox'a is a peculiar form of counter-irritation, introduced into Europe by the Portuguese, who acquired it from the East. As practised by the Chinese, a small cone is formed of the downy covering of the leaves of *Artemisia Moxa*, or of the pith of such plants as the common sunflower, or of linen steeped in nitre. The cone is placed over the affected part, and set fire to. In this country issues were established by means of the M. as follows:—A piece of lighted German tinder was placed on a frame, and the flame directed on to the skin by means of a blow-pipe. The same end may be attained by means of the actual cautery, which is now occasionally used in certain forms of neuralgia, and in chronic diseases of the joints.

Mozambique', a region on the S.E. coast of Africa, nominally belonging to Portugal, whose authority, however, is practically confined to a few settlements. The coast-line of M. extends from Cape Delgado in 10°41′ S. lat. to Delagoa Bay in 26°30′ S. lat., a distance of 1200 miles. The inland boundary is undefined, but the area of the province is officially estimated at about 400,000 sq. miles, and the pop. at 300,000. Portuguese rule extends 400 miles up the Zambeze to the confluence of the Loangwa, and up the Shire for 130 miles, but elsewhere it ceases within 100 miles of the coast. The Limpopo, the only other considerable river that flows to the sea through M., is only navigable for 60 miles. M. is divided into two nearly equal parts by the river Zambeze, and the southern portion is known by the name of Sofala. The climate of M. is very hot and humid, and consequently unhealthy. The soil is rich, and under an efficient government the country is capable of producing large quantities of rice, coffee, cotton, sugar, and tobacco. It also possesses large but undeveloped resources in the shape of wax, gums, spices, and valuable woods. Ivory to the value of £50,346 was exported from the port of M. in 1875. Coal is found near the Zambeze, as well as iron of superior quality. Gold and silver are likewise to be obtained, and the deposits of both were once extensively worked. The principal ports are M., Delagoa Bay, Ibo, Quillimaine, Inhambane, and Lourenço Marques, whose aggregate imports and exports in 1875 amounted to £174,282 and £202,412 respectively. Trade is carried on chiefly with India and Marseille, but is paralysed by the existence of slavery outside of the circle of Portuguese authority, and by the inertness of the government. Delagoa Bay, the only first-class harbour between Natal and Zanzibar, is the nearest place of export for the produce of the Transvaal gold-diggings. Myack Island, the last of the low-lying cluster that fringes Delagoa Bay, has in recent years proved an excellent sanitarium for fever-stricken Europeans.—**M.**, the capital, is situated on an inshore coral island, 3 miles from the mainland. It possesses a good harbour, is fortified, and contains an arsenal which was completed in 1876. In 1875, 224 vessels of an aggregate tonnage of 32,000 tons, entered the port of M. Pop. 8522.

Mozambique Channel divides Madagascar from Africa. It has a length of about 1000 miles with an average breadth of 450 miles. The Comoro Islands (q. v.) are in the M. C., near its northern extremity.

Mozarab'ic Lit'urgy (Ar. *mostarab*, 'one who has adopted the Arab mode of life,' applied to Christians and Jews in Africa and Spain who did so to avoid persecution), is the most perfect extant form of the ancient Gallican and still older Ephesine Liturgy (see LITURGY). Its early history is unknown, but the groundwork is of the highest antiquity. It was suppressed in Arragon in 1060, and in Navarre, Castile, and Leon in 1074 that the Roman Use might be established; but revived in the beginning of the 16th c. by Cardinal Ximenes, who endowed a chantry at Toledo for its peculiar use, where it has been preserved to the present time. Blunt's *Dict. of Doct. and Hist. Theol.* (1872).

Mozart', Wolfgang Amadeus, one of the greatest of musicians, was born at Salzburg, in Austria, January 27, 1756. He could play the harpsichord well at four years of age and composed before he was six. His father, a musician, guided his efforts, and from 1762 to 1765 exhibited his precocious talents as performer and composer to the courts and wealthy circles of many European cities, including Vienna, Paris, and London. Four *sonatas* were M.'s first published work (Par. 1764). In 1768 he was made Concert-meister by the Archbishop of Salzburg, but received no salary till 1772. His visit to Italy (1769–71) was a succession of triumphs in Milan, Bologna, Naples, and Rome; among the Italian operas written there *Mitridate* (Milan, December 1770), the work of a boy of fourteen, had twenty successive representations. After some years' activity spent in composition at Salzburg, he left that town (September 1777) to seek a wider field of activity; but, failing in various places to obtain anything but empty applause, he returned to Salzburg as cathedral organist (January 1779). From March 1781 till his death, December 5, 1791, he lived at Vienna, seldom free from the anxieties of poverty. He was made 'chamber musician' in 1787, and in 1790 had a pension of 1000 florins granted him by some musical noblemen. Among M.'s works we may name the operas *Idomeneo* (1781); *Le Nozze di Figaro* (1786); *Il Don Giovanni* (first performed October 29, 1787, at Prague); *Cosi fan Tutte* (1790); *Die Zauberflöte* ('magic flute,' 1791); and *La Clemenza di Tito*; the great series of *Symphonies*; the string quartetts, pianoforte sonatas, and other chamber music; the concertos for piano and orchestra, increasingly associated of late years; and the church compositions, including the *Masses* and the *Requiem*. He wrote in all 800 separate works.

including 16 operas and 33 symphonies. M. not only possessed a rich, triumphant, and (musically speaking) universal genius, but profound learning and untiring industry. As an instrumental composer he has been surpassed only by Beethoven, while in opera he has no equal. He was of a generous and lovable disposition. There are lives of M. in German by Niemelschek (1798), Nissen (1828), Otto Jahn (4 vols. Leips. 1856-59; new ed. 2 vols. 1869), and Nohl (2d ed. 1870; Eng. trans. by Lady Wallace, 2 vols. 1877). In English there are Holmes's *Life of M.* (1845); and Lady Wallace's translation of *M.'s Letters* (1865).

Mozuff'erpore' (*Muzaffarpur* = town of Muzaffar), the chief town of the district of the same name in Bengal, British India, on the little Gunduck river, 50 miles N.E. of Patna. Pop. (1872) 38,223. It is the home of the Behar Scientific Society, an association of Mohammedans.—The *district* of M., which up to 1875 constituted the western portion of the old district of Tirhut, has an area of 2969 sq. miles; pop. (1872) 2,188,382. It is highly cultivated, the principal crops being rice, barley, pulses, indigo, and tobacco. Saltpetre is also largely produced. The other towns are Hajipur, Sitamarhee, and Lalgunge. In the year 1876-77 the exports were valued at £800,000, chiefly indigo, tobacco, saltpetre, oil seeds, and hides; the imports at £680,000, chiefly piece-goods, food grains, salt, cattle, and indigo seed. There is considerable traffic with Nepaul.

Mozuff'urnugg'ur (*Muzaffarnágar* = city of Muzaffar), the chief town of the district of the same name, in the N.W. Provinces, British India, 984 miles N.W. of Calcutta. Pop. (1872) 10,793. It was founded about 1633, and is closely built. It is now a railway station. Malarious fever is said to have been caused by the proximity of the canal.—The *district* of M., which lies in the *doab* between the Ganges and Jumna rivers N. of Meerut, has an area of 1659 sq. miles; pop. (1872) 690,107. It is also watered by the Hindun, and by the Ganges and E. Jumna Canals. Both the fertility and health of the country have suffered from an excessive water supply. The crops are wheat and barley, rice, sugar-cane, and millets; about 80,000 tons of food grains are annually exported. The towns, besides M. itself, are Kairana, Shamli, and Jelalabad. During the Mutiny of 1857 there were some murders and much plundering.

Mtsensk', a town in Russia, government of Orel, on the Zusha, 78 miles S.W. of Tula by rail, has thirteen churches, and important trade in brandy and agricultural produce. Pop. (1870) 14,159.

Mualitch, a town of Asiatic Turkey, in the vilayet of Brussa, 16 miles S. of the Sea of Marmora, and 42 W. of the town of Brussa. It has considerable trade with Constantinople in wool, silk, and fruit. Pop. about 16,000.

Mu'cilage (from Lat. *mucus*, 'slime') is a vegetable exudation allied to gum, but which mixed with water swells up and softens without dissolving. The term is also applied in pharmacy, &c., to any thick aqueous solution of gummy matter. The so-called gum-tragacanth is an example of a mucilaginous substance. It, in the form of M., is used in medicine as a demulcent for making pills to a proper consistency and for suspending heavy powders in liquids.

Muck'ers (Prov. Ger. 'hypocrites'), a mystic sect founded at Königsberg in the early part of the present century by Ebel and Diestel, two German pastors who had adopted the theosophistical views of Johann Heinrich Schönherr (born at Memel, 1771; died at Königsberg, 1826). Charges of immorality preferred against the members of this sect—many of them persons of wealth and station—led to a process (1835), which terminated (1842) in the deposition of both ministers, and in the imprisonment of Diestel. How far these accusations were based on fact has been warmly contested, Graf Kanitz in his *Aufklärung über den Religionsprocess* (Basel, 1862) maintaining that the judges were biassed and unfair; while Hepworth Dixon (*Spiritual Wives*, 1868) sees in the M. the German counterpart of the English Agapemone, and the American Perfectionists.

Mu'cous Mem'brane and **Mu'cus.** M. M. is the name given to the delicate membrane which lines the interior of the passages of the bodies of higher animals. Like serous membrane, it consists of three chief parts—(1) a primary membrane of structureless nature, often named the basement membrane; (2) a layer of secreting cells; and (3) a network capillary of blood-vessels. The latter furnish the blood from which the cells secrete the mucus or special product of M. M. This variety of membrane is soft and vascular, and is usually attached to other structures and tissues. That covering the tongue is attached to muscles; that lining the intestine to a lower or submucous layer, which in turn rests on the intestinal muscular fibres; and that of the tympanum or 'drum' of the ear to *Periosteum* (q. v.). The epithelial cells of M. M. present considerable variations in form and structure, and the basement-membrane on which the cells rest is structureless and transparent. The entire digestive system is lined by M. M., which is modified in certain regions to form granular or secreting structures. Beginning with the mouth, we find this membrane lining that cavity, and continued downwards into the gullet and stomach. Thence it proceeds along the intestine to the anus. It is also continued from the digestive tract into such openings as the ducts of the liver, sweetbread, and gall-bladder. The respiratory or breathing organs are similarly lined with M. M. The cavity of the nostrils is lined by a specially modified M. M., known as the Schneiderian membrane, in which the olfactory nerves ramify. The eyelids and conjunctiva are provided with this structure, and also the lachrymal sac and canal (see EYE). It is found investing the windpipe, and extends into the lungs. The internal genital passages are lined with M. M., and the urinary organs have a similar investment. But as is well seen in the gastric glands of the stomach, or in the intestinal glands, the M. M. is convoluted or folded to form glands of various kinds, the secretions of which have most important functions in the economy of the body. Mucus is found in the fluids which come in contact with, or which are secreted by M. M. Thus the saliva of the mouth contains mucus which is secreted by the M. M. lining the mouth. Mucus when microscopically examined is seen to contain a large number of epithelial cells, which have become detached from the surface of the membrane, and which float in a colourless and somewhat viscid fluid. It is distinguished by containing a peculiar substance known as mucin, and differs from albumen in that it does not contain sulphur. The function of mucus is that of lubricating the surfaces on which it occurs, although it probably possesses other functions of a more complicated nature, but which are still undetermined.

Mudâr (the Hindustani and Bengali name for *Calcopsis gigantea*), one of a small genus of Asclepiads, is a branching shrub or small tree, bears ovate leaves about six inches long, and deep rose, somewhat bell-shaped flowers. The inner bark of the young branches furnishes a valuable fibre, equal in strength to hemp, and all parts of the plant abound in an acrid milky juice, that on hardening resembles gutta percha. In a fresh state, it is said to be very efficient in cutaneous diseases, while the powder of the bark of the root is an excellent substitute for ipecacuanha in the treatment of dysentery. In large doses it is a reliable cholagogue, and is also a sedative to the muscular fibres of the intestines. A smaller species (*C. procera*), growing also in India, and ranging to Syria and various parts of Africa, possesses similar qualities. M., in combination with arsenic and black pepper, forms the celebrated 'Asiatic Pills.' The active principle, called *mudarine*, gelatinises on the application of heat, returning to its fluid state when cold.

Mud'fish. See DIPNOI and LEPIDOSIREN.

Mu'die, Robert, was the son of a weaver, and was born in the neighbourhood of Dundee, Scotland, 28th June 1777. After holding the appointment of drawing master in the Inverness Academy and Dundee High School, he removed to London in 1820, and became a reporter on the *Morning Chronicle*. Worn out by a life of incessant literary toil, M. died 29th April 1842. In the course of twenty years he produced more than eighty volumes, only one of which still possesses any vital interest. The *Feathered Tribes of Great Britain* (2 vols. 1833), though desultory and incomplete, ranks as a British classic in natural history.

Mu'die's, the largest circulating library in London, and probably in the world, was established in 1842 by Mr. Charles Edward Mudie, who is still manager and a principal shareholder of the concern, although it passed in 1864 into the hands of a limited liability company. The library is situated in New Oxford Street, near the British Museum, and has a branch in the

City, and another at Manchester. There are various classes of subscriptions. £1, 1s. a year entitles a town member to choose one volume from the entire library, and to exchange it daily; £2, 2s. three volumes in the same way; £3, 3s., six volumes; and every additional guinea, two volumes extra. Country subscribers obtain sets of books at reduced rates. There are lower subscriptions (from 10s. 6d. upwards) for the unreserved portion of the library. Many provincial libraries and institutions obtain their books from M., some paying as much as £500 a year. Several thousand copies of a popular work are frequently purchased for the library. Since its commencement, Mudie's has issued 3,000,000 volumes to its subscribers; the daily exchange of books is about 12,000; and over 500,000 volumes are at present available for circulation. A large staff of officials is employed, and all the binding work is done at the premises in Oxford Street.

Mûd'ki (*Moodkee*), a town in the district of Ferozpore, Punjaub, British India, 26 miles S. of the left bank of the Sutlej, and 65 S.E. from Lahore. It is celebrated for the battle of 18th December 1845, which opened the first Sikh war. Lord Gough, after a fierce struggle, finally drove the Sikhs across the Sutlej.

Muezz'in (from Arab. *uzn*, 'an ear'), a Mohammedan official, partly answering to the mediæval watchman. Bells not being allowed in mosques, the M. summons the Faithful to prayer (*namaz*) five times in the twenty-four hours, his chant by day being termed the *adan*, by night the *ula*. That he may not from his lofty minaret be able to spy into the privacy of the surrounding harems, a blind man is usually chosen for the post.

Muf'ti (Arab. 'expounder'), in Turkey, an interpreter of the Koran. The Grand M. or *Sheik-ul-Islam* ('head of the elect') presides over the Ulema (q. v.), and ranks next to the Grand Vizier, like whom he holds his appointment immediately from the Sultan. Though nominally a spiritual authority, he performs no priestly functions; but war cannot be proclaimed, or peace concluded, without the decree (*fetwa*) of the Grand M. and his Ulema, 'that it is conformable to law.' The title M. is also bestowed on the jurisconsults attached to local and general councils throughout the dominions of the Porte.

Muggleto'nians were a sect which arose in the end of the 17th c., founded by Ludovic Muggleton (1609–97), a tailor in London, and an associate named Reeves. These two professed to be the two witnesses of Rev. xi. 3–6, Reeves representing Moses, and Muggleton Aaron. They affirmed that they had received special revelations from heaven, as well as power to destroy all who opposed them. Some of their other strange notions were that Satan became incarnate in Eve, that it was God the Father who died on the cross, having left Elijah to rule in heaven during his absence on earth, &c. The sect survived till within the last few years. See *The Snake in the Grass* (1698). The last edition of Muggleton's works appeared in 1832 in 3 vols.

Mühl'berg, a town in Prussia, province of Saxony, on the right bank of the Elbe, 83 miles S.E. of Magdeburg, with two churches and a castle, and is famous as the scene (24th April 1547) of the Emperor Karl V.'s victory in the Schmalkaldic War over Johann Friedrich, Elector of Saxony, who was taken prisoner in the battle. Pop. (1875) 3244.

Mühlhau'sen, or **Mülhausen** (Fr. *Mulhouse*), a town of Elsass, in the S.W. of Germany, 30 miles N.N.W. of Basel by rail. The old town, on an island between the Ill and the Rhône and Rhine Canal, is irregular, but the newer parts are regularly built, and contain many fine buildings. The most noteworthy are the Hôtel-de-Ville (1551), the old Reformed Church, and the Synagogue. The Place de la Bourse is an imitation of the Rue de Rivoli at Paris. M. has 17 muslin and cotton, and 11 cloth manufactories, and 15 calico printworks. Morocco leather, silks, locomotives, and machinery are manufactured, and wool and cotton spinning, bleaching, and dyeing are actively carried on. Pop. (1875) 58,513 (with the suburb Dornach, 62,627). M. was made a free city of the Empire by Rudolf of Hapsburg in 1273, and was only incorporated with France as late as 1798. With the rest of Elsass it reverted to Germany in 1871.—**M. in Thüringen**, a town in Prussia, province of Saxony, on the Unstrut, 23 miles N.N.W. of Gotha by rail. It is a very old town, with a fine Gothic Marienkirche and thirteen other churches. The trade in corn and wool is considerable, and there are extensive industries in spinning and weaving wool. There are 50 tanneries, 14 glue factories, and 14 dyeworks. Pop. (1875) 20,938.

Mühl'heim am Rhein, a town of Rhenish Prussia, on the right bank of the Rhine, 2¼ miles N.N.E. of Deutz by rail. It actively carries on river-traffic and commission trade, and has considerable manufactures of silks, leather, paper, oil, and flour. Pop. (1875) 17,350.—**M. an der Ruhr**, also in Rhenish Prussia, is 5½ W.N.W. of Essen by rail. It has extensive trade in sandstone and Ruhr coal (the latter amounting to about 5,000,000 tons annually), and important manufactures of iron, zinc, machinery, leather, cotton, paper, and farm implements. Pop. (1875) 15,286.

Muir, John, belongs to an Ayrshire family, traceable as far back as the middle of the 17th c. He was born at Glasgow, in 1810, studied two years at Glasgow University, thence proceeded to the East India College, Haileybury, and in 1828 went out to Bengal as a writer in the East India Company's Civil Service. After filling various offices in the revenue and judicial departments, he retired from service in 1853. In the early period of his Indian career he began to study Sanskrit, and subsequently during his residence in the East composed several religious tracts in Sanskrit verse. Since his return to his native country, M. has published a work which has given him a distinguished place among Sanskrit scholars. It is entitled *Original Sanskrit Texts on the Origin and History of the People of India, their Religion and Institutions, Collected, Translated, and Illustrated* (5 vols. Lond. 1858–70). Each volume takes up a separate subject, and has, so to speak, an independent value. Vol. I. contains the 'Mythical and Legendary Accounts of Caste;' Vol. II. discusses the 'Trans-Himalayan Origin of the Hindus;' Vol. III. is devoted to 'The Vedas: Opinions of Indian Authors on their Origin, Inspiration, and Authority;' Vol. IV. gives a 'Comparison of the Vedic with the later Representations of the principal Indian Deities;' Vol. V. consists of 'Contributions to a Knowledge of the Cosmogony, Mythology, &c., of the Indians in the Vedic Age.' M. is not only a scholar himself, but has signalised himself by his liberal benefactions to the cause of learning. Of these, the most important is the foundation (1862) of a professorship of Sanskrit and Comparative Philology in the University of Edinburgh. But Sanskrit literature is not the limit of M.'s sympathies. He has deeply interested himself in biblical questions. In 1861 he published anonymously a *Brief Examination of the Prevalent Opinions on the Inspiration of the Old and New Testaments*, with an Introduction by the Rev. H. B. Wilson. More recently, he has contributed to introduce into Great Britain a knowledge of the writings of the modern Dutch school of theological science, represented by Kuenen (q. v.), Oort, &c. In 1876 he was appointed one of the commission charged to inquire into the condition of the Scottish universities. M. is a D.C.L. of Oxford, an LL.D. of Edinburgh, a Ph.D. of Bonn, and is a member of various foreign societies.—**Sir William M.**, LL.D., younger brother of the preceding, was born at Glasgow in 1819, educated at the Grammar School of Kilmarnock, at the Universities of Edinburgh and Glasgow, and at the East India Company's College, Haileybury, went out to India in the Bengal Civil Service in 1837, served in the N. W. Provinces in various executive offices, and subsequently as Secretary to Government and Member of the Revenue Board till 1864, when he was appointed Foreign Secretary and member of the Supreme Legislative Council of India. In 1867 he became a member of the Supreme Executive Council, and was made Knight Commander of the Star of India. In 1868 he was appointed Lieutenant-Governor of the N.W. Provinces, an office which he held till 1874, when he was made Financial Minister of India. On retiring from India, he was appointed a member of the Council of India. Besides contributing a variety of articles to the *Calcutta Review*, and publishing a small work entitled *The Testimony of the Corân to the Scriptures of the Old and New Testament* (Agra, 1854; 2d ed. Allahabad, 1861), Sir William M. has written a *Life of Mahomet* (1861; new ed. 1877), a work of great learning and penetration, marked throughout by a singularly just and critical spirit. Mahomet's character is finely and truthfully conceived. The nobility of his earlier, the baseness of his later career are admirably set forth; and if men now clearly perceive the vast difference between the 'Prophet of Mecca' and the 'Prince of Medîna,' it is mainly owing to Sir William M.'s sober and discriminative history.

Muirburn, a term of Scotch law, denoting setting fire to a heath or moor. The statute of 13 Geo. III. c. 54 makes it criminal in Scotland to set fire to any heath or 'muir' between the 11th April and 1st November. The offence is punishable by fine or imprisonment.

Mukden' (Mantchu, 'flourishing'), the Chinese **Shin-Yang,** or **Fung-Tien-Fu** ('rich capital'), is the chief town of Chinese Mantchuria, and has been since 1631 the centre of the government of its three provinces. It lies on a tributary of the Siramuren or Liao-ho, 390 miles N.E. of Peking, is surrounded by a wall 9 miles in circuit, and contains an imperial palace (also surrounded with walls and ramparts) constructed on the pattern of that of Peking, and occupied by members of the imperial family. The trade and industry of M. are considerable. In a fine valley about 70 miles E., and near the palisade which marks the boundary of Corea, is Inden or Hing-king, formerly the family residence of the Mantchu rulers, and at the mouth of the Liao-ho, in the Gulf of Liao-tong, 110 miles S.W., is Newchang (q. v.). Pop. of M. estimated at 200,000.

Mukh'tar, Ghazi Ahmed, Pasha, a Turkish general, was born about 1836. He received command of the main Turkish army operating in Montenegro in 1876, when his campaign was unsuccessful. He was appointed commander at Erzeroum in February 1877, and on the outbreak of the war with Russia obtained the supreme command in Asia. He checked the Russian invasion at Zewin in June 1877, and by an active movement thereafter relieved Kars. On 25th August he won an important victory at Kezil-Tepe. He received the title of Ghazi or Victorious from his grateful Sultan, September 1877. Near the Russian frontier in the beginning of October he withstood a furious onslaught by the Russians, which lasted several days, and cost the assailants (according to M.), 15,000 men; but on the 14th, 15th, and 16th of October, in a succession of fierce battles, M., attacked in front and flank by an overwhelming force of Russians, was disastrously defeated, his positions captured, his army cut in two—one portion surrendering and the other retiring on Erzeroum. The siege of Kars (q. v.) was in consequence vigorously renewed, and on the 18th of November, after a desperate resistance on the part of the Turks, the town was stormed by the Russians, the whole of the garrison not slain in the struggle were made prisoners, and 364 cannon captured.

Mul'berry (*Morus*, from Gr. *moron*, a word of unknown origin, introduced into Greece with the tree), is a genus of milky-juiced trees or shrubs, belonging to the natural order *Moraceæ*, to which it gives name. They are represented in tropical and temperate Asia and America, but are not natives of Europe or Africa. The leaves are large and deciduous, the inconspicuous flowers in unisexual spikes, and a compound fruit is ultimately formed by the aggregation of the numerous female flowers, the calices of which become succulent—technically termed a *sorosis*. The Common or Black M. (*Morus nigra*), the best-known species, is thought to be of Persian origin. The various classical writers from Theophrastus, make frequent mention of it. In England it has been cultivated from the beginning of the 16th c. (perhaps earlier) for its highly aromatic fruit, which is used in dessert, or as a preserve, or for puddings and pies. From it also an agreeable wine and syrup are prepared. The M. is remarkable for its longevity, and for its vitality under adverse circumstances. The leaves are sometimes used for feeding silkworms, but the White M. (*M. alba*) is the species so largely cultivated for this special purpose. A native of China, it is supposed to have been brought into Italy about 450 years ago, where it speedily supplanted the first-named species, and is now cultivated in all countries where silkworm breeding is carried on—the latest successful attempt on a large scale having been made in California: perhaps Australia will follow. In its native country it is believed to have been grown at least 4000 years—before tea, sugar, and cotton were cultivated. The tree is of more rapid growth than *M. nigra*, and the leaves containing a larger proportion of the glutinous milky juice common to the genus, the silk from the worms fed upon them possesses a greater tenacity. Superior varieties of M. can be grafted on the ordinary stock, and of the existing species large numbers have been described under their specific names. The fruit is not sought after, and the tree is too tender for the British climate. The Red M. (*M. rubra*) of N. America is the largest of the genus, attaining a height of 70 feet, and yielding a strong and compact timber. The Paper M. (*Broussonetia papyrifera*), a small tree, is a native of Japan and China. The 'bast' is converted into a very strong paper. It can also be used as a textile fabric, and formerly, under the name of Tapa cloth, formed the chief article of dress of the natives of the S. Pacific Islands.

Mulberry Juice, or **Mori Succus,** the deep purple juice of the ripe fruit of the *Morus nigra*, is used in medicine as a colouring matter for draughts, an agreeable addition to a gargle for sore throat, and as a refreshing drink, slightly laxative, in febrile cases. The only officinal preparation is the *syrup*, which may be given in doses of from 1 to 2 drachms.

Mul'der, Gerardus Johannes, a Dutch chemist, was born at Utrecht, December 27, 1802, studied medicine in the university of his native town, and after taking his doctor's degree in 1825, settled as a physician in Amsterdam. In 1826 he removed to Rotterdam, where he lectured on physics and chemistry, and in 1840 was appointed Professor of Chemistry at Utrecht. Here he discovered Protein (q. v.)—a discovery which has carried his name over all Europe and America. M. is the author of numerous valuable works upon the chemistry of wine (1856; Eng. trans. by Dr. Bence Jones), of beer (1858), &c., and also upon physiological and agricultural chemistry.

Mule (Old Eng. *mul;* Lat. *mulus*, perhaps from the '*mu*'-ing or 'whinnying' sound it makes) is the name specially given to the hybrid animal produced by the union of the ass with the mare; the *hinny* being the product of interbreeding between the female ass and stallion. The general features of the body are those of the horse; but in the head, ears, and tail the M. resembles the ass. It has the docility of the former with the endurance of the latter. Its reputed stubbornness arises most probably from the ill-treatment to which it is usually subjected. In Spain and Italy it is still largely bred. Of old mules were used as beasts of burden and of conveyance in Palestine and elsewhere; and in S. America they form in the present day the chief means of communication, and are also employed to convey goods between civilised and remote districts. Their surefootedness renders them invaluable for traversing mountainous paths. Males are more numerous than females. They appear to be sterile when bred together, but it is certain that when bred either with the horse or ass, they may produce young.

Mull (Gael. *maol*, 'a headland'), the second largest of the Inner Hebrides, separated from Argyleshire by the Sound of M. (2 miles wide), has an extremely irregular coast-line of nearly 300 miles, and is 29 miles long by 28 broad. Estimated area, 237,000 acres; pop. (1871) 5947. The prevailing rocks are basalt, gneiss, granite, and blue syenite, and the surface is mountainous, attaining in Benmore an elevation of 3168 feet. Of several freshwater lakes, the largest, Loch Erisa, is 4 miles long. The crops (oats, barley, flax, and potatoes) only suffice the wants of the inhabitants, but sheep and cattle are exported in considerable numbers. The fisheries employ a great portion of the inhabitants. Tobermory (Gael. 'Well of St. Mary'), the only village of any size, has a small harbour, and a pop. (1871) of 1344. The antiquities of the island are the castles of Aros, Duart, and Moy, and a few cairns and barrows.

Müller, Wilhelm, one of the most charming lyric poets of Germany, was born at Dessau, 7th October 1794, studied philology and history under F. A. Wolf at Berlin (1812), acted as a volunteer in the German War of Liberation (1813), took part in the battles of Lützen, Bautzen, Hainau, and Kulm, and on the conclusion of peace resumed his studies at Berlin, devoting himself especially to the Old German language and literature. In 1817 he visited Italy, and some time after his return was appointed ducal librarian at Dessau, where he died, 1st October 1827. M. had a certain nobility of character and love of comprehensive culture which reappear in his illustrious son; but it is as a poet he will be remembered by his countrymen. The first work that distinctly evinced his poetic power was *Gedichte aus den hinterlassenen Papieren eines reisenden Waldhornisten* (2 vols. 1821–24). His *Lieder der Griechen* (5 parts, 1821–24), simultaneously issued, show still finer work. But he is seen at his best in his *Lyrische Spaziergänge* (1827). They are marked by an inward truth and feeling, a fresh and vivid power of description, a noble ardour for the rights of the people, and a

singular melody of language. A collection of his *Gedichte* was published at Leipsic in two vols. in 1837 (latest edition 1869). Schwab published M.'s *Vermischte Schriften* (5 vols. 1830), with a biographical memoir.—**Friedrich Max M.**, a son of the preceding, was born at Dessau, 6th December 1823, studied Sanskrit at Leipsic under Hermann Brockhaus, and published a translation of the *Hitopadesa* (1844). After attending courses of Bopp and Schelling at Berlin, he proceeded to Paris (1845), where, at Burnouf's suggestion, he commenced to collect materials for an edition of the *Rigveda*. With this object he came to England (1846) to collate the Sanskrit MSS. in the Bodleian and East India House, and in 1847, on the recommendation of Bunsen and Wilson, the East India Company undertook the cost of publishing his work (6 vols. Oxford Clar. Press, 1849–74). Settling at Oxford (1848), Max M. became successively Deputy Taylorian Professor (1850), honorary M.A. and member of Christ Church (1851), Taylorian Professor and full M.A. (1854), a Curator of the Bodleian (1856), and a Fellow of All Souls (1858). A candidate for the Sanskrit professorship (1860), Max M. lost his election through the 'country parsons,' men who cared little for philology, and scented rationalism in a fellow-countryman of Strauss; but raised in 1868 to a newly-founded chair of comparative philology, he refused a call to the University of Strassburg (1872). He is one of the eight foreign members of the French Academy (1869), and has received honours and titles from almost every learned society throughout the world. If not the founder of the science of philology in England, Max M. has done more to popularise its study than any other author. His works, written in faultless English, and abounding in striking familiar illustrations, are only marred by an occasional dogmatism that has involved him in unworthy disputes with Mr. Darwin and Professor Whitney. They include *A Letter to Bunsen on the Classification of the Turanian Languages* (Lond. 1854); *History of Ancient Sanskrit Literature* (Lond. 1859); *Lectures on the Science of Language*, two series, delivered at the Royal Institution in 1860 and 1863 (8th ed. 1875); *Sanskrit Grammar* (Lond. 1866); *Sacred Hymns of the Brahmins* (1869); and various essays, collected in *Chips from a German Workshop* (4 vols. Lond. 1867–75). Max M. is also author of an exquisite novelette, *Deutsche Liebe* (Leips. 1857; Eng. trans. Lond. 1876).

Müller, Johann, a German physiologist, was born at Koblenz, July 14, 1801. He studied medicine at Bonn, where he graduated as doctor in 1823, and where in 1826 he became extraordinary, and in 1830 ordinary professor of physiology. In 1833 he resigned this for the corresponding chair at Berlin, which he held till his death, April 28, 1858. M. was one of the founders of the physico-chemical school of physiology, and was the author of several valuable works, of which the most important are *Handbuch der Physiologie des Menschen* (3d ed. 1837–40), and *Ueber den feinern Bau und die Formen der krankhaften Geschwülste* (1838).

Müller, Johann von, the historian of Switzerland, was born at Schaffhausen, January 3, 1752, entered the University of Göttingen (1760), and in 1772 became Professor of Greek in the Gymnasium of his native town. He removed to Geneva (1774), accepted the chair of Statistics in the Collegium Carolinum at Kassel (1781), and became librarian and aulic councillor to the Elector of Mainz (1786), by whom he was ennobled (1791). In 1792 he entered the service of Austria, to quit it in 1804 for the posts of Councillor of War and Historiographer to the King of Prussia. An interview with Napoleon (November 20, 1806) was followed by a summons to Fontainebleau, and in 1807 M. accepted office under Jerome, the newly established King of Westphalia. He died at Kassel, May 29, 1809. Besides his great work, *Geschichte der Schweizer* (5 vols. 1780–1808; continued by Blozheim and Hotlinger), M. published *Bellum Cimbricum* (Zür. 1772), *Vierundzwanzig Bücher allgemeiner Geschichten* (3 vols. Tüb. 1811), and numerous treatises, contained in his *Sämmtliche Werke* (2d ed. 40 vols. Stuttg. 1831–35). Of four biographies of M., the best are those by Woltmann (Berl. 1810) and Roth (Sulzb. 1811.)

Müller, Karl Otfried, a famous German archæologist, born at Brieg, in Silesia, August 28, 1797, studied at Breslau and Berlin, and in 1817 became Professor of Ancient Languages at the Magdalenum of the former city. Two years later, having accepted a call to the chair of Archæology in the University of Göttingen, he visited the art collections of Dresden (1819), and of France and England (1822), and then settled down to fifteen years of hard and successful labour. The Hanoverian troubles of '37 induced him to obtain leave of absence on a scientific journey, and after a tour through Italy, Sardinia, and the Peloponnesus, he died at Athens, August 1, 1840. M. was a keen and profound critic, though he sometimes shows an over-fondness for arriving at the reason of everything. His writings include *Orchomenos und die Minyer* (Bresl. 1844), *Die Dorier* (2 vols. Bresl. 1824; Eng. trans. by Sir George C. Lewes and Henry Tuffnell), *Die Etrusker* (2 vols. Bresl. 1828), *Handbuch der Archäologie der Kunst* (Bresl. 1830), and *History of the Literature of Ancient Greece* (Lond. 1840), undertaken at the request of the English 'Society for the Diffusion of Useful Knowledge,' and left unfinished at the author's death. Sir George Lewes and Dr. Donaldson translated the work into English. The German version was edited from the author's MS. by his brother Edward (2 vols. Bresl. 1841). See Lücke, *Erinnerungen an O. M.* (Gött. 1841).—**Julius M.**, brother of the preceding, born at Brieg, April 10, 1801, studied at Breslau, Göttingen, and Berlin, and became pastor of Schönbrunn and Rosen in Silesia (1825). He was appointed Professor of Dogmatics and Ethics at Marburg (1835), and at Halle (1839), an office which he still (1877) holds. The author of *Das Christliche Leben* (Bresl. 1826) and *Die Christliche Lehre von der Sünde* (Bresl. 1839; Eng. trans. Edinb. 1836), M. is also known as the founder, with Nitzsch and Neander, of *Die Deutsche Zeitschrift für Christl. Wissenschaft und Leben* (1850).

Mull'et (*Mugil*), a genus of *Teleostean* fishes, belonging to the *Acanthopterous* section of that order, and to the family *Mugilidæ*. It has large scales, two dorsal fins placed widely apart, and small teeth. The most common M. is the grey M. (*Mugil capito*) of the S. coasts of Britain, and which also occurs in other seas of Europe. Its colour is bluish grey above, with a dark spot at the base of each pectoral fin. The grey M. is active and wary, and is highly valued as a food fish. The average length is 15 inches. Other and nearly allied species are the *M. cephalus*, found in the Mediterranean Sea, and the *M. chelo*. The *M. albula* of the N. American coasts resembles the British species. To the genus *Mullus* belong the *Surmullets*, also named mullets. The species of *Mullus* are nearly related to the Perch (q. v.). Two long filaments project from the under jaw, the body is long and compressed, and the upper jaw has no teeth. Of this genus the surmullet (*Mullus surmuletus*), or common red M. of British seas, is a well-known example. It attains a length of 14 inches, is of a bright red colour, and is marked with three yellow lines. The famous M. of the Romans was probably the red M. (*M. barbatus*) of the Mediterranean Sea.

Mull'et, or **Moll'et**, in Heraldry, one of the marks of cadency, a charge supposed by some to have been originally designed to represent the rowel of a spur. It is often pierced at the centre, and has five points, while the *star*, of similar shape, has six. M. is also a term for a fish.

Mullingar', the county town of W. Meath, Ireland, on the Royal Canal, near the river Brosna, and 50 miles W.N.W. of Dublin by rail. It has an Episcopal church (1813), a Roman Catholic, a Wesleyan, and a Presbyterian chapel. It has four large horse and cattle fairs in the year. Pop. (1871) 5103, of whom 4090 are Roman Catholics.



Gothic window, showing Mullion.

Mull'ions (Old Eng. *monyal*, Fr. *meneau*, from Lat. *munio*), upright shafts dividing the lights of windows, screens, &c., were variously moulded, and first became common in Early English.

Mu'lock, Dinah Maria (Mrs. Craik), a popular English novelist, is the daughter of a clergyman, and was born at Stoke-upon-Trent in 1826. Her earlier novels, *The Ogilvies* (1849), *Olive* (1850), *The Head of the Family* (1851), *Agatha's Husband* (1852), &c., led the way to her great success with *John Halifax, Gentleman* (1857), an admirable novel both in concep-

tion and tone. The reputation she had by this time achieved as an earnest and thoughtful writer, and accurate portrayer of middle-class life, has since been well maintained by *Mistress and Maid* (1863), *A Noble Life* (1866), *Hannah* (1871), *The Laurel Bush* (1876), and other novels. She has also written *Fugitive Poems* (1860), *Sermons out of Church* (1875), besides many short tales and sketches, and books for the young. She received a pension in 1864, and married Mr. George Lillie Craik in 1865.

Mulread'y, William, R.A., an artist of great celebrity, was born at Ennis, Ireland, 1786, and became a student of the Royal Academy when fifteen. His first pictures were very ambitious, but he soon selected the smaller canvasses his name is associated with, and painted such subjects as 'The Rattle' (1808), 'The Roadside Inn' (1811), 'Punch' (1813), 'Idle Boys' (1815). On the appearance of the last he was made Associate, and next year he became R.A. M. died at Bayswater, 7th July 1863. One or two of his most finished specimens are 'The Wolf and the Lamb' (1820), 'The Cannon' (1827), 'The Whistonian Controversy' (1844), 'Choosing the Wedding Gown' (1846) 'Blackheath Park' (1852). His collected works were exhibited in 1848. M.'s is a fame more than insular. His drawing was faultless, and he painted with great delicacy of touch, and a luminous splendour of colour, lacking which all the engravings of his works appear feeble.

Multiplepoind'ing, a term of Scotch law, denoting a kind of action which may be brought by the holder of money or effects claimed by different persons, to dispose of the same by judicial authority. Each claimant is cited to appear in court, and there to state his ground of claim.

Multiplica'tion, one of the fundamental rules of algebra and arithmetic, by which is found the number which contains a given number a given number of times. Thus, 3 times 4, or 4 taken 3 times, is 12, and this is obviously the same as 3 taken 4 times. The symbol of M. is ×, so that $3 \times 4 = 12 = 4 \times 3$. 12 is the *product* of 3 and 4. Generally if *a* and *b* are two numbers, $ab = ba$; or, in technical words, M. is said to be *commutative*. If there are several numbers to be multiplied together, it does not therefore signify in what order the M. is made, the resulting product is always the same. Sir W. R. Hamilton, however, has extended the meaning of M. in his calculus of Quaternions (q. v.). He has conceived it as an operation, and except when the quantities are Scalar (q. v.)—which includes all ordinary numbers—there is a material difference as to which quantity is the operator and which the operand. Thus, if A and B are vectors or quaternions, AB is in general different from BA.

Mul'tivalve, the name given to the *Shell* (q. v.) of a single family (*Chitonidæ*—see CHITON) of Gasteropodous Molluscs, from the fact that it consists of eight pieces, disposed in pairs. All other molluscs have either two pieces or valves in the shell, when it is named *bivalve* (oyster, cockle); or one piece, when it is termed *univalve* (whelk, snail).

Mul'ture is, in Scotch law, a quantity of grain, manufactured or in kind, given to the proprietor or tacksman of a mill in return for grinding corn. The M. is payable by every one having his corn ground at the mill; but the tenants and proprietors of some lands are bound to use a particular mill, and the lands so bound are termed the *Thirl* or the *Sucken*, and the tenants or proprietors the *insucken multurers*. Those using the mill without being bound to do so are termed the *outsucken multurers*. See THIRLAGE.

Mumm'y. See EMBALMING.

Mummy Wheat. At one time it was believed that the grains of wheat found in Egyptian graves were capable of growth!—hence the name M. W. Of course, reliable experiments at once showed the fallacy of such an idea. Two varieties have been collected from different tombs, both pertaining to those still cultivated in the country. It was found that the form of the grain had not changed, and the specific weight was also the same. The flour was bitter tasted and bituminous. On being sown in moist soil, the grains became soft, swelled during the first four days, reached their maximum on the seventh, but on the ninth decomposition was complete. No trace of germination was at any time discoverable. Similar negative results occurred with barley.

Mumps is the popular name for an inflammation of the *parotid* gland, probably specific and occasionally contagious. The technical name is *Parotitis*, or *Cynanche Parotidæa*. Inflammation of the parotid, like that of any other gland, may take place as the result of exposure to cold or wet, or in the course of enteric and typhus fever, and one or both sides of the neck may be affected. The swelling, stiffness, and pain may be considerable, but suppuration seldom occurs, unless it be in the lymphatic glands of the neighbourhood. There is, however, a form of the disease which is evidently zymotic and communicable, and which prevails in certain localities rather than others; so that local causes or local hygienic conditions have something to do with its origin. M. is very common in Shetland, and seems to be endemic there. The disease has fourteen days of incubation, which may be extended to three weeks, but seldom longer than twenty-two days. The first symptoms are febrile, associated with pain and uneasiness in the region of the parotid. Beneath one or both ears there is swelling and hardness, which generally extends to the submaxillary glands, the tonsils, and the pharynx, rendering swallowing difficult. During the subsidence of M. the testicles or the mammæ frequently swell; and, in some cases, the gastro-enteric mucous membranes, or the cerebral membranes, become implicated, and death ensues. The disease runs a definite course, and generally terminates favourably.

Münch'hausen, Hieronymus Karl Friedrich, Freiherr von, born in 1720 at Bodenwerder in Hanover, was a cavalry officer in the Russian campaigns against the Turks from 1737 to 1739, after which he lived on his family estate at Bodenwerder till his death in 1795, and became famous for telling highly exaggerated and incredible stories of his adventures and exploits in hunting, war, and travel. In 1785 there was published in London by Rudolf Erich Raspe, who had been a professor at Kassel, a collection of such tales under the title *Baron M.'s Narrative of his Marvellous Travels and Campaigns in Russia*, which in two years went through five editions, and received extensive additions from older works, such as the *Facetiæ* of Bebel (1508) and the *Deliciæ Academicæ* of Lange (1765). In 1787 Burger published at Göttingen a German version, the second edition of which (1788) contains numerous other additions, partly by Lichtenberg. See Ellissen's *Des Freiherrn von M. wunderbare Reisen und Abenteuer* (10th ed. Gött. 1870), and *Aventures du Baron de M.*, illustrated by Doré (Par. 1862).

Mün'den, a town of Prussia, province of Hanover, at the confluence of the Fulda and Werra, 351 feet above the sea, and 17 miles N.E. of Cassel by rail. The Schloss dates from 1566. M. has a considerable commission trade, and manufactures of alum. Pop. (1875) 5616.

Mundi' (*Mandi*), the capital of a native state of the same name in the Punjaub, India, in the Jullundhur Doab, at the confluence of the Sukeit River with the Beas, 220 miles N. of Delhi. The palace is surrounded by excellent fruit and flower gardens. Pop. 7300.—The *state* of M., which lies among the hills, almost enclosed by the district of Kangra, has an area of 1000 sq. miles, and a pop. of 135,000. Its revenue is £36,500, and its tribute to the British, £10,000. M. has salt mines, and iron is found. The ruling family, who are Rajputs, came under British protection after the first Sikh War of 1846, and the state has lately been under British administration.

Mundla (*Mandla*), the chief town of the district of the same name, Central Provinces, India, on the right bank of the river Nerbudda, by which it is almost surrounded, 50 miles S.E. from Jubbulpore and 510 W. of Calcutta. It was the former capital of the Gond kingdom, and possesses ruined fortifications, and many *ghauts* or bathing-places on the river.—The *district* of M., which is very mountainous, has an area of 4719 sq. miles, and a pop. (1872) of 213,018. It forms the stronghold of the aboriginal race called Gond; agriculture and trade are very backward, but the soil in the valleys is extremely fertile. Tigers abound.

Mungo. See SHODDY.

Mungo, Saint. See KENTIGERN, SAINT.

Mungoose, or **Mongoose** (*Herpestes griseus*), a species of Carnivorous quadrupeds, belonging to the family of the Ichneumons (q. v.), and sometimes named the Indian Ichneumon. It

attains the size of a cat, and is of grey colour. Another species, named the banded M. (*Mungus fasciatus*), inhabits Africa. The Indian species is famous as a destroyer of that most deadly of snakes, the Cobra (*Naja tripudians*), and combats between it and the reptile almost invariably result in the death of the latter. Some observers think that the fur of the M. protects it; others that the M. may be bitten, but that, by eating some herb, it counteracts the effects of the poison; while a more likely theory is that the agility of the animal enables it to keep out of harm's way, and that it seizes and despatches the snake before the latter has time to bite.

Mu'nich (Ger. *München*), the capital of Bavaria, and by far the largest city of S. Germany, lies on the left bank of the Isar, in a wide, sterile plain, near the W. base of the Alps, and 1700 feet above the sea. One of the chief art centres of Europe, it is unrivalled among the cities of the empire for the number and splendour of its churches and secular buildings. It is in great part a modern city, its glorious architecture being due to Ludwig I., who expended £1,050,000 in beautifying and extending his capital, the population of which has quadrupled during the present century. Near the heart of the city, and on the Max-Joseph Platz, which is the great centre of traffic, and contains the statue of King Max by Rauch (1825), stands the royal palace, consisting of three parts—the Königsbau, the Festsaalbau, and the Alte Residenz, or old palace. The Königsbau, or modern residence, built by Klense (1826–33) in imitation of the Palazzo Pitti in Florence, is adorned with marble sculptures, and with the famous Nibelungen frescoes by Schnorr; the Banqueting-Hall (1832–42), in Renaissance style, has a fine balcony resting on ten Ionic columns, and encaustic mural designs by Schwanthaler; the Alte Residenz (1600–16) contains many beautiful bronze statues, and is fitted up magnificently in the style of the 17th c. The palace-garden (*Hofgarten*) is girt on two sides with open arcades containing frescoes by Rottmann, Kaulbach, &c. Adjoining the palace are the *Hof-theater* (1825), accommodating 2500 spectators, and the beautiful All Saints' Church (1837), in the Byzantine style. Among the other great churches of M. are the Ludwigskirche (1829–42), with a façade flanked by two towers 234 feet high, and containing the 'Last Judgment,' by Cornelius, 66 feet by 40; the Basilica (1850), the grand resting-place of Ludwig I. (died 1862); the Frauenkirche or cathedral of the Archbishop of M. and Freising, a brick building (1468–88), surmounted by two incomplete towers 357 feet high; the court church of St. Michael (1583), in Romanesque style; and the Mariahilfkirche (1830–39), in the suburb of Au, which has an open tower 290 feet high, and beautiful stained glass windows. Ludwig's Strasse, lined almost continuously with public buildings, runs N. from the palace to the famous Siegesthor, or 'Gate of Victory,' an imitation of the Arch of Constantine at Rome (1840). On this street are the Odeon, for concerts, designed by Klense (1828); opposite the Odeon, the statue of Ludwig I., erected by the 'grateful city of M.' in 1862; the palaces of the Duke of Leuchtenberg and of Duke Max, and the War-Office, all by Klense; the library, in Florentine style, built by Gärtner (1832–42), and containing 800,000 vols. and 22,000 MSS.; and the university (founded at Ingolstadt in 1472, and transferred hither in 1826), which is associated with various medical and other schools, and had in 1876 116 professors and teachers and 1203 students, and a library of 160,000 vols. The Bavarian National Museum, founded by Karl Max II. in 1855, and erected 1858–66, contains magnificent art and industrial collections. The Old Pinakothek (Gr. 'picture repository'), erected in 1826–36, is a splendid gallery of 1400 pictures, including the Boisserée collection of early German works, the grand Rubens collection from Düsseldorf, Rembrandt's scenes from the Passion, and many fine specimens of the Dutch and the Spanish schools. It has also 168,000 engravings, and 9000 drawings by old masters (among which are five by Raphael, ten by Fra Bartolommeo, and sketches by Rembrandt, Dürer, Holbein, &c.), and 1300 Grecian and Etruscan vases. Other art institutions are the New Pinakothek (1846–53), exclusively for modern pictures; the Glyptothek (1805–16), consisting of eleven halls, containing rare ancient sculptures, and two containing modern marbles; the Schwanthaler Museum of Sculpture; the Exhibition (1845) for the annual display of works by M. artists; the Academy, with valuable art and technical collections, and a cabinet of 20,000 Greek and Roman coins; the Stained-Glass Institution, with many fine modern specimens; and the Bronze Foundry, with its extensive collection of models. To the S.W. of the city, near the Karl Gate, stands the Ruhmeshalle ('Hall of Fame'), a grand Doric edifice (1853), within which are the busts of seventy-six renowned Bavarians; and in front of it is the allegorical figure of Bavaria—a female colossus 66 feet high, modelled by Schwanthaler. The English Garden, laid out by Count Rumford, is an extensive park with fine old trees, watered by two arms of the Isar. M. is well endowed with benevolent institutions, and has three gymnasia, four Latin schools, an academy of fine arts, a music conservatory, &c. Among the special industries are bronze-casting, glass-staining, photographing, and the making of scientific instruments. Some fifteen large breweries produce yearly about 15,400,000 gallons of the famous Bavarian beer. There are also manufactures of machinery, cottons, woollens, damasks, paperhangings, pianos, jewellery, porcelain, &c. Pop. (1875), with the suburbs Neuhausen, Schwabing, and Untersendling, 211,812. M. was made a mint and custom town by Heinrich the Lion in 1152. The territory is said to have belonged to the monks of Schäftlarn, whence the name *Forum ad Monachos*, later *München*. The Wittelsbach princes made the town their residence (from 1253), and it was in great part destroyed by fire in 1327. Its fortifications were removed by Karl Theodor (1772–99), and it was captured by the French in 1800. The improvements by which the city has been transformed were begun by Maximilian I. and greatly extended by Ludwig I. and Maximilian II. See Förster's *München* (7th ed. Mun. 1858), Burgholzer's *Geschichte von M.* (2 vols. Mun. 1796, and the works of Hauff (1865), Steub (1863), Nöe (1865), and Berlepsch (1870).

Municipal'ity is, in law, a town or city having certain privileges of self-government. The term also denotes the governing body, or municipal corporation (see CORPORATION). Municipal corporations, with the exception of that of London (see LONDON, LAWS REGARDING), are regulated by 5 and 6 Will. IV. c. 76, by which all previously existing laws, usages, grants, and charters are abolished (see BURGESS). The acts applying to corporations specified in the schedule of the Act in question are extended by 16 and 17 Vict. c. 79 to corporations constituted subsequent to the passing of that Act. The law relating to 'elections and divisions of boroughs into wards' was amended by 22 Vict. c. 35. Under that Act, on petition to her Majesty by two-thirds of the council of any borough, it may be divided into wards, or the number and boundaries of boroughs already so divided may be altered. Notice of petition must be given in the *Gazette*. See ELECTORS, QUALIFICATIONS OF.

Mu'niment House or **Room**, a strong, fire-proof room for the safe keeping of such *muniments* of property as records, charters, seals, and title-deeds.

Mun'jeet (*Rubia cordifolia*) is cultivated exclusively in Asia, especially in India, where it has been used as a dyestuff for a long period, either alone or mixed with other dyes, to produce a variety of red shades. It has been imported into Britain from time to time, but has not been extensively employed, as the colours produced from it are neither so bright nor so fast as those obtained from *R. tinctorium*, which possesses different tinctorial principles.

Munkacs', a town of Hungary, capital of the comitat of Beregh, on the Latorcza, 67 miles N.E. of Debreczin by rail. It has manufactures of cloth, furs, and hosiery; and iron, alum, and rock-crystals ('Hungarian diamonds') are found in the neighbourhood. On an isolated rock (310 feet high) 2 miles E. of the town, stands the strong fortress of M. (1359), now converted into a state prison. Pop. (1869) 8602.

Munnipore' (*Manipur*), a native state on the extreme N.E. frontier of our Indian Empire, situated among the mountains that bound Burmah. Area of the 'M. valley' 650 sq. miles; pop. about 56,000; revenue about £5000. The area occupied by subject hill tribes is estimated at 8000 sq. miles. The exports are india-rubber, ivory, wax, elephants, and timber. As early as 1762 a treaty was made with the Rajah against the Burmese, a political agent was appointed in 1835, whose duties have chiefly to do with freedom of trade and intercourse with the neighbouring wild tribes.

Munro, the name of two distinguished Indian officers.—(1) **Sir Hector M.** originally went to India as a major in H.M.'s 89th Regiment. He signalised himself by suppressing the first mutiny of the Bengal sepoys in the cantonments at Patna in 1764. A battalion attempted to desert; they were captured, and twenty men of the grenadier company were blown from guns. In the same year, and with the same soldiers, he won the decisive battle of Buxar against the Nawab Vizier of Oude. This made the British supreme in Hindustan, and the Mogul Emperor, Shah Alum, presented himself at their camp. M. was afterwards commander-in-chief at Madras during the war against Hyder Ali, 1780–82, but was superseded by Sir Eyre Coote.—(2) **Sir Thomas M.**, also a general, but better known for his civil administration, was the son of a Glasgow merchant, and was born in that city, 27th May 1761. In 1779 he proceeded to Madras as an infantry cadet, distinguished himself in the wars against Hyder Ali and Tippoo Saib, and in 1800 was promoted to the rank of major. From 1800 to 1808 he governed the districts of Bellary and Cuddapah, ceded by the Nizam of Hyderabad, and in 1818 he took a prominent part in the last Mahratta war. He was appointed Governor of Madras in 1820, with the rank of major-general, and was chiefly instrumental in introducing the *Ryotwarry* Settlement (q. v.). In 1825 M. was created a baronet of the United Kingdom. Attacked by cholera when on a farewell visit to the ceded districts over which he had long ruled, he died at Putticondah, near Gûti, 6th July 1827. See Gleig's *Life of Sir Thomas M.* (3 vols. 1830).

Mun'ster, the largest of the four Irish provinces, occupying the S. W. portion of the island, is bounded N. by Connaught, E. by Leinster, and W. and S. by the Atlantic. It embraces the six counties of Clare, Cork, Kerry, Limerick, Tipperary, and Waterford; and has an area of 9273 sq. miles, of which, in 1876, 5398 were in pasture and 1968 under tillage. From 1841 to 1871 the population fell from 2,396,161 to 1,393,485. In the Lakes of Killarney M. contains the most beautiful Irish scenery, and its bogs are neither numerous nor extensive. Before the English conquest it was an independent kingdom. It was divided into counties under Henry VIII.

Mün'ster, a town of Prussia, province of Westphalia, on the brook Aa, and at the beginning of the M. Canal, 65 miles N.E. of Düsseldorf by rail. It has a medieval appearance, most striking among the arcades and gabled houses of the Principal-Markt and Roggen-Markt. Of its fourteen churches, the finest are the Cathedral (1225–1261), a combination of the Gothic and Romanesque styles, the Ludgerikirche (founded in 1170, and rebuilt in the Gothic style after a fire in 1838), the Liebfrauen or Ueberwasser-Kirche, with a fine tower, the Church of St. Mauritz, a Romanesque building of the 12th c., and the beautiful Gothic Lambertikirche of the 14th c., from the S. side of whose tower hang the three iron cages in which the bodies of the Anabaptist leaders were displayed. The Rathhaus, of the 14th c., has a fine Gothic façade, and contains the 'Friedenssaal' (restored 1864), where the Peace of Westphalia was signed in 1648. Behind the Schloss (1767) is a botanical garden belonging to the academy, which was a university till 1818. The chief industries are glass-painting and the manufacture of woollens and cottons, and there is a large trade in Westphalian hams and rye-bread, and in Baumberg sandstone. Pop. (1875) 34,705. M. appears first in the time of Karl the Great under the name Mimigardevord. Karl gave it as a dwelling-place to St. Ludger, Bishop of the Saxons, and the earliest buildings rose round his *Monasterium*, from which the town takes its present name. M. is a bishop's see of great antiquity. In the 13th and 14th centuries it was a flourishing Hanse town. In 1533–34 it suffered much from the excesses of the Anabaptists (q. v.), and in 1650 it came under the warlike Prince-bishop Von Galen. It subsequently shared the fortunes of Westphalia (q. v.). See Erhard, *Geschichte M.'s* (Münst. 1837); and Geisberg, *Merkwürdigkeiten der Stadt M.* (Münst. 1866).

Munt'jac (*Cervus Muntjac*), a species of deer found in Java and other islands of the Eastern Archipelago, and differing from the other members of the deer family in the possession by the males of prominent upper canine teeth and of straight horns, each provided with a little branch. The M. resembles the Roebuck (q. v.).

Münz'er, Thomas, a religious fanatic of the Reformation period, and one of the leaders of the Anabaptists (q. v.) was born at Stolberg in the Harz in 1489. After some time spent as a schoolmaster at Aschersleben, and convent chaplain at Halle, he appeared at Zwickau as a preacher in 1520. Thence he passed to the Hussites in Bohemia, and in 1523 was at Allstedt in Thuringia. Everywhere he displayed an intolerant fervour. Not only the Papacy was denounced; he assailed the servile, letter-worshipping, half-and-half ('*knechtische, buchstäbische und halbe*') character of the Protestant movement, upheld the superiority of the 'inner light,' and demanded a radical reformation in ecclesiastical and political affairs, universal freedom, and a community of goods. The peasants and the populace were enchanted. Expelled from Allstedt by the Elector, Friedrich of Saxony, and Johann, Duke of Weimar, M. went first to Nürnberg, thence to Schaffhausen, and finally returned to Thuringia, settling at Mühlhausen, where he overthrew the civic power, and plundered the monasteries and houses of the rich. The violence of his actions and his language roused the German princes to arms. The Elector Johann, Duke Georg of Saxony, the Landgraf Philipp of Hessen, and Duke Heinrich of Brunswick, sent a large force against M. and his followers, who were defeated with great slaughter at Frankenhausen, 15th May 1525. M. fled in dismay, and sought to hide himself, but was captured, carried to Mühlhausen and beheaded with twenty-four of his chief accomplices. See Strobel, *Leben, Schriften und Lehren Thom. M.'s* (Nürnb. 1795), and Seidemann, *Thom. M.* (Dresd. and Leips. 1842).

Muræ'na (*M. Helena*), the name given to a species of Eel (q. v.) famous in classical times. It is found in the Mediterranean Sea, and has been occasionally taken off the British coast. The M. has no pectoral fins, and the gill-openings are represented by mere slits. There is a single row of teeth on the nasal bone. The M. was highly esteemed by classic epicures on account of the peculiar flavour of the flesh. It attains an average length of 1½ feet. Its colour is a golden yellow, mottled with bands and markings of purple and brown.

Mu'ral Cir'cle is an astronomical instrument of large size, consisting of a telescope attached to a graduated circle which is firmly fastened to a solid wall of masonry. It is fixed in the meridian plane, and is intended for measuring angular distances in the meridian. Originally the telescope was used simply with a graduated arc or quadrant, but the circles constructed by Troughton in the beginning of the present century showed the many advantages which a complete circle has over an arc. The instrument cannot be used for accurately determining right ascensions; and consequently it is now giving place to the more complete structure known as the Transit Instrument (q. v.).

Mural Crown (Lat. *corona muralis*), among the Romans one of the highest military decorations, a crown of gold, surmounted by turrets ('muri pinnis'), given to the first who scaled the wall of a besieged city.

Murat, Joachim, son of a tavern-keeper, was born 25th March 1771, at La Bastide-Fortunière, received a liberal education at the college of Cahors, went to Toulouse to join the priesthood, but followed a cavalry regiment for two years, and entered at Paris the Constitutional Guard of Louis XVI. On the 30th May 1791 he attained the grade of sub-lieutenant and distinguished himself by his hot partisanship of the Revolution, his ardour taking shape in the desire to change his name to Marat. Passing through the different grades until he became colonel, M. was appointed (Oct. 5, 1795) by Napoleon to a mission of some importance in connection with a movement of cavalry in the Tuileries Gardens, and in the following year went to Italy with him as a chief of brigade. He distinguished himself at every point of the campaign, more especially at the siege of Mantua, at Roveredo, and in executing the passage of Tagliamento. On the 19th May 1798, M. embarked with Napoleon, and (Feb. 1799) took charge of a cavalry regiment *en route* for Syria. He led the assault at the siege of Acre, penetrated to Gennesaret, and Napoleon wrote to the Directory that to M. was chiefly due the triumph of Aboukir. In Oct. 1799 he was created a general of division. Having dispersed, on the 18th Brumaire, the Council of Five Hundred at St. Cloud, M. was rewarded by the hand of Caroline, youngest sister of Napoleon, and appointed Commandant of the force. A brilliant march to Milan brought

him fresh honours (1801); in 1803 he was made President of the Electoral College of Lot, in 1804 Governor of Paris and Marshal of the Empire, a Prince and General adorned with the great eagle of the Legion of Honour in 1805, and in 1806 Grand-Duke of Berg and Cleves. The same year saw him engaged at Jena; in 1808 he conducted operations in Spain till July, when Napoleon nominated him King of Naples. As a king he wrought consistently enough for the welfare of the people entrusted to his care, organised a fine army out of poor material, but adopted a most theatrical style of display. His position was rendered vexatious also by the interference of Napoleon, who made him feel how much he was a vassal and how little a king. They had come to an open rupture when the war with Russia again called him into the field, and he took part in the battles of Smolensk and Moscow, but after the defeat of Leipsic he returned to his kingdom and began to treat with the allies. After Napoleon's escape from Elba, M. again joined him, but was defeated at Ferrara and Tolentino, 1815. A revolt occurred at Naples, his kingship was no longer recognised, he fled to Ischia, from that to France, and finally made Corsica his asylum. Driven by a restless ambition to the shores of Naples, where he claimed his crown, M. was betrayed into the hands of the populace of Pizzo, and was shot, 13th October 1815. M. was a brave and dashing soldier, with a true instinct for political freedom, but with no turn for the responsibilities of civil life which fell upon his shoulders. See Thiers' *Histoire de la Revolution, Histoire du Consulat et de l'Empire*; Léonard Gallois' *Histoire de J. M.* (Par. 1828); Coletta's *Histoire des six derniers Mois de la Vie de J. M.* (Par. 1821). He left two sons, Napoléon Achille M. and Napoléon Lucien Charles M., both of whom emigrated to the United States. The former, born 21st January 1801, settled in Florida, and died 15th April 1847. The latter, born 16th May 1803, returned to France at the Revolution of 1848, joined the party of Louis Napoleon, was appointed Ambassador Extraordinary to the court of Turin in 1849, was made a senator in 1852, a prince in 1853, and several times put forward his claim to the throne of Naples. In 1870 he was shut up in Metz with Bazaine, and on its capitulation was imprisoned in Germany. By his marriage with an American lady he has three sons and two daughters.

Murato'ri, Ludovi'co Anto'nio, an Italian historian and archæologist, was born at Vignola in Modena, 21st October 1672, and at the University of Modena acquired an extensive knowledge of ancient literature. In 1694 he became keeper of the Ambrosian Library, Milan. His uneventful life was one of incessant literary toil. In 1700 he returned to Modena as keeper of the Duke's Library, and here were composed those works which have made him known as a prodigy of learning and patience. The most famous are: *Rerum Italicarum Scriptores Praecipui* (29 vols. folio, Milan, 1723–51); *Antiquitates Italicæ Medii Ævi* (6 vols. folio, Milan, 1738–43); *Novus Thesaurus Veterum Inscriptionum* (6 vols. folio, Milan, 1739–42); *Annali d'Italia* (12 vols. Ven. 1744–49). M. died at Modena, 23d January 1750. His complete works were published at Venice (48 vols. 1790–1810). See his nephew G. F. M.'s *Vita del celebre Lud. Ant. M.* (Ven. 1756).

Mur'chison, Sir Roderick Impey, one of the greatest geologists of the present century, was born February 19, 1792, at his father's estate of Tarradale, in Ross-shire, Scotland. After being educated at Durham Grammar School, he entered the army, accompanied the 36th Regiment as ensign to Spain in 1808, was one of the survivors of the battle of Coruña, and on his return to England was promoted first to a lieutenancy and then to a captaincy. He saw no more active service, and in 1815 married and retired from the army. The next two years were spent in Italy studying art. In 1818, he settled at Barnard Castle, Durham, a property which belonged to his wife, and for the next five years threw himself enthusiastically into field sports —especially fox-hunting. In the year 1824, his true life began; and his subsequent brilliant career as a man of science is directly traceable to the influence of his wife, to whom, as he himself records, he owed his fame. In this year he removed to London, attended the science lectures at the Royal Institution, and became at once greatly interested in the science of geology, then in its infancy. In 1825 he entered the Geological Society (founded 1807), where he met the leading British geologists and naturalists of the day—Sedgwick, Fitton, Greenough, Wollaston, Buckland, Conybeare, De la Beche, Lyell, Scrope, and others. M. was elected secretary to the Society in 1825, and president in 1831. Henceforward his summers were spent in field work, for which he showed a peculiar fitness. In 1827, in company with Sedgwick, he took a rapid geological raid through Scotland, the results of which were given in a conjoint paper read before the society in 1828. The next three summers were spent amongst the secondary rocks of Central Europe, first in company with Lyell, and then with Sedgwick. In 1831 his attention was drawn to the so-called 'transition' rocks or *grauwacke* of the Germans; and he commenced operations in 1833 on the Welsh frontier amongst those formations, which must always be connected with the name of M. His discovery of a marked succession of life in the 'Silurian' series is undoubtedly his greatest work. Till the year 1838, when his great work *The Silurian System* appeared (last edit. 1867), he was busily engaged in investigating and arranging those ancient formations underlying the Old Red Sandstone. In 1840, the Geological Survey of Russia was entrusted to him, De Verneuil, and Count von Keyserling, and the results of the journey are given in the joint work, *The Geology of Russia and the Ural Mountains* (Lond. 1846). His subsequent work amongst his own peculiar Silurians, and among the Permian and Devonian, sustained his now world-wide fame. His nomenclature and classification were everywhere adopted, though the latter has been considerably modified in recent times. He was a member of all the great scientific societies of Europe, was twice President of the Geological Society, presided over the British Association (of which he had from the first been one of its most active promoters) in 1846, and held the President's chair of the Geographical Society for 13 years before his death. Latterly, indeed, it is more as a geographer, and more because of his annual addresses before this society, which owes its present vitality to his untiring energies, that he is known to the general public rather than by his geological work. The marks of honour which he received from the British and from foreign Governments were many. He was knighted in 1840, made K.C.B. in 1863, and a baronet in 1866. In 1853 he succeeded De la Beche as Director-General of the Geological Survey; and in 1871 founded the M. Chair of Geology and Mineralogy in Edinburgh University. He died shortly after, on October 22, at his residence in Belgrave Square, London. Most of his papers appear in the *Transactions of the Geological Society*, or in the *British Association Reports*. His other works are *Outline of the Geology of the Neighbourhood of Cheltenham* (1845), *A General View of the Palæozoic Rocks* (1852), and *Siluria* (1854). See *Memoir of Sir R. I. M.* (2 vols. 1875) by Professor Geikie.

Murchiso'nia, a genus of fossil Gasteropods belonging to the family of the 'Ear-shells' (*Haliotidæ*). They are confined in their distribution to rocks ranging from the Lower Silurian to the Permian. *M. gracilis* (L. Silurian) is a familiar species. The shell is long and spiral; its outer lip is notched; and the surface of the shell is frequently sculptured.

Mur'cia, an ancient kingdom and province in the S.E. of Spain, bounded S.W. by Granada and Andalusia, N.W. by La Mancha, N.E. by Valencia, and S.E. by the Mediterranean. Area, 10,449 sq. miles; pop. (1870) 660,040. With the exception of the N.E. plateau, the country is generally mountainous. As a whole the soil is poor and badly watered; and only in the valleys through which the Segura and its tributaries flow, or in the ridge-compassed plains of Lorca, Albacete, Chinchilla, and Almansa, is it at all productive. The valley of the Segura is especially fertile—wheat, maize, silk, hemp, oil, wine, oranges, pepper, &c., being among its products. Goats, sheep, and swine, are profitably reared. Mineral springs abound; and of minerals, sulphur, alum, and the ores of iron, lead, and copper, are found in quantity. M. belonged to the Moors from 711 to 1241 A.D., when it was subjugated by Ferdinand III. of Castile. It now consists of the two provinces Albacete and Murcia.—**M.**, the capital of the modern province of the same name, lies on the left bank of the Segura, 28 miles N.N.W. of Cartagena by rail. A canal connecting these two places is (1877) in course of construction. M. has several fine modern buildings, notably the cathedral with its pillared tower, the corn exchange (Alhondiga) with 140 marble columns, and a flourishing silk manufactory. Silk spinning and making mats, baskets, cordage, &c., from the esparto-rush, are its chief industries; and

it furnishes red pepper to nearly all Spain. The Jardin de Florida Blanca forms a splendid promenade; and the Huerta of M. rivals in its beauty and fertility that of Valencia. Pop. (1860) 87,803.

Murdan' (*Mardan*), a town in the district of Peshawur, Punjaub, British India, 33 miles N.E. from Peshawur. It is the permanent headquarters of the celebrated Guides Corps, more than 1000 strong, including horse and foot. In 1857 the Guides marched to the siege of Delhi, covering 580 miles in twenty-two days. M. has been the scene of the assassination of more than one British officer by Mohammedan fanatics. See Sir J. W. Kaye's *History of the Sepoy Mutiny* (vol. ii. Lond. 1860).

Murder is the crime of killing a human being with malice aforethought. Intention to kill any one, proving the cause of death of a human being, is M.; thus if A shoot at B, and miss him, but kill C, A is guilty of M. To incite any one to suicide is M.; thus when two persons incited each other to suicide, and the means employed took effect on one only, the survivor was held guilty of M. Every person convicted of M., or of being accessory to it, is punishable with death. Rescuing or attempting to rescue a murderer, subjects the offender to penal servitude for life, and to not fewer than 15 years.

Mure or **Muir** (Latinised 'Mora,' whence 'More' and 'Moore'), the name of an ancient and distinguished family in the West of Scotland, stated (but without proof) to be of Irish origin, and an offshoot from the famous clan O'More. The earliest M. of whom history makes record is David de Mora of the house of Polkellie, Renfrewshire, who appears as a witness to a charter of Alexander II. He is supposed to have been the predecessor of Gilchrist More, who is genealogically regarded as the root of the family. Gilchrist More was forcibly deprived of the 'house and living of Rowallan' by Sir Walter Cumyn in the beginning of the reign of Alexander III., but for his bravery at the battle of Largs was knighted, and reponed in his Rowallan property; also by his marriage with Cumyn's daughter he inherited the lands of his father-in-law within the sheriffdom of Roxburgh. One of his daughters, Anicia, married Richard Boyle, of Kelburne, ancestor of the Earl of Glasgow. His son Archibald married a daughter of Sir John Montgomerie, of Eastwood, and was killed at the storming of Berwick by Edward I. in 1297. Sir William M., eldest son of Archibald, is mentioned in an indenture of truce with England during the minority of David II., and is supposed to have died about 1346. Other 'sons' (whose existence, however, or at least whose filial relationship is by no means clear) are reputed to be the founders of the Mures of Caldwell and Auchindrane. Sir Adam M., son of Sir William by his marriage with the heiress of Polkellie, recovered that estate which had been disponed by his great grandfather Gilchrist to a kinsman, Ranald M. Sir Adam had two sons, Adam and Alexander, and a daughter Elizabeth, whose beauty raised her to the throne. In 1348 she was married to Robert, High Steward of Scotland, afterwards King Robert II. Her eldest brother Adam in a charter granted by Robert III. is termed 'consanguineus.' In his time, says the historian of the House, the spelling More gave place to Mure. He died in 1399. His eldest son Archibald married Euphame Kennedy, daughter of the Knight of Dunure, the ancestor of the Marquis of Ailsa, and is said to have fallen in battle with the English; but the date is uncertain. His successor Archibald (son or brother) was the father of an unfortunate Robert, who, on account of his size and strength, was known as 'the Rud of Rowallane.' 'He waysted, sold and wadset all his proper lands of Rowallane;' and committed the additional folly of marrying Margerie Newtoune, 'ane druncken woman.' The 'Rud' died in 1504, leaving four sons and a daughter. The eldest, John, married Elizabeth Stewart, daughter of Lord Evandale, a descendant of the Duke of Albany, but died before his father. His successor, also named John, married Margaret Boyd of Bonshaw, mistress of James IV., and fell at Flodden in 1513. His eldest son Mungo, who married Isobel, daughter of Sir Hugh Campbell of Loudon, Sheriff of Ayr, seems to have been a prudent and worthy man, much esteemed by his kinsfolk: he was slain at the battle of Pinkie in 1547, leaving five sons and six daughters. His eldest son John took great delight in planting, 'lived gratiouslie,' and died in 1591. By his marriage with a daughter of Cunninghame of Cunninghamehead he had three sons and three daughters: his eldest son William was 'of a meik and gentle spirit, and delyted much in the study of phisick.' **Sir William M.**, grandson of the preceding, was born in 1594. His mother was a sister of Alexander Montgomery, author of *The Cherrie and the Slae*. Before he was twenty he executed a translation of the story of Dido and Æneas from Virgil. Among the poetical addresses to King James on his visit to Scotland in 1617 is one by M. In 1628 he published a translation in English sapphics of Boyd of Trochrig's fine Latin poem *Hecatombe Christiana*, together with a small original piece called *Doomesday*. But his principal work is his *True Crucifixe for true Catholikes* (Edin. 1629). His version of the Psalms of David was executed about 1639, and was much admired. If Sir William had transmitted it to the General Assembly it might have prevented the Westminster Assembly of 1644 from recommending the version of Rous. M. was a member of the Convention of 1643 by which the Solemn League and Covenant was ratified with England. He accompanied the Scotch army on its march to the South, was wounded at Marston Moor (2d July 1644), took part in the storming of Newcastle in the following August, and died in the end of 1657. Specimens of his poems, many of which are still in manuscript, may be seen in Lyle's *Ancient Ballads and Songs* (Lond. 1827). Sir William M., eldest son of the preceding, was a staunch Presbyterian, and an intimate friend of the famous Guthrie (q. v.), minister of Fenwick. He suffered greatly in his person and purse for his attachment to the national religion, and died in 1686. The male line of the house of Rowallan became extinct in the person of his son William, who married Dame Mary Scott, supposed heiress of Collarny in Fife, by whom he had three daughters, only one of whom, Jean, survived him. Jean married first William Fairlie of Bruntsfield, near Edinburgh, and secondly, David, Earl of Glasgow, by whom she had three daughters. She died 30th September 1724. Her second daughter, Lady Jean Boyle M., to whom the estate of Rowallan was made over by special provision, married a son of the second Earl of Loudon. The son of this union, James M. Campbell, succeeded to the estate of Rowallan, and also became fifth Earl of Loudon. In this way the Rowallan property passed to the Loudon family.

The Mures of Caldwell are descended from a Sir Reginald M. of Abercorn and Cowdams in Ayrshire, who was possibly a son, certainly a kinsman, of that Sir William M. of Rowallan who died about 1346. The family furnishes several names prominent in Scottish history. Sir Robert M. was one of the jury appointed (1580) to try Lord Ruthven for the murder of Rizzio. He was the friend of King James VI., to whom he was related by the marriage of an ancestor with a daughter of an Earl of Lennox. William M., fourth in succession to Sir Robert, was an ardent Covenanter, and was compelled to take refuge in Holland (1667), and died in exile. His estate of Caldwell was attainted and given to General Dalzell, but by special Act of Parliament it was restored in 1690 to his second daughter Barbara. Dying without issue, she was succeeded by her kinsman William M., laird of Glanderstoun; and he also dying without issue, the Caldwell property passed to his nephew William, eldest son of M. of Rhoddens in Ireland. His son William became a Lord of Session, was a friend of David Hume, wrote some tracts on questions of political economy, was lord-rector of the University of Glasgow in 1764–65, and died in 1776. His grandson, **William M.** of Caldwell, born 9th July 1799, was educated at Westminster School, studied at Edinburgh and in Germany, was M.P. for Renfrewshire from 1846 to 1855, and lord-rector of Glasgow University in 1847–48. He died at London, 1st April 1860. By his *Critical History of the Language and Literature of Ancient Greece* (5 vols. Lond. 1850–57), M. won for himself a foremost place in the ranks of classical scholars. The work is still an authority: it is marked by a German solidity of learning and an English sobriety of judgment. Other works of his are, *Brief Remarks on the Chronology of the Egyptian Dynasties; A Dissertation on the Callendar of the Zodiac of Ancient Egypt* (1832); and *A Tour in Greece* (1842). He also compiled and edited the valuable *Caldwell Papers*, printed for the Maitland Club in 1854. His son, **Colonel William M.**, born in 1830, served in the Crimean War, and since 1874 has been M.P. for Renfrewshire. He is an accomplished member of the Liberal party, and, in keeping with the traditions of his house, a staunch adherent of the National Church.—**David M.**, younger brother of the historian of the Greek literature, was born in 1810,

passed advocate at the Scottish bar in 1831, was appointed sheriff of Perthshire in 1853, Solicitor-General of Scotland in 1858, Lord-Advocate in 1859, and was raised to the bench in 1865. See *The Historie and Descent of the House of Rowallane.* By Sir William Mure, Knight, of Rowallan, written in or prior to 1657 (Glasg. 1825), and Colonel Mure's *Selection from the Caldwell Papers* (3 vols. 1854).

Mu'rex, a genus of *Gasteropoda* (q. v.), representing the family *Muricidæ*. In this family the shell has a straight, anterior canal, and a broad foot is developed. In M. itself a long canal is formed of the extended outer lip, and the shell is covered externally with many spines or *varices*. *M. tenuispina* is a common species, often named the 'thorny woodcock shell;' the *M. erinaceus* is the 'British woodcock.' Other species of M. afforded the Tyrian purple dye. *M. tribulus* is the 'Venus' comb' of the Indian Ocean, and *M. regius* is the 'royal M.'

Murex'ide (purpurate of ammonium), a dye of a purple rose colour, yielding various shades, formerly extensively used as a dye for wool and silk, and for printing on cotton fabrics, but now superseded by the aniline or coal-tar colours. It was first observed in 1776 by Scheele as a result of the action of nitric acid on uric acid. Guano yielded the uric acid from which M. was once extensively manufactured. Uric acid in nitric acid yields *alloxantin*, and this substance in contact with ammonia becomes purpurate of ammonium.

Murfrees'boro, a village of Tennessee, U.S., situated in a fertile plain 32 miles S.E. of Nashville. Pop. 3502. It is historically interesting as the scene of a prolonged contest, known also as the Battle of Stone River, between the Confederates and Federals, which resulted in the final retreat of the former, after the loss of 10,000 out of an army originally 35,000 strong. The fighting lasted from December 31, 1862, to January 4, 1863.

Mur'ger, Henri, a French novelist, born at Paris, March 24, 1822, after receiving a meagre education, served as clerk to a notary (1836–38), and next as secretary to a Russian nobleman, Count Tolstoi. He wrote poems, but could find no publisher for them, and plunged presently into that life of misery and adventure which he dubbed *la vie Bohémienne*, and has described in his first and ablest production, *Scènes de la Vie de Bohème* (Par. 1845). This M. frequently copied, but never equalled, in his *Pays Latin* (1851), *Scènes de Campagne* (1854), *Sabot Rouge* (1860), &c. He also published *Ballades et Fantaisies* (1854) and *Nuits d'Hiver* (1861), besides several comedies, as *Bonhomme Jadis* (1852), and *Le Serment d'Horace* (1860). M. died at Paris, January 28, 1861. A complete edition of his works has been issued in 10 vols.

Murghab', a river of Central Asia, which rises among the Hindu Kush mountains in the N. of Afghanistan, and after a generally north-westerly course for some 400 miles, during which it receives several tributaries, it is finally lost in the sandy plains to the north of Khorassan.

Muriat'ic Acid. See HYDROCHLORIC ACID.

Mu'ridæ, a family of Rodents, including the mice, rats, voles and lemmings. The tail is long and sparsely covered with hair; often scaly or naked. The lower incisor teeth are narrow and pointed. The collar-bones or *clavicles* are well developed, and the hind feet have five toes; the front feet only four and a rudimentary thumb.

Murill'o, Bartolomeo Esteban, a great Spanish painter, baptized at Seville, 1st January 1618, learnt the rudiments of art under his uncle, Juan del Castillo. In order to gain means for travelling to Madrid, the young painter shipped coarsely-executed Madonnas by the dozen to America, and to Madrid he went in 1643. Here Velasquez instructed him, obtained permission for him to copy in the royal collection, and introduced him to the king's personal notice. M. returned to Seville in 1645, an eclectic in art, now painting in the style of Rubens, now of Velasquez, now of Vandyck. In 1646 he adorned the chapel of the Franciscan convent in his native town. His life thereafter was one of successful but incessant toil. It has been usual to divide his paintings into three styles: first, his *calido* or 'warm' style, in which golden tints and great transparency prevail; second, his *frio* or 'cool' style, marked by softer execution and a more delicate harmony of colour, chiefly clear silvery tints; third, his *vaporoso*, in which wan grey colours predominate, and the drawing is less accurate. Among M.'s best works are the paintings in the Franciscan convent already referred to; 'The Flight into Egypt,' 'San Leandro,' 'San Isidoro,' 'The Nativity of the Virgin;' 'The Dream,' 'The Virgin of the Conception,' 'Faith,' 'St. Peter Released from Prison by the Angel,' 'St. Elizabeth of Hungary,' 'The Immaculate Conception,' 'The Blessed Virgin.' M. was pre-eminently an ecclesiastical painter, but has left many finely-executed portraits. His style may be best described as a combination of the rich colouring of Rubens with the depth and transparency of Vandyck. He died at Seville, 3d April 1682. M. founded an academy of painting in his native city. Spain now possesses only a few of his paintings; many were carried into France, the Louvre at Paris being especially rich in his works. A *Life of M.* was translated from the Spanish by Davies (1819).

Murom, a picturesque old town in central Russia, government of Vladimir, on the river Oka, 172 miles E. by S. of Moscow. It has 18 churches, a large annual fair, and extensive trade in alabaster, cucumber seed, and haricot beans produced in its vicinity. Pop. (1870) 10,173.

Murr'ay (aboriginal name *Goolwa*), the largest river in Australia. In the upper part of its course it is also known as the Hume (the name of its discoverer), and the Indi. During three-fourths of its length it forms the boundary between New South Wales and Victoria. See AUSTRALIA.

Murray, James Stewart, Earl of, natural son of James V. of Scotland, by Margaret, daughter of John, Lord Erskine of Mar, was born about 1531, became in his eighth year Prior of St. Andrews, later on of Pittenweem and Mâcon, and in 1544 took the oath of fidelity to the Pope. In 1558 he acted as one of the Scotch Commissioners at the marriage of his half-sister with the Dauphin of France, and in 1560 waited upon her at Vitry in Champagne to negotiate concerning her return to Scotland. By this time he had adopted all the leading doctrines of the Reformation. On Queen Mary's return, he advocated toleration for her religion, and she made him chief administrator of her realms. When in 1562 he married the daughter of the powerful Earl Marischal, she created him Earl of Mar, a title which he shortly afterwards laid aside to assume the earldom of Murray. Acting independently of his counsel, Mary married Darnley, whilst M. supported the suit of Leicester. The assumption of kingly honour by Darnley and the Catholic reaction drove M. and other discontented barons to arms, but they were compelled to retreat into England before the royal army in 1565. In London, to suit Elizabeth's policy, M. had to declare that she never gave them countenance in this 'traitorous resistance.' On the 10th March 1566 M. returned to Edinburgh, and though he has been accused of complicity in the murder of Rizzio, there 'is no sufficient evidence,' says Mr. J. H. Burton, 'that he was so, and such a thing is not consistent with his steady, careful, decorous walk in life.' M. went to France (April 1567), and during his absence was confirmed by the Estates in all his acquisitions, and on the discovery of the casket documents was named Regent. He met the Queen's forces, after her escape from Lochleven, at Langside, May 13, 1568, and routed them. In the same year he acted as one of the Commissioners at York, with power to adjust all matters rising out of the political crisis in Scotland. Among his most effectual measures was his chastisement of the Border rievers, concerning whose obedience it is written that 'the like was never done to na king in na man's days of before.' On the 23d of Feb. 1570, whilst passing in state through Linlithgow, M. was shot from the window of Archbishop Hamilton. With opportunities for gratifying the highest ambition, M. remained a strictly loyal and constitutional ruler. He was a brave, wary, honest, and serious man. See J. H. Burton's *History of Scotland* (vols. iii.–iv. v.).

Murray, John, perhaps the most famous English publisher in the early part of this century, was born November 27, 1778. He succeeded his father, Lieutenant John M'Murray, in a publishing business at No. 32 Fleet Street. His first happy venture was the *Domestic Cookery Book*, of which 300,000 copies were

sold. He took a higher flight with the *Quarterly Review* in 1808, for which he secured the services of the great Tory writers of the day. In 1812, when he published the first two cantos of *Childe Harold*, he removed to Albemarle Street, whence for many years much of the literary wealth of the day came streaming forth. M. was the friend of Crabbe and Moore, Rogers and Campbell, Scott and Byron, and his back parlour was a favourite resort of wits and poets. Shrewdness, enterprise, and generosity characterised all his dealings. He died 27th June 1843, since which time the business has been conducted by his son and namesake, born in 1808. If the house of M. is not now foremost in the publication of brilliant efforts of genius, it is still in the front rank, and its catalogue comprises valuable and original works in every department of literature. Its *Handbooks of Foreign Travel* are of world-wide fame.

Murray, Lindley, a popular English grammarian, was born at Swatara in Pennsylvania, U.S., in 1745, amassed a fortune in business, and on the establishment of American Independence withdrew to England, and settled at Holdgate, near York, where he spent his time in the composition chiefly of school-books. His *English Grammar* was first published in 1795, and has since gone through innumerable editions, though now superseded by more scholarly and scientific manuals. M. died 16th February 1826.

Murri (*Marri*) a hill station and sanitarium established in 1851 among the spurs of the Himalayas, 7330 feet above the sea, in the district of Rawul Pindi, Punjaub, British India, 39 miles N.E. of Rawul Pindi. Pop. (1868) 2,346. The census was taken in midwinter; during the summer season the number of visitors may amount to 12,000. The scenery is very beautiful, and the climate healthy, though there have been disastrous outbreaks of cholera. There are 5 hotels and a thriving brewery. In September 1857, during the Mutiny, M. was attacked unsuccessfully by the insurgent hill tribes. One of the Lawrence Memorial Asylums for the children of European soldiers is situated here, and is occupied by 70 boys and 56 girls.

Murrumbid'gee, a large river in the S. of New South Wales. It rises in the Snowy Range, an offshoot of the Australian Alps, and for the greater part of its course of 1300 miles flows W. until it unites with the Murray in 34° 35′ S. lat., 143° 20′ E. long. The country on its banks is for the most part well adapted for pastoral purposes, except near its junction with the Lachlan, where there is a vast morass. The M. is navigable by light-draught steamers for 500 miles.

Murvie'dro (Lat. *Muri Veteres*), a town of Spain, province of Valencia, 18 miles N.N.E. of Valencia city by rail. It occupies the site of the ancient Saguntum, has a strong castle, and the ruins of a temple of Hercules. M. was at one time a seaport, but is now four miles from the coast. Pop. about 4300.

Murzuk', the capital of Fezzan, 485 miles S.E. of Tripoli. It is an oasis of the Sahara, and forms an important trading centre to the caravans of Egypt, Tunis, Tripoli, Borun, &c. It is enclosed within mud walls, and has broad streets and well-built houses. The inhabitants, estimated in 1869 at about 3000, are cold and inhospitable; but the lower classes are industrious, and work in leather, iron, and coarse fabrics. The slave-trade is actively prosecuted, and ivory, dates, senna, zinc, &c., are staple articles of commerce.

Musa'ceæ, or the Banana family, is a small but beautiful and highly important natural order of Monocotyledons, composed of plants without true aërial stems, but with stem-like shoots proceeding from subterranean root-stocks, and composed of the combined sheathing leaf-stalks. The veins of the generally large leaves are parallel, proceeding in a curved manner from the midrib. The flowers are congregated on spadices, which burst through the protecting spathes. All are natives of warm and tropical countries, and furnish a large supply of food, besides yielding useful fibres. The gorgeous *Strelitzia Reginæ* (named in honour of Caroline, queen of George III.) belongs to this order, and in addition to it four or five other magnificent species of the genus are in cultivation. See ABACA, BANANA, PLANTAIN, and TRAVELLER'S TREE for the most valuable plants of the M.

Muse'us, (1) a mythic poet, who presided over the Eleusinian mysteries in the time of Herakles. According to one legend, he was the son of Eumolpus and Selene; to another, of Orpheus. Various poetical compositions, such as oracles, precepts, hymns, &c., were attributed to him by the ancients. (2) **M.**, a grammarian, who flourished not earlier than the 5th c. A.D., was the author of a Greek poem on the loves of Hero and Leander, which was first discovered in the 13th c., and has been translated into English among others by Marlowe, Stapylton, and Stirling.

Musäüs, Johann Karl August, a German writer, born in 1735 at Jena, where he studied theology, became (1763) tutor of the pages in the court of Weimar, and in 1770 Professor at the gymnasium of that town, where he died 28th October 1787. In 1760-62 he published anonymously at Eisenach *Der Deutsche Grandison* (2d ed. *ib.* 1781), a book of telling and good-humoured satire on sentimental fiction, which soon found great favour. Eighteen years after, his *Physiognomische Reisen* (Altenberg, 1778), ridiculing the fancies of Lavater (q. v.), was so popular that M. soon cast off disguise, and in a series of *Volksmährchen der Deutschen* (Gotha, 1782–86; new ed. 1868), full of a dry, genial humour, he pleasantly opened the productive mine of popular traditionary tales. M.'s other works are *Freund Heins Erscheinungen* (1785), and the posthumous *Straussfedern* (Berl. 1787), left incomplete at his death, and *Moralische Kinderklapper* (Leips. 1788). His relative Kotzebue edited (1791) a small volume of his *Nachgelassene Schriften*. According to Carlyle, 'M. ranks rather as a sound common-sense thinker than as a man of high wisdom or originality.'

Mus'cæ Volitan'tes, or **Myodeso'pia**, is the term used in medicine to denote any spectrum or visual appearance which leads the patient to think that flies or black specks are moving before him. The seeing of M. V. may arise from a mere want of sensibility in certain parts of the retina (*Myodesopia insensitiva*); but more frequently from the actual perception of objects on or in the eye (*Myodesopia sensitiva*). The former condition arises from certain diseased states of the retina, or of the choroid; and the latter from the layer of mucus and tears on the surface of the cornea; from corpuscles between the external surface of the cornea and the focal centre of the eye; or from corpuscles between the focal centre of the eye and the sensitive layer of the retina. *M. insensitiva* is a serious disease, and is always indicative of danger to vision from amaurosis; but *M. sensitiva*, although in some cases of a serious nature, varies in importance according to its cause. When M. V. shift their position in the eye, they indicate the existence of *M. sensitiva;* but when they are fixed, of *M. insensitiva*. It is sometimes difficult to ascertain accurately which condition exists, owing to the movements of the eyeball; but the nature of the affection can always be ascertained by means of the ophthalmoscope.

Mus'cardine is a disease in silkworms caused by the growth through their substance of a filamentous fungus called *Botrytis Bassiana*. The spores speedily germinate when once they find their 'host,' and the threads prey upon the caterpillar until it becomes mummified. The prevention consists in care and cleanliness. See MOULD.

Muscat' or **Muscatel'** (Fr. *muscat;* Lat. *muscatus*, from *muscus*, 'musk'), an esteemed variety of white or black grape, extensively grown in southern districts of France, and generally in European vineyards. The French liqueur M. wines of Rivesaltes and Frontignan have a great reputation. M. grapes are allowed to become dry and raisin-like before the juice, which is then syrupy, is expressed.

Muscat', or **Omân**, an independent state in the E. of Arabia, extending from Râs-Mussendom in the N.W. to Râs-el-Had in the S.E., a distance of some 370 miles, and forming the southern seaboard of the Gulf of Omân, at the entrance to the Persian Gulf. Estimated pop. 500,000. The coast is low-lying and fertile, yielding cotton, sugar, rice, maize, water-melons, and bananas. A broken range of barren hills runs parallel to the coast, at a distance inland of from 20 to 40 miles, culminating in Jebel Achdar, 6000 feet high, and enclosing many luxuriant valleys, where are produced abundance of coffee, figs, dates, almonds, grapes, oranges, lemons, &c. Behind the mountain ridge and on the edge of the Arabian desert are many rich oases, which are mostly inhabited by Beduins. During the present

century an important trade has developed between M. and Europe and America. The exports are chiefly Arabian coffee, pearls, dates, sulphur, drugs, and horses. M. is by far the most important commercial depôt in Omân, but the ports of Sur and Sohar import goods from India and the Persian Gulf independently, and as the customs duties are (1875) practically in abeyance at those places, they are absorbing a great deal of trade. The existence of Omân as an independent state dates from 751 A.D. In that year the people elected a ruler, and for nine centuries the 'Imaums' were chosen on account of their personal character. In 1507 Omân was subdued by Albuquerque, and retained by the Portuguese till 1648, when it was recovered by the Arabs. Subsequently the Imaums acquired Zanzibar, Mombas, Quiloa, and other places in E. Africa, and Bender Abbas, together with certain territories on the coast of Persia, paying for the latter a fixed tribute. The country was singularly prosperous under the Sultan Said Seid (1803–56), who left M. to his son Thuwany, and appointed his second son Majid to govern Zanzibar (q. v.). The former was murdered by his own son Selim in 1868, and Selim was supplanted by an uncle, Said Tuky, in 1870. Bender Abbas and the coast settlements have meantime reverted to Persia; but M. still retains the Bahrein Islands in the Persian Gulf—the seat of the most valuable pearl fishery in the world.—**M.**, the capital, is situated in a fertile plain, amid gardens and plantations, and on an inlet of the sea which forms a safe and spacious harbour. It is fortified, but rather poorly built, and has a very hot climate. In 1875 the customs were farmed for 120,000 dollars, which is probably much less than the actual receipts. Pop. 60,000. See Badger's *History of the Imaums and Seyids of Omân*, from the Arabic of Sahib-ibn-Razik (1871), and Markham's *History of Persia* (1874).

Mus'catine, a city of Iowa, U.S., on the left bank of the Mississippi, 41 miles E.S.E. of Iowa city by rail. It has fifteen churches, two newspapers, a farm-implement factory, and four large saw-mills. Pop. (1870) 6718.

Musch'elkalk, the *Calcaire coquiller* of the French geologists, is the name given to the Middle Trias, which occurs all over the continent of Western Europe, but is absent in England. It is composed of magnesian limestone with bands of gypsum and rocksalt at its base, and contains characteristic Triassic fossils, notably the remains of Saurian reptiles. It is intermediate to the Bunter (q. v.) and Keuper (q. v.) formations, which are represented in England by the New Red Sandstone.

Mus'ci. See MOSSES.

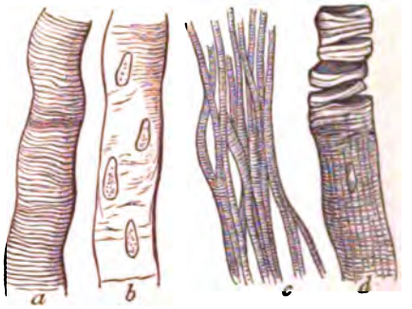
Muscicap'idæ, a family of *Insessorial* birds, including those popularly named Flycatchers (q. v.). They are included in the *Dentirostral* group of the order. They have a bill curved above, and the sides are compressed at the tip. In the true flycatchers, the bill is broad at the base, and has bristles. The wings are long and pointed, and the outer toe is longer than the inner. In the genus *Muscicapa*, the bill is short, and the nostrils are partly hidden by plumes. The tail is even, and the third and fourth quills are the longest.

Mus'cidæ, a family of Dipterous insects, including the common house-fly and its allies. The antennæ in the M. are three-jointed. The proboscis ends in a fleshy segment. The larvæ are footless grubs, and the chrysalis is usually enclosed in the larval skin. The abdomen consists of five segments.

Mus'cle and **Mus'cular Tissue**, the names given to the tissue found in animals, in virtue of which they can move. M. constitutes what is popularly known as the 'flesh' of animals. Anatomically it is sharply divided into two varieties, named *striped* or *striated*, and *unstriped* or *non-striated* M. T. The former constitutes the so-called *voluntary* muscles, or those which are under the command of the will. The latter forms the *involuntary* muscles, which are beyond the command of the will. The *heart's* tissue may be said to be the only exception to this rule; inasmuch as the M. T. of this organ is of *striped* nature, while its action is involuntary. A muscle consists of a mass of M. T. usually attached at either extremity to adjacent parts by *tendons*. The simplest idea of muscular action is to regard a muscle as stretched between two points, and as capable of approximating these points in virtue of the property known as *contractility*. It is this property which constitutes the distinguishing feature of M. T. The point from which a muscle springs, and which constitutes its fixed point is named the *origin*. The moving point, or that which is approximated to the fixed point in the act of contraction, is termed the *insertion;* the fleshy part, the *belly*. The *microscopic examination* of M. shows that it can be split up into bundles of fibres, the bundles being named *fasciculi*. Each fasciculus is defined by a covering of cellular tissue, the sarcolemma, which also serves to enclose the smaller bundles of which the fasciculus is composed. These smaller bundles of fibres may again be divided until the most elementary parts of the M. T., the *primitive fasciculi*, are found. This variety of structure is more especially characteristic of the voluntary muscles. The involuntary muscles are composed of long 'fibre cells' (*e*), flat and spindle-shaped. These cells attain a length varying from the $\frac{1}{300}$th to the $\frac{1}{100}$th of an inch, and a breadth varying from the $\frac{1}{2500}$th to the $\frac{1}{1500}$th of an inch. Within each cell a long *nucleus* may be seen, while along the edge of the cell dark lines or points may also be noticed. The fibre cells unite to form the fibres of involuntary muscles. This latter variety of M. T. is found in the digestive system, forming the muscular layer of the stomach and intestines which serves to propel the contents of the alimentary tract. In the trachea or bronchi the M. T. is of the involuntary or unstriped variety; it also occurs in the ureters and urinary bladder, in the walls of blood-vessels, and in the skin. It is the contraction of the M. T. of the skin that causes the prominent appearance of the skin-papillæ—an appearance well seen on exposure to cold. Involuntary muscles are sometimes also said to be made up of *organic fibres*, from the fact that they are associated with those functions named *organic functions*—such as digestion, respiration, &c., which are common to both animals and plants as organisms.



The fibres of *voluntary* or *striped* M. T. when microscopically examined, are seen to attain a diameter of about $\frac{1}{800}$th of an inch, their greatest length being about 1½ inches. Each fibre is enclosed within a delicate tubular sheath already noticed, called the *sarcolemma*. When the M. T. itself is torn across, this sheath may be seen to unite the torn ends in the form of a delicate membrane. The fibres of voluntary muscles are cylindrical and somewhat prismatic in form; the number of faces or sides in a fibre depending upon the manner in which it has been compressed and surrounded by its neighbour-fibres. Each fibre derives its most prominent character and its name from the fact that fine lines or *striæ* (*a*) may be seen to mark it in a cross or transverse fashion. Hence has arisen the name *striped* muscles. The ultimate *fibrils* (*c*) of the striped muscle are believed to be composed of discs or portions of a thick or firm substance alternating with discs of different density. Viewed by transmitted light under the microscope, the thick portions of the fibril (or *sarcous elements* as they are named) appear as the dark stripes, separated by the intervening lighter elements.



This composition of a striped muscular fibre may be demonstrated by the fact that the fibre may be split transversely (*d*)

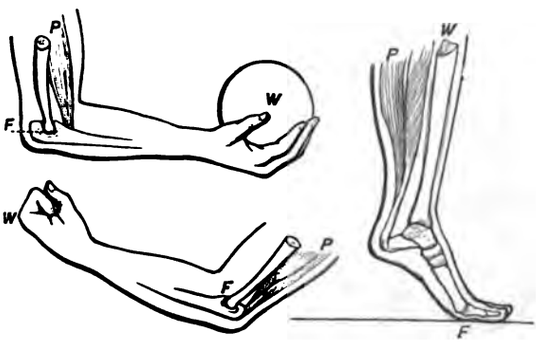
into plates or discs of *sarcous* kind, united by the more pellucid and thinner material. The muscular fibres of the heart, we have already seen, are involuntary, but of striped structure. The heart-fibres differ, however, from the fibres of other striped muscles in that they are of finer structure: the stripes are more delicately marked, the sarcolemma is wanting, and the fibres branch and unite with each other. Muscles are well supplied with *blood-vessels*. The minute capillaries form a network on the external surface of the sarcolemma. The *nerves* of muscles are also numerous.

M. T., it has been said, shortens itself through the possession of contractility. This property is excited in various ways, but chiefly through the medium of the nervous system. In ordinary muscular action, the nerve-force, transmitted to the muscles through the nerves, supplies the *stimulus* under which contractility is excited. But chemical substances applied to M. T. will cause contraction, and stimuli of a purely mechanical kind—as when the muscle is directly pinched or irritated—will produce the same effect. It seems to be abundantly proved that the contractility of M. T. is really a property of, and is inherent in muscles. This is proved not only by the fact that a muscle will contract after division of the nerves supplying it, but also from the consideration that contractility is exhibited by muscular fibres in which no nerves are to be found. The contractility lessens or disappears when the blood-supply of the muscle is diminished or impaired—a fact demonstrated by the absence of muscular power after the main artery in a limb has been tied. Muscles possess common sensibility to pain, heat, &c., although not to a very great degree. When a muscle contracts, Bowman believes that the constituent parts of its fibrils are pressed close together, and that the fibres become shorter, thicker, and flatter, but without changing their axis or direction. The shortening of the fibre is in fact compensated for by its increased thickness. As a result of muscular contraction, *heat* is developed. Increase of temperature can be demonstrated to occur during the action of a muscle, while *sound* is also evolved. Contraction of M. does not follow after stimulation at an equal rate in all muscles. The striped muscles respond to stimulation more quickly than the unstriped; and of the latter the M. T. of the ureters and gall-bladder appears to be the least sensitive to stimuli. After death, the contractility of M. disappears first in the left ventricle of the heart; then in the digestive canal; next in the right ventricle, iris, and urinary bladder; then in the trunk and upper and lower extremities; and last of all in the right and left auricles of the heart.

The condition known as *rigor mortis*, or *post-mortem rigidity*, occurring after death, and known popularly as the 'death-stiffening,' depends upon the fact that after they have lost their contractility the muscles of the dead body pass into a state of contraction, which persists for a longer or shorter period. The muscles of the neck and lower jaw are the first to become rigid after death; then follows stiffening of the upper limbs, the lower limbs becoming rigid last of all. Rigidity varies in the period of its appearance after death. The occurrence during life of anything which causes muscular exhaustion, tends to ensure the speedy appearance of rigidity. Bedridden persons soon become rigid after death from this cause; and the reverse obtains in cases of sudden death. The rigidity endures in proportion to the tardiness of its appearance.

The disposition of the muscles in the body varies greatly in different parts of the frame. The muscles of the limbs are arranged in groups around the bones, and are applied to the performance of definite movements. The muscles of the trunk serve to enclose cavities, or to form the walls of the body; while some (*e.g.*, the *Diaphragm*) perform an important share in the maintenance of the bodily functions.

In the movements of the body, the action of all three kinds of *levers* are well illustrated. The lever of the first order, in which the fulcrum (*F*) is between the power (*P*) and weight (*W*), is illustrated by the balancing of the head on the spine. When the head is drawn backwards, the spine = *F*; the muscles of the back of the neck = *P*; and the face and front part of the head = *W*. In the second variety of lever, the *W* is situated between the *F* and *P*. When the heel is raised, the toes being firmly placed on the ground, the *W* is represented by the weight of the body transmitted through the leg; the *P* resides in the muscles of the heel, and the *F* is represented by the toes. The third kind of lever has the *P* between the *F* and *W*. When the fore-arm rests on a table, and a weight in the hand is approximated to the shoulder, this action is illustrated. The *F* is the fixed elbow; the *W* is the hand and its contained object; and the *P* is applied in the fore-arm, at the insertion of the *biceps* muscle.



Diseases of the Muscles.—Muscles are liable to rupture from injury, from over-exertion, and from spasms, the usual seat of rupture being at the junction of the muscle and tendon, or in the centre of the muscular belly. A rupture, if recent, is indicated by the hollow which replaces the natural outline of the muscle. Inflammation of muscles occurs usually in the course of rheumatism or syphilis. The *gummatous* tumours of the secondary or tertiary stages of constitutional syphilis appear in large muscular masses, forming round, hard, movable tumours, chiefly seen in the gastrocnemius or the scapular muscles. They show very little tendency to suppurate. Muscles are liable to *granular degeneration*, causing paralysis; and, in such cases, they are wasted away, sometimes even to annihilation. The degree of change into fat is various—in some cases no fat is found; in others it is abundant, probably as an after-degeneration. Between the striæ there may be grey molecules, or the striæ may be replaced by long cylinders. The muscles are frequently the seat of parasites, such as the *Trichina* (q. v.), &c.

Mu'ses, The, were in the earliest times the inspiring goddesses of song, and were commonly held to be the daughters of Zeus and Mnemosyne, born in Pieria, at the foot of Mount Olympus. They were originally three in number, and Hesiod is the first to state the names of the nine who became established throughout Greece—viz., Clio, Euterpe, Thalia, Melpomene, Terpsichore, Erato, Polyhymnia, Urania, and Calliope. In later times the M. were regarded as divinities, exercising a special patronage over the various kinds of poetry, and over the sciences and the fine arts. The invocations addressed to them in this connection gradually became among classical writers as formal as they are in modern times. The worship of the M. was introduced from Thrace and Pieria into Bœotia, when it was associated with Mount Helicon, and the sacred fountains Aganippe and Hippocrene, from whence it spread into the remoter parts of Greece. The sacrifices made to them consisted of libations of water or milk, and of honey. The poets apply to them various surnames, as *Pierides*, *Aonides*, *Aoniæ puellæ*, derived from the localities held sacred to them, or in which their worship prevailed.

Muse'um primarily indicated a building devoted to the worship of the Muses; but in modern times the term means a public institution containing collections of objects illustrating the various branches of science, especially natural history and ethnology, arts, manufactures, and industry. In Continental cities a M. also includes galleries of art, many of the most important Continental museums being devoted entirely to the exhibition of works of art. Museums may be classified into strictly scientific collections, which are used only for purposes of systematic instruction or of research; and popular collections, the main purpose of which is to communicate general instruction in an agreeable place of resort. Some museums are restricted in their scope to a limited range of objects—as, for example, zoology, botany, or geology; others are universal in their range, and embrace all departments of science, art, and literature. In Great Britain

museums of considerable importance have hitherto been almost entirely restricted to the metropolitan towns, but now the value of such institutions is being recognised in all great centres of population, and the want is being rapidly supplied. Our greatest national institution of this kind is fully described under the head BRITISH M. The South Kensington M. of the Science and Art Department, devoted principally to the illustration of art as applied to manufactures, has attained great success as a popular institution, and it has had a most marked influence on the taste of the public and the artistic skill of our artizans.

Mush'room, or **Agaric,** one of the largest and most important of the genera of *Fungi*, is known botanically as *Agaricus*. Frequently, however, the name is limited to the one or few species popularly recognised as edible (all others being ignorantly called 'Toadstools'), while formerly among herbalists the name A. embraced numerous species in addition to those now included in the genus above mentioned. *Agaricus* stands at the head of the *Hymenomycetes*, the highest of the six great divisions of Fungi, containing those having naked spores borne on an exposed fructifying surface (*hymenium*). The common M. will serve as an example. Upon an underground mass of living matted cells (*spawn* or *mycelium*), under the influence of warmth and moisture, the young M. is developed—at first enclosed in a tough membrane or wrapper (*volva*): in the process of growth the volva is ruptured, a stem manifests itself, bearing at its summit an umbrella-like cap (*pileus*), growing perpendicularly from which in a radiating manner are a number of lamellæ or plates (*gills*). The exposed surface of the gill is the fruiting, spore-bearing, or hymenial surface, certain of the cells of which it is composed (*basidia*) bearing the clusters of the four spores characteristic of the M. tribe. It should be noted that during the early stage of growth the pileus is attached to the stem by a membrane (*veil*), which on rupturing leaves a portion as a ring round the stem (*annulus*). The mature spores readily germinate, forming a mycelium, which in its turn continues reproduction. From the colour of the spores—white, brown, pink, purple, and black—five natural divisions for classification have been established, the total species numbering upwards of 1000, of which over 450 are British. Among those of most interest or use, the following may be enumerated. Fly M. (*A. muscarius*), viscid, with a warted orange or scarlet pileus, and having a yellowish flesh, found in woods in autumn. It is highly narcotic, producing intoxication, delirium, and death. Parasol M. (*A. procerus*), pileus 3-7 in. broad; cuticle velvety, red brown; gills very remote; common in pastures; esculent, with a pleasant taste and smell. Horse M. (*A. arvensis*), pileus 4-18 in. broad; white, very thick, firm, and tough; distinguished from the next by the almost white gills (when young), and the yellow stains of the flesh when bruised; found in meadows, often forming large rings; doubtfully esculent, but good for ketchup. Common M. (*A. campestris*), with its several varieties, the favourite British esculent, but said to acquire deleterious properties in Italy; the gills are at first of a beautiful pink, becoming dark with age; found in pastures, &c., and common in cultivation. In other genera of the order *Agaricini* may be mentioned as edible species the Fairy-ring Champignon or Scotch Bonnets (*Marasmius oreades*), common in exposed pastures, and the Chantarelle (*Cantharellus cibarius*), common in woods; of an egg-yellow colour, with a smell like an apricot. A European species (*A. Cæsarius*) occurring in the middle and S. of Europe, in spruce forests, has long been famed on the Continent as a highly delicious M. As to distinguishing poisonous fungi from the edible or harmless species, no precise characters can be given, but as a general rule those that have a disagreeable smell should be rejected; also those of a lurid colour, and those that when tasted leave a burning sensation in the mouth. In case of accident a strong mustard emetic should be administered, and medical advice obtained. In cultivating M. a good bed of half-dried droppings of highly-fed horses to form the bed, good spawn, and a gentle, moist atmosphere are the principal things required.



Agaricus campestris (Common Mushroom).

Mu'sic, one of the most delightful of the arts, is produced by a skilful combination of agreeable sounds. As some people are colour blind, others are so constituted that music affords them no pleasure. But it has a potent influence over the great majority of mankind; and the higher the state of civilisation that influence becomes purer and more refined. M. is in truth one of the most glorious of gifts. Even by itself it exerts a wonderful influence upon the emotional part of our being, inspiring kindred feelings within us according as its character is sublime, mirthful, passionate, or plaintive; wedded to poetry it appeals with double force to the intellect and heart. The troubadour has pressed it into the service of love, the warrior has sounded on it the note to battle, the priest has made it the medium of his praises to the Most High. The ecstasy of joy unconsciously breaks forth into singing, as the Israelites sang on their deliverance from Pharaoh; sadness is soothed by sympathetic melody, even as the sweet harp of David drove the evil spirit out of Saul. The character of peoples can often be traced in their national music. Racy of the soil are the deep sentiment of German Volkslieder, the ornate beauty of Italian arias, the light-hearted gaiety of French chansons, the homely ballads of England, the patriotic songs of Scotland, and the changeful—now gloomy, now sprightly—melodies of Ireland. And each great composer has his own secret and his own charm. The enthralling splendour of Mozart carries us into the furthest regions of phantasy and fairyland, while the gate of Heaven itself seems to open in the mighty magnificence of Beethoven and the majestic strains of Bach and Handel.

Theoretical music deals with the nature of sounds, their ratio, and relations, and with the science of acoustics. Practical music embraces the art of composition, and its performance, vocal and instrumental. In the brief space at our disposal, we can do no more than touch on a few of the leading points in each of these departments. Additional information may be gleaned under various headings in the work, but we must refer those who desire anything like a comprehensive knowledge of this vast subject to the list of authorities appended to this article.

Sounds are produced by vibrations of the air, and when these are regular and rapid they become musical. The pitch of a sound depends upon the rapidity of vibrations; the swifter the vibrations, the higher the pitch. Thus the deepest really musical sound gives about 40 vibrations in the second, the highest about 5000 in the same time (D of the piccolo flute, 4752 vibrations). Within these limits rather less than seven octaves are comprised, which may be considered the extent of sound available for the purposes of the art. An octave represents the space between any given note, and the note which produces in the same time exactly twice its number of vibrations. Thus the note called middle C in the pianoforte (although in France it has 522 and in England and Germany 528 vibrations) is usually assumed to give 512 vibrations in the second. The C an octave higher will consequently give 1024 vibrations, and if the notes be struck together the sounds will be in unison, the interval between them including all the notes in the musical system. According to the diatonic scale in use in music there are seven distinct steps of pitch in the octave, all of which bear distinct ratios to the key or primary note as follows:—

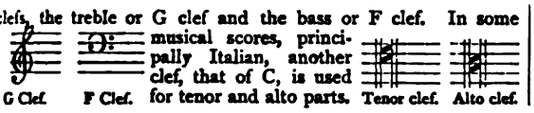
Name of note in key of C major,	C Do	D Re	E Mi	F Fa	G Sol	A La	B Si	C Do
Ratio to key-note,	1	: $\frac{8}{9}$	: $\frac{4}{5}$	: $\frac{3}{4}$	: $\frac{2}{3}$	: $\frac{3}{5}$	: $\frac{8}{15}$	: 2

These notes form a 'gamut,' and a higher or lower gamut is produced by simply doubling or halving the number of vibrations.
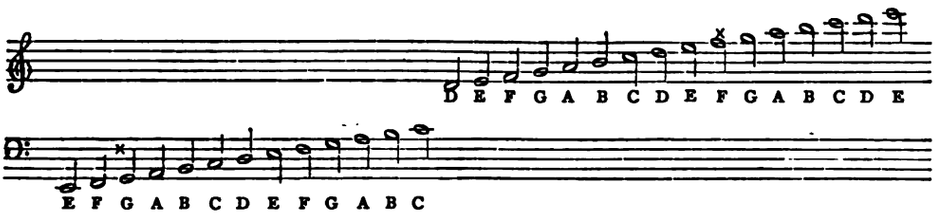
The simpler the ratio, the greater the harmony; the more complex the ratio, the greater the discord. When musical sounds are produced by stretched strings of equal weight and tension, a string half the length of another will give twice the number of vibrations, and thus sound an octave higher. And the ratios given above will apply *reciprocally* to the length of strings producing the respective notes.

Musical compositions are expressed by notes on five horizontal lines called a staff, which notes take their names according to the key or 'clef' used. In pianoforte M. there are two
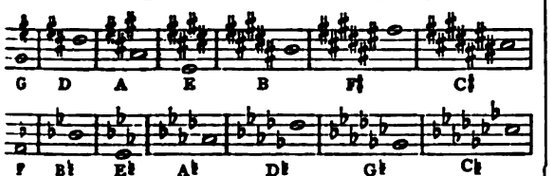
clefs, the treble or G clef and the bass or F clef. In some musical scores, principally Italian, another clef, that of C, is used for tenor and alto parts.
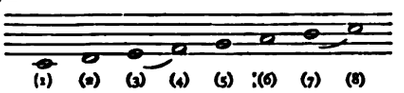


Higher or lower notes necessary in a piece of music are placed on what are called ledger lines, being supplementary lines placed where required above or below the staff. The following is the musical scale for all ordinary ranges of the human voice :—



the most usual range of voice being from lower G to upper F, as marked thus ×. A sharp (♯) placed before a note raises it a semitone, a flat (♭) lowers it to the same extent. The alteration is increased to two semitones by the prefix of a double sharp (×, or double flat (♭♭). A sharp or flat placed at the beginning of a staff affects every note in the line. A natural (♮) restores a note which has been raised by a sharp or lowered by a flat to its normal state. The notes C D E, &c., on the pianoforte and organ are given by the white keys, while the sharps and flats are supplied by the black keys. In the key of C Major, that is the scale with C for its initial note, no black keys are necessary. All the other major gamnts are modelled on the primitive gamut of C, and are formed by the natural notes modified by the insertion of sharps or flats when necessary to produce the major musical progression. In the key of G, for example, one note (F) requires to be sharpened ; in the key of F one note (B) is flattened. Beneath are the signatures of the different major keys :—
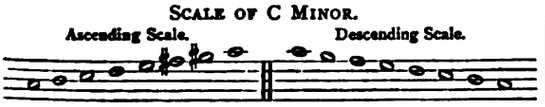


In a diatonic scale, the various notes proceed from the key-note to its octave by five tones and two semitones. A tone signifies the distance between two sounds which have only one sound between them ; a semitone is the smallest interval recognised in music. In the following major scale the semitones are indicated by slurs :—



Numbering these notes, they take the following names :—(1) tonic, (2) supertonic, (3) mediant, (4) subdominant, (5) dominant, (6) submediant, (7) subtonic or leading note, (8) final note. The tonic, the subdominant, and the dominant are the emphatic or governing notes of the scale. The first four and last four notes of the scale form two 'tetrachords,' each consisting of two tones and one semitone. Another series of diatonic scales are the minor mode, which differ from the major mode by the introduction of a minor instead of a major third. In the ascending scale the 7th requires to be sharpened, and the 6th is usually sharpened also, to avoid harshness. This is not done in the descending scale.

SCALE OF C MINOR.



Major and minor scales which have the same signatures are called relative. The following is a list thereof :—

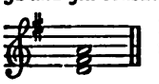
Major Scale (in)	C	G	D	A	E	B	F♯	C♯	F	B♭	E♭	A♭	D♭	G♭	C♭
relative to Minor Scale (in)	A	E	B	F♯	C♯	G♯	D♯	A♯	D	G	C	F	B♭	E♭	A♭

Chromatic scales include thirteen notes in the octave, embellishing the diatonic scale by its semitones, and usually ascending by sharps and descending by flats. The enharmonic scale unites the ascending and descending scale of the chromatic, and includes every note to be found in the octave. An interval is the distance from any one note to another. The following are the various intervals in the octave :—

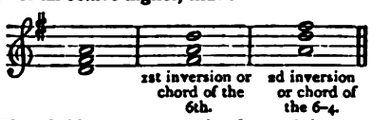
NAME OF INTERVAL.	NUMBER OF SEMITONES.	DISTANCE.
Minor Second	One	C to D♭
Major Second	Two	C to D
Minor Third	Three	C to E♭
Major Third	Four	C to E
Augmented Fourth	Six	C to F
Perfect Fourth	Five	C to F♯
Imperfect Fifth	Six	C to G♭
Perfect Fifth	Seven	C to G
Minor Sixth	Eight	C to A♭
Major Sixth	Nine	C to A
Minor Seventh	Ten	C to B♭
Major Seventh	Eleven	C to B
Octave	Twelve	C to C

A diatonic interval may be augmented by diminishing or augmenting either of the notes by one semitone. It is then called a chromatic interval.

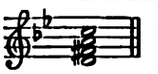
Harmony is a combination of simultaneous sounds, each combination being called a chord. A note struck together with its 3d and 5th constitute a triad or common chord:—
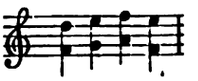


It may be inverted by transferring the root-notes an octave higher, thus :—

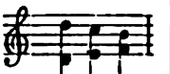


The addition of a 7th to the triad gives a chord of the 7th, of a 9th a chord of the 9th, &c., &c. The triad is a consonant chord containing perfect concord, the others are all dissonant containing discords. The chord of the dominant 7th consists of a major triad and minor 7th ;



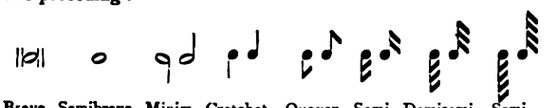
The chord of the dominant 9–7 consists of the chord of the dominant 7th with its 9th added. These chords are all subject to inversion, and also to chromatic alteration. Upon a thorough knowledge of harmony the merits and beauty of a composition greatly rest. Melody depends solely upon the imagination, harmony on the imagination combined with experience and judgment. The closing chords in a piece of music are called a cadence. When the notes in a chord rise or fall together we speak of them as proceeding in direct motion, when one rises and the other falls or *vice versa* we call it contrary motion. When a piece of music changes from one key to another, the alteration is described as modulation.
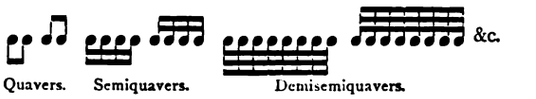




Musical Notation.—The following are the forms of notes in

use, each in succession being half the length in duration of the one preceding :—



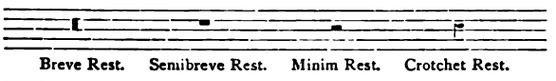
Breve. Semibreve. Minim. Crotchet. Quaver. Semi-quaver. Demisemi-quaver. Semi-demisemi-quaver.

A number of hooked notes are grouped together thus :—

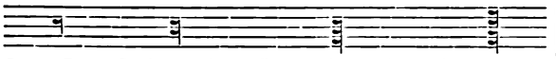


Quavers. Semiquavers. Demisemiquavers. &c.

A dot after a note lengthens it by one-half, a double dot by three-fourths. When silence takes place in a musical composition for a longer or shorter time it is indicated by a rest :—



Breve Rest. Semibreve Rest. Minim Rest. Crotchet Rest.



Quaver Rest. Semiquaver Rest. Demisemiquaver Rest. Semidemisemi-quaver Rest.

A great number of signs are also used in M. The pause placed over a note or rest signifies that it is to be prolonged ; implies repetition ; a short note placed before an ordinary note (called an appoggiatura) is meant to be accented, and deprives the second note of one-half or a lesser proportion of its value. The slur signifies that the notes so marked are to run smoothly into one another. A dash | or point · placed over a note directs it to be played 'staccato,' sharply and distinctly. *f* (*forte*, loudly), *mf* (*mezzo-forte*, rather loudly), *p* (*piano*, softly), *ff* (*fortissimo*) and *pp* (*pianissimo*) are directions that contain their own interpretation. < crescendo and > diminuendo denote a gradual increase or diminution of volume of sound. Musical terms are invariably taken from the Italian language, and are very numerous. Most works of music contain glossaries of these. *Largo*, *Adagio*, *Andante*, *Moderato*, *Allegro*, *Vivace*, and *Presto* are among the more common directions as to time, and express various degrees of rapidity in the order in which they are here written.

Rhythm is to M. what prosody is to poetry. It divides a composition into bars, phrases and sections. Bars each contain a certain and equal number of beats. At the end of a strain a double bar is placed. A composition is said to be written in common time when two or four beats are in a bar, and in triple or ternary time when three beats are in a bar. In common time the first note and the first note in the second half of the bar are accented, in triple time the first note alone. When beats are of the value of dotted notes, the time is called compound common or compound triple time, as the case may be. The time is indicated at the commencement of a composition by a signature.



Single bar. Double bar.



for common time crochet beats;



for common time minim beats.

$\frac{2}{4}$ expressed thus : $\frac{2}{4}$ for 2 crotchets in the bar, $\frac{4}{4}$ for 4 crotchets, $\frac{3}{2}$ for 3 minims, $\frac{3}{4}$ for 3 crochets, $\frac{3}{8}$ for 3 quavers, and so on, the denominator of the fraction always expressing the division of the semibreve, and the numerator the number of these in the bar.

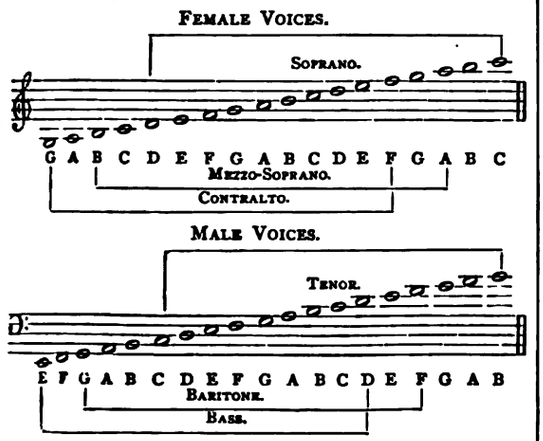
Composition.—The key to musical composition was formerly thought to be a knowledge of counterpoint, or polyphony, which is the art of part-writing, or of adding supplementary parts either above or below a musical phrase. Each added part must form a melody in itself, yet the combination must be so arranged as to secure perfect harmony. In a canon the melody repeats itself in the different parts, one portion thus forming an accompaniment to another. In a fugue the parts somewhat similarly follow in imitation. Though a freer and more imaginative style (homophony) is substituted in modern M. for the stiff and quasi-pedantic teaching of earlier days, counterpoint is still a branch of the art which demands the attention of every composer. The earlier masters were such proficients in it that compositions containing twelve and more individual parts were common. A manuscript is said to be in existence with ninety-six parts. The writing of parts for different instruments is called 'scoring.' A thorough composer is able to write a score without hearing it, and often to judge its effect as correctly in his study as in the concert-room.

Musical compositions are of many kinds. To purely vocal M., arias, part-songs, glees, madrigals, and cantatas may be said to belong, though most of these have instrumental settings. Sacred pieces, such as masses, requiems, oratorios, *Te Deums*, and church service M. are also chiefly written for the voice, with organ or orchestral accompaniments. In opera, though the singing is of course the leading attraction, the instrumentation is of great importance, and entire sections, such as the overture, the entracte, and the ballet, are composed for the orchestra alone. Sonatas, concertos, &c., are among non-vocal compositions, and, written for one or more instruments as solos, trios, quartettes, &c., are usually termed 'chamber M.' The symphony, which is designed for a full orchestra, is the same in form as the sonata, elongated and elaborated, and consists of several (usually four) independent movements. A scherzo is a quick gay movement. A rondo, a kind of piece which rambles round again to the phrase with which it opened, is a very important movement. There are five separate rondo forms, an exhaustive treatment of which will be found in the German edition of Dr. Marx's *Theory of M.* (vol. iii.). Marches of various kinds, and old-fashioned dances like the minuet and gavotte, are favourite interludes. The crowning peroration of an entire work is termed the 'Finale.' The character of many minor pieces, nocturnes, serenades, fantasias, &c., is apparent from their titles.

Musical Instruments may be classed as (1) stringed instruments, (2) wind-instruments, and (3) instruments of percussion. (1) The pianoforte, which has superseded the clavichord, harpsichord, and other instruments of the kind, ought strictly to be called an instrument of percussion, as the notes are produced by hammers striking strings. Stringed instruments of friction include the violin (four strings), the viola (four strings tuned one-fifth below the violin), the violoncello (four strings), the double-bass (three strings, the sounds of which are an octave lower than written). In France and Germany the four-stringed double bass is much used. Double bass is sometimes tuned in fourths. On all these instruments the strings are tuned in fifths, the intermediate notes being procured by stopping the strings with the finger, thus shortening the vibrating portion. Stringed instruments, such as the harp, are called pectral, from being plucked with the fingers. The natural key of the harp is C♭, and with the aid of pedals the pitch of the strings can be inflected one or two semitones. (2) The organ is built of wooden or metal pipes of widely different lengths, the air being supplied by a bellows, and having various sets of keys for the hands called manuals, and a set for the feet called pedals. The harmonium is another instrument with a key-board and bellows. Various kinds of flutes are used. The highest (the piccolo) plays an octave higher than the notes written. The trumpet, cornet-à-piston, oboe, clarionet, bassoon, double-bassoon, French horn, trombone, serpent, and ophicleide, are other important wind instruments. Some of these are only used in military bands. (3) Instruments of percussion include the kettle-drum, side drum, bass drum, cymbals, the triangle, &c. The usual proportion of instruments in an orchestra may be gathered from the following analysis of the orchestra of the London Philharmonic Society in 1876. Of 78 instruments, there were 13 first violins, 12 second violins, 9 violas, 10 violoncellos, 8 double basses, 2 flutes, 1 piccolo, 2 oboes, 2 clarionets, 2 bassoons, 4 horns, 3 trumpets, 3 trombones, 2 harps, and 6 drums and minor instruments. The Handel Festival Orchestra, at the Crystal Palace, numbering 447 performers, comprised 91 first violins, 90 second violins, 66 violas, 61 violoncellos, 59 double basses, 7 flutes, 6 piccolos, 7 oboes, 8 clarionets, 8 bassoons, 2 double-bassoons, 6 trumpets, 5 cornets, 12 horns, 9 trombones, 2 ophicleides, 3 double drums, 1 bass drum, and 4 side drums.

Female voices are divided into soprano, mezzo-soprano, and contralto ; male voices into tenor, baritone, and bass. The

character of a voice is often not determined by range of notes, but by those which are best in quality. The following table shows the compass and relative position of the various voices:



Ordinary voices do not as a rule exceed two octaves in range, but some very extraordinary singers have had voices ranging through three and sometimes even three and a half octaves. The highest note recorded is the (C) one octave above the soprano C in the table, which on the authority of Mozart was taken by Lucrezia Ajugari. On the other hand, some very exceptional bass singers have sung the F one octave lower than the lowest in the table for male voices.

History.—M. of one kind or another has existed from the earliest times. In Asiatic countries it has made scarcely any progress for centuries, and in its present condition is probably akin to the art as known to the ancients. The Hindus at an early date developed a mathematical and scientific knowledge of acoustics. Among the ancient Egyptians certain families were set apart as musicians, and the Hebrews probably derived the art from this source. We know that the singing in the Temple was conducted by alternate choirs, and that both wind and stringed instruments were used by the Jews. M. entered heartily into their religious and national life. There has been much contention as to the acquaintance of the Greeks with the art. In the Greek drama the speeches were made in recitative, and the performers wore metallic masks to add to the resonance of the declamation. The lyre, flute, trumpet, and pandean-pipes seem to have been the chief instruments of accompaniment. The Romans cultivated M. but languidly. It had a place in their drama, and female players performed at their festivals. The early hymns of the Christian Church, borrowed from Hebrew and Pagan sources, form the basis of our modern M. Pope Gregory gave it a vast impetus by the introduction of the chants which bear his name and the formation of a school of musicians. In the 9th c. harmonies were introduced. Meanwhile national melodies sprung up, and the era of minstrels and minnesingers began. The first attempt at musical notation was made by Guido, a Benedictine monk of Arezzo, who conceived in 1022 the idea of representing notes on horizontal lines. The science and the study of counterpoint received great attention in Holland in the 14th and 15th centuries. The most celebrated of the Dutch composers, Josquin des Pres, exerted an influence all over Europe, and Palestrina in Italy, following in his footsteps, made enormous improvements in church M. Madrigals in the 16th c. became greatly in vogue in England, which could boast of such composers as Tallis, Morly, and Willbye. Italian opera seems to date from the production of Peri's *Euridice* at Florence in 1600. Among the composers of the 17th c. were Monteverde in Italy, Cambert in France, and Purcell in England. In the 18th c. M. took wondrous flights. In this century were born Handel, Bach, Haydn, Glück, Mozart, Beethoven, Marcello, Scarlati, Porpora, Clementi, Cimarosa, Spontini, Cherubini, Rossini, and a host of illustrious composers. It were vain to attempt to follow the giant progress of the art. Church M. was perfected by Bach, the oratorio was almost created by Handel, opera under Mozart and Glück attained its highest development, orchestral M. became beautiful under Haydn, sublime under Beethoven. Nor have the musical geniuses of our own day been few. The 19th c. can claim Mendelssohn, Weber, Meyerbeer, Auber, Schubert, Spohr, Schumann, Chopin, Bellini, Verdi, Wallace, Sterndale Bennett, and Gounod as its sons. Instrumental performance has been carried to a higher pitch than ever by great virtuosos like Paganini, Thalberg, Joachim, and Von Bulow. The art has become popular as it never was before, and inspires a hundred students for one dilletante a century back. And the tide of progress in its history has not yet receded. Brahms, Raff, Rubinstein, Lizst, Gade, Rudorff, Berlioz, Massenet, Bizêt, and the great Wagner himself point to a glorious 'M. of the Future.'

References.—Burney's *General History of M.* (4 vols. Lond. 1776); Hawkin's *General History of the Science and Practice of M.* (5 vols. Lond. 1776; new ed. 2 vols. 1853); Hullah's *History of Modern M.* (1862); Fetis' *Histoire Generale de la Musique;* Ouseley's *Treatise on Harmony* (Ox. 1868); Richter's *Lehrbuch der Harmonie* (Leips. 6th ed, 1866); Weber's *Allgemeine Musiklehre* (Darms. 1872); Chappell's *History of M.* (1874 *et seq.*); H. C. Banister's *M.* (Lond. and Cam. 5th ed. 1875); Blaserna's *Theory of Sound in its Relations to M.* (Lond. 1877); Bosanquet's *Elementary Treatise on Musical Intervals and Temperament* (Lond. 1877); and Hullah's *M. in the House* (Lond. 1877). A list of over 500 works on M. is given in Dr. F. L. Ritter's *History of M.* (Lond. 1877).

Mu'sical Box, a case fitted with a mechanical contrivance for playing tunes. Such boxes first came into fashion about the beginning of the 18th c., when it was common to attach small ones as pendants to watch-chains. The mechanism consists of a steel board with tongues of different sizes called a comb, a cylinder fitted with small steel points, and a fly or regulator. The notes are produced by the revolving action of the cylinder on the comb; the shorter the tongues the quicker being the vibrations, and consequently the higher the pitch. Some boxes play as many as 100 tunes. The most famous manufactories of these articles are at Geneva and St. Croix, Switzerland, at Prague, and at St. Susanne, France. Musical clocks are extensively manufactured in the Black Forest. The insertion of reeds, pipes, bells, castanets, &c., produce different kinds of boxes, such as the mandoline, organocleide, &c.

Musical Glasses, an instrument composed of glass goblets filled more or less with water, to be struck gently and rapidly with the end of a damped finger. A complete scale is formed by graduating the quantity of water, the less the quantity the ower being the pitch of the sound produced.

Music Halls, cheap-priced places of entertainment, somewhat akin to the French Cafés Chantants, where refreshments are supplied, and comic singing, dancing, and acrobatic exhibitions form the leading attractions. Within the last twenty years M. H. have become very numerous in England, every town containing one or more, which are largely resorted to chiefly by the working classes. The entertainments, though usually harmless, are with few exceptions of an inferior and often of a vulgar type. Some of the M. H. in London, the 'Canterbury,' for instance (opened 1876), are enormous and splendid buildings.

Musk Deer (*Moschus*), a genus of deer belonging to the family *Moschidæ*, which differ from the true Deer (q. v.) or *Cervidæ*, in having largely-developed upper canine teeth in the male animals, while horns are absent in both sexes. The males alone secrete 'musk,' which is contained within a glandular bag placed in the abdomen. The scent of this perfume is exceedingly powerful, and it is said that the musk-bag must be cut off at once from the animal after it has been killed, otherwise the flesh becomes impregnated and tainted with the odour. The *M. moschatus* is the common species of M. D. It occurs in N. India, and attains a height of from 2 to 2½ feet, the colour being a light brown. Another species is the pigmy M. D., or Kanchil of Java (*Tragulus pygmæus*), which is distinguished by the black stripe running across the chest, and by its smaller size. This animal is exceedingly wary and cunning, and counterfeits death to escape the toils of the hunter. In the M. D. the blood-corpuscles are exceedingly minute, and much smaller than those of any other mammal. When extracted from the musk-gland, musk is in the form of brownish granules or pellets, somewhat greasy to the touch.

About 190 grains are found on an average in each sac. In commerce two forms of musk are distinguished—Tonquin or Thibet musk, worth £3, 10s. per oz. in the grain, and the Siberian or Russian variety, worth about 15s. per oz. The former is thus much the more valuable of the two kinds, and is imported in oblique boxes lined with lead; the musk bags, each separately rolled in Chinese paper of red or blue colour, being placed in these boxes. About 10,000 oz. are annually imported into Britain.

Musk Duck (*Cairina moschata*), a species of Duck (q. v.) found on the Central American coasts, and receiving its name from its musky odour. It is common in Guiana in winter, is of a glossy black colour, with white wing-coverts, and attains a larger size than the common duck. The hinder toe is elevated, and the base of the bill has a tubercle, while the head in the male is crested. A species of duck also named the M. D. occurs in Australia, and belongs to the genus *Biziura*.

Mus'ket (Ger. *muskete*, Fr. *mousquet*, from Med. Lat. *muschetta*, a warlike engine for throwing bolts, derived from the name of the male young of the sparrow-hawk, it being customary in the middle ages to name projectile machines after different species of hawks), a firearm introduced early in the 16th c., and carried by European foot-soldiers called musketeers. It was distinguished from the Arquebus (q. v.) merely by its larger calibre and by its great weight, necessitating the use of a rest or staff with a forked head. Gustavus Adolphus reduced the weight of the M. from 15 lbs. to 10 lbs., and thereby dispensed with the support. In the end of the 17th c. the flint-lock M. (Fr. *fusil*) became the approved weapon for infantry. This firearm was improved by the invention of the percussion lock early in the present century, and eventually was superseded by the Rifle (q. v.). Most if not all European nations have schools of musketry. The English school at Hythe is superintended by a commandant and inspector-general of musketry instruction, with subordinate instructors. The inspector-general exercises a supervision over every regiment in the service.

Musketoon', a disused small kind of musket with a wide trumpet-shaped mouth like the blunderbuss, called in France *mousquet tonnerre*.

Musk Ox (*Ovibos moschatus*), a genus of *Bovidæ* or oxen found in the Arctic regions and in the extreme N. of the New World, and distinguished by their peculiarly-shaped horns, which are about 2 feet long, and are broad and united at the base, thus forming a kind of bony shield on the forehead. The horns curve downwards and then upwards in the male; in the female they are set widely apart on the head, and simply curved. The muzzle is hairy, and the woolly hair is extremely long and of dark-brown colour. The flesh is strongly impregnated with a musky odour. The M. O. is active in habits, and lives in precipitous localities. It is considered by some authorities to exhibit a structure intermediate between the sheep and the ox, is gregarious in habits, and feeds on mosses and lichens.



Musk Plant, Musk Root, Musk Tree, Musk Wood, are names given to various plants from their musk-like odour. For the first see MIMULUS. The second is generally termed sumbul root, and though long known to trade and used in medicine for nervous diseases, it was only in 1869 that M. Kauffman discovered it to be the root of an umbelliferous plant collected by him in Russian Turkestan, to which he gave the name of *Euryangium sumbul*. It has a very powerful odour of musk, and a bitterish acrid taste. The third—an old greenhouse favourite for the pleasant smell of its leaves—is the *Aster argophylla*, a native of Tasmania. The fourth is a Jamaica tree (*Guarea Swartzii*) of about 20 feet in height belonging to *Meliaceæ*. All parts, especially the bark, have a strong smell of musk, and probably the tree is possessed of medicinal properties. Other plants might be brought into the present category, for it is well known that Oriental physicians use a number of vegetable substances with this powerful odour in their various compounds.

Musk-Rat. Under this name several very different quadrupeds are included. (1) The *Musquash* or M.-R. of N. America is described in the article Musquash. (2) The Dæsman or Desman (*Galemys Pyrenaica*) belongs to the *Insectivora* (q. v.), and is also known by the name of M.-R., from the musky odour it exhales. This animal is found in the Pyrenees. An allied species, the Russian Dæsman (*G. moschata*), is common in the Volga and other rivers of S. Russia. The Desmans have a long muzzle, ending in a slender proboscis. Their feet are webbed, and have five toes each. The tail is long, and sparsely covered with hair. There are no canine teeth; but two upper and four lower incisors, the molars numbering eight above, and six below. These animals closely resemble the water-shrews in appearance and habits. The Russian species attains a length of 17 inches, and is brown above and white below, the fur being highly esteemed. The French or Pyrenean species is much smaller, its tail tapers, and its colour is reddish-brown above and greyish-white below. The musky odour proceeds from certain glands placed near the tail. The animals feed on the crustaceous worms, &c., which they obtain in rivers and lakes. (3) The Indian M.-R. (*Sorex murinus*), or 'Sondeli,' is a true shrew (*Insectivora*). It exudes an odour from musk-glands, so strong that it is even said to be capable of impregnating wine through the cork which it has touched. It is of a reddish-chestnut hue above, and grey on the under parts. The muzzle, as in the shrews, is pointed. The average size is that of a large rat.

Mus'lin, a fine cotton fabric, used plain, dyed, or printed, for ladies' dresses, or figured or embroidered for curtains and furniture coverings. M. derives its name from the Asiatic town, Mosul, where manufactories of cotton stuffs of great lightness and beauty formerly existed. Two thousand years ago Bengal was celebrated for cotton fabrics of exceeding thinness, and Dacca in that province still excels in the production of the finest muslins. England sends out to all parts of the world muslins of great variety; and in France, figured and embroidered muslins are a speciality of Tarare and St. Quentin.

Mus'quash (*Fiber Zibethicus*), a species of Rodentia (q. v.), also known as the *Ondatra* and as the 'Musk Rat.' It belongs to the *Castoridæ* or Beaver family, and is found in N. America above the 20th degree of latitude. It attains a length of two feet; its colour being a dark-brown above, and ashen-grey below. The incisor teeth are white and very prominent. The M. inhabits burrows which it excavates in the banks of rivers, but occasionally builds 'lodges' or habitations like the beaver. It is hunted for the sake of the fur. Its food consists of crustaceans and molluscs, but the M. has been known to feed on vegetable matters and to devastate gardens. The hinder feet are webbed, and the animal swims and dives with great facility. It is doubtful whether the M. exhales a musky odour.

Muss'el, a name given to various *Lamellibranchiate* (q. v.) Molluscs, belonging to different families. Thus the Freshwater Mussel (q. v.) belongs to the family *Unionidæ*. The marine mussels are included in the *Mytilidæ*, in which the shell is equivalve, and the hinge toothless. The impression of the *anterior adductor muscle* of the shell is small, that of the *posterior adductor* large. The 'foot' of the mussel secretes a *byssus* or 'beard,' by means of which it attaches itself to fixed objects; it is cylindrical in shape, and grooved. The halves or lobes of the *mantle* are united between the apertures by means of which water is inhaled or exhaled. The common M. is the *Mytilus edulis*, abundant on the British coasts, and largely used for bait by fishermen. It occupies the crevices of rocks and stones, and is found adhering in immense numbers to wooden poles immersed in the sea. Mussels are regularly 'farmed' in France like oysters. The horse M. of the sea belongs to the genus *Modiola*, and is larger than the common species; while a species allied to the latter is the Magellanic M. (*M. Magellanicus*). Mussels are a favourite article of food among the lower classes. They may be safely eaten if obtained from pure water, and from coasts on which no sewage-contamination is allowed to escape. Cases are on record in which serious illness has resulted from eating mussels taken from docks and harbours.

Probably the nature of the food on which such molluscs feed is the cause of their poisonous properties. The pearl M. belongs to a different family from the common M.

Muss'elburgh, a small seaport town of Scotland, in Midlothian, stands 6 miles E. of Edinburgh by rail, at the mouth of the Esk, which divides it from the suburb of Fisherrow. Its chief objects of interest are a Roman bridge, the tolbooth (1590), Pinkie House, and a monument to D. M. Moir (q.v.), a native of the place; while fishing, brewing, tanning, and manufactures of nets, sailcloth, starch, and oilcake form the leading industries. The Edinburgh races are held three times a year on the M. golflinks. As one of the Leith Burghs, M. joins in returning one member to Parliament. Pop., with Fisherrow and Westpans (1871), 4999.

Muss'et, Louis Charles Alfred de, the descendant of an ancient Vendomois family, was born at Paris, 11th November 1810, and educated at the Collège Henri IV., where he formed a friendship with the Orleans princes, and carried off the prize of philosophy (1827). His earliest poetical efforts—an elegy (1828), ballad, and drama—exist only in fragments. These bear a strong Romantic impress, and were indeed suggested by a visit to Victor Hugo. His next masters, Shakespeare, Byron, and Richardson, exercised no apparent influence on *Les Contes d'Espagne et d'Italie* (1830), a bizarre, sensuous work, whose mingled passion and mockery, native elegance and studied trivality, ensured its success. The Revolution of 1830 dispersed M.'s comrades of the 'Cénacle,' and thenceforward began that life which was one long suicide, its central episode the visit to Italy (1833–34) in company with George Sand, depicted by that writer in her *Elle et Lui*, and by the poet's brother in *Lui et Elle* (1859). By Louis-Philippe M. was appointed librarian to the Ministry of the Interior, a post which, taken from him in 1848, was restored under the Empire; and in 1852 he was admitted to the French Academy. He died of heart-disease at Paris, May 1, 1857. The *Œuvres Complètes* of M. (10 vols. 1865) include the *Spectacle dans un Fauteuil* (1832); *Les Nuits* (1835–37), in which, says Sainte-Beuve, his lyric talent reaches its loftiest elevation; *Lettre à Lamartine* (1836); the famous retort to Becker's *Rheinlied—Nous l'avons eu votre Rhin Allemand* (1840); *Namouna* (1832), a prose romance of the Don Juan type; and a series of comedies, of which *La Nuit Vénitienne* was condemned at the Odéon (1st December 1830), and *Le Chandelier*, prohibited after forty representations (1847). Many of these appeared originally in the *Revue des Deux Mondes*, and all are marked by that contest of a twofold nature, seeing the good but following evil, by that blending of cynicism with enthusiasm, of child-like naïvete with *blasé* heartlessness, of melancholy with wild abandonment, which have endeared M., above all his brethren, as the typical and national poet of the France of the 19th c., to the present generation of Frenchmen. Wanting the wit of Heine and the sublimity of Byron, he is yet far nobler than the German, more tender than the English poet. See the *Biographie de A. de M.* (Par. 1877), an elaborate *pièce justificative* by his brother, Paul de M.; and the soberer *A. de M.* (Berl. 1877) of Paul Lindau. The most recent edition of his *Œuvres Complètes* was published by Charpentier (Par. 1876).

Mussou'ree, a hill station and sanitarium, in the district of Dehra Dûn, N.W. Provinces, British India, 6282 feet above the sea, and 1058 miles N.W. of Calcutta. Pop. (1872) 2445, but in the season about 8000. In the hot weather M. is crowded with Europeans, who have established churches, schools, hotels, clubs, and banks. Beer, also, is largely brewed. The railway station is Rûrkee, from whence there is a good road. M. was a refuge for non-combatants during the Mutiny of 1857. It has recently obtained a bad reputation for gambling.

Muss'ulman (Arab. *moslemûna*, pl. of *moslem*), a Mohammedan. The English plural is *Mussulmans*. See ISLAM.

Mus'tang. See HORSE.

Mus'tard, a word of doubtful derivation, but accepted as the common name for the genus *Sinapis*, to which the plants belong that supply the condiment so generally used. The species are herbaceous plants, found in most quarters of the globe, but especially in the Mediterranean region. *Sinapis* is now, however, reduced by some botanists to a section of *Brassica*. The Black M. (*S. nigra*), widespread in the eastern hemisphere, and probably a native near the coast in Britain, is a tall, rigid, branched annual, with bright yellow flowers, succeeded by tortuose pods of about half an inch in length, containing seeds of a reddish-brown colour. These furnish the bulk of the M. of trade, causing the plant to be largely cultivated in Durham, Yorkshire, &c. A further supply is obtained from the white M. (*M. alba*), of like distribution to the above, and met with as a colonist in Britain from mid-Scotland southwards. It bears a hispid pod two inches in length, with a sword-shaped beak. The seeds are larger than those of the black M., and of a yellow colour externally. The seed-leaves of *S. alba* are used with those of *Lepidium sativum* to form the salading called 'M. and cress.' Charlock is another species of Sinapis (*S. arvensis*). An oil for burning can be obtained from it, and on the Continent the plant is used for fodder. In Britain it is simply a mischievous weed, in some parts during early summer rendering the cornfields a sheet of yellow by its gaudy flowers. In the E., the leaves of *S. cernua* and *S. Pekinensis* are eaten, and *S. ramosa*, *S. dichotoma*, and *S. glauca* (the last two united by Dr. Hooker to *Brassica campestris*) are cultivated in India for their seeds, where also *S. juncia* is grown for its oil, which is used for burning, and for medicinal purposes. The M. of Scripture (Matt. xiii. 32) is by most supposed to be *S. nigra* (it grows to 15 feet in Palestine), and by others a species of *Salvadora*.

The condimental value of M. depends principally on a pungent volatile oil containing sulphur and nitrogen, and which is present only in the black M. seeds. This oil is not developed till the M. flour is wetted, and consequently M. ought to be prepared for use by moistening it with cold or lukewarm water, and neither hot water nor vinegar should be in the first place mixed with it. There are a considerable variety of recipes for the preparation of flavoured M. for table use, in which flavoured vinegars, spices, ketchup, &c., are employed. M. is also much employed as a stimulating poultice in colds and inflammatory disorders of the chest. For poultices, 'Rigollot's leaves,' consisting of a thin coating of M. on paper, are very convenient and elegant.

Medicinal Properties of M.—The powder of the seeds of *Sinapis nigra*, and *Sinapis alba*, is used in medicine as an emetic and rubefacient. Mustard *poultice* is prepared by mixing 2½ parts of mustard, 2½ of linseed meal, and 10 of boiling water. The two latter should be mixed first, and the mustard should be gradually added while constantly stirring. M. poultice is used as a counter-irritant in inflammation, neuralgic pains, and spasms. M. *paper*, or *Charta sinapis*, is a more elegant and convenient preparation. Before application to the skin, it should be dipped in warm water for about fifteen seconds. *Compound liniment* of M. is used as a stimulating liniment. *Oil* of M. is prepared from the seeds of *black* M. by distillation with water, and when applied to the skin, it produces almost instant vesication; it is contained in the *compound liniment*.

Mustel'idæ, the weasel-family, belonging to the *Carnivorous* order of Mammalia (q. v.). In this family the animals are small in size. Their bodies are long, and the legs short. They walk partly on the tips of the toes, and are hence known as *Semiplantigrade* carnivora; the truly *Plantigrade* forms, such as the bears, placing the whole sole of the foot to the ground in walking. The M. have five toes on each foot.

Mus'ters (It. *mostre*, from Lat. *monstrare*, 'to show'), parades of officers and men for inspection, receipt of pay, or verification of the returns sent in to the Admiralty and War-Office (muster-rolls), are held weekly in the navy, and in the army on the 24th of each month.

Mute, a little utensil composed of wood, brass, &c., intended to soften or deaden the sound of certain musical instruments, such as the violin or cornet.

Mu'tiny (Fr. from *meute* = *émeute*, 'a revolt;' *meute* = Lat. *mota* from *movēre*, 'to move or stir') is a word that expresses any kind of seditious or rebellious conduct on the part of soldiers, sailors, or other public servants, but in Great Britain the *Mutiny Act* refers chiefly to the first of these. It includes the planning, investigating, or taking part in any insurrection against authority, the failing to use the means in your power to suppress it, or to give information to your superior. Under the annual Mutiny Act the sovereign may form Articles of War (q.v.) and constitute courts-martial (see COURT-MARTIAL and MARTIAL LAW), with power to try

criminals in accordance with the articles, and with the provisions of the statute. This Act was first passed in 1689, from which year it has been passed annually with some alteration in its provisions, but without change in any radical point, such as the dependence of a standing army on the consent of Parliament, and the subjection of soldiers to the civil law. It is provided that any officer or private soldier who shall excite a mutiny or join it, or knowing of it shall not give notice to the commanding officer, or who shall desert, or sleep at his post, or leave it before he is relieved, or hold correspondence with a rebel or enemy, or use violence to his superior officer, or disobey his lawful commands, shall incur the penalty of death, or such minor penalty as a court-martial may inflict. The Act, as stated, recognises the supremacy of the civil courts; and any officer or private accused of a civil offence must be delivered to the civil power. Any commanding officer refusing to deliver the accused will be cashiered (see CASHIERING).

Mutt'on (Fr. *mouton*, 'a sheep') is the flesh of full-grown sheep. The best M. is obtained from animals from four to five years of age, but it is seldom sheep are kept more than from two to three years. The flesh of Southdown and of blackfaced sheep is esteemed the sweetest. M. contains considerably more fat and much less nitrogenous matter than beef, but next to beef it is the most valuable and extensively used flesh-food.

Mutt'ra (*Mathurá*), the chief town of the district of the same name, N.W. Provinces, British India, on the right bank of the Jumna, 35 miles N.W. of Agra, and 97 S.E. of Delhi. Pop. (1872) 59,281. It is an ancient city, mentioned by Arrian and Pliny, and it is known to have been a religious centre in the Buddhist period. But it is most famous as the scene of the birth and adventures of Krishna, and as such it is crowded by Vishnuvite pilgrims, for whose guidance there are 1400 families of Chowbays, a sect of Brahmins. The river is lined with *ghauts* or bathing-places, built from the neighbouring quarries of sandstone. M. has twice been sacked by the Mohammedans: by Mahmud of Ghuzni in 1017, who carried off untold wealth from the golden and bejewelled idols, and again by the Afghans in 1757. It was acquired by the British in 1803 from the French adventurer Perron, who had received it as a fief from Scindiah. Its trade is now very great, and its merchants are reckoned extremely wealthy. The chief buildings are the Jumma Musjid of Aurungzebe, the Observatory of the Rajput Prince, Jey Singh, now both in a ruinous state; and the residence and Jain temple of Paruckji, the former treasurer of Scindiah, reputed to be the richest banker in India.—The *district* of M., which is crossed by the Jumna river, and watered by the newly-opened Agra Canal, has an area of 1612 sq. miles, and a pop. (1872) of 887,689. The crops are wheat, barley, millets, pulses, and sugar-cane. It contains the hills of Goverdhun, among which lies Brindabun, the scene of the amorous youth of Krishna. See *Travels of a Hindoo*, by Baboo Bholanauth Chunder (Lond. 1869).

Mu'za (Arabic form of Hebr. *Môsheh*, 'Moses') **Ben-Nasser** (*Abu Abd el Rahman*), a famous Arab soldier, was born at Mecca in 640. Being appointed governor of Africa by the calif Walid I., he reduced (703–9) all the country on the S. shore of the Mediterranean as far as Morocco. After this he sent into Spain his lieutenant Tarik, who quickly overran Andalusia, worsted Roderic, the Gothic king, at the river Guadalete, and took Toledo, the capital of his kingdom. The next summer M. entered Spain with 18,000 men, took Asido (now Medina Sidonia), Beja, Merida, and Saragossa, and sent his son Abd el Aziz to complete the conquest of Andalusia, he himself leading his troops into Catalonia. After the greatest success in other parts of Spain, M. was preparing to carry the war into the mountain-lands of Galicia, when an order from the calif summoned him and Tarik, who had long been rivals, to Damascus. Before their arrival Walid died, and the new calif, Suleiman, deposing both generals, fined M. in a sum equal to £80,000. The calif having caused Abd el Aziz, who had been governor of Spain in his father's absence, to be beheaded, M. soon after died of grief (718).

Myce'lium. Immediately on the germination of the spore in fungi M. is developed. It is a living matted mass of cells in a resting condition, needing only suitable surroundings for vivification and renewal of the species. M. has a great tenacity of life, and is commonly, if not always, perennial. In substance it may consist of simple filaments, loose flocculent masses, branching bundles, pellicular expansions, or compact tuberous masses (as in *Ergot*), and may produce its 'fruit' only once or repeatedly. It is what in the mushroom is called 'spawn.' The M. of certain fungi that did not pass beyond that condition gave rise to the spurious genus *Rhizomorpha*.

Myce'næ, one of the oldest cities of Greece, situated in the N.E. of Argoli, was said to have been built by Perseus. It was celebrated as the city of Agamemnon, and in his time was at the head of Greece. It was displaced from this supremacy by Argos, after its destruction, by which in B.C. 468 it remained desolate. Its ruins, which are of great extent and remarkable interest, include the great Gate of Lions, the chief entrance of the Acropolis, and the Treasury of Atreus, the largest of five subterranean buildings, to which special attention has been recently attracted by the discoveries of Dr. Schliemann.

Myeli'tis (Gr. *myelos*, 'marrow') is the term employed to signify inflammation of the substance of the spinal cord. The acute inflammatory stage, or M. proper, may be followed by softening or ramollissement, by undefined suppuration, or by abscess. The most common affection, however, is the ramollissement, or serous inflammation. This disorganisation may embrace the whole substance of the cord, or only one of its columns; but the centre, or grey substance of the cord is usually more softened than that of the circumference or white surface. M. may exist in the cervical, dorsal, or lumbar portions; but it is most common in those parts which contain the greatest amount of grey substance, the lumbar and the cervical portions. The symptoms of M. are, in general, limited to the parts below the seat of the disease, but they are occasionally reflected from below upwards. The first symptom is numbness, with a sensation of coldness extending up the limb—the arm or leg. This is followed by pain in the back, aggravated by pressure on the seat of inflammation, the pain being succeeded by impaired motion and sensation of one or both limbs, followed by paraplegia, or some other form of palsy. If one side only of the cord be affected, the symptoms are confined to one side only of the body; if the anterior columns be affected the paralysis is that of muscular motion; but if the posterior columns, the more prominent symptoms are those of sensation, and when the grey substance is implicated the function of reflex action is impaired. The peculiarity of the symptoms indicates the seat and nature of the spinal lesion. The disorganisation of the substance of the cord causes paralysis, more or less extensive, according to the seat and extent of the inflammation. When the disease is situated above the origin of the phrenic nerves, death may speedily follow from paralysis of the nerves supplying the diaphragm and other muscles of respiration; but when it extends throughout the cord to the fifth pair of cervical nerves, the upper extremities and those parts which receive their nerve power from a lower level of the cord are paralysed. M. is thus dangerous to life according to the portion of the cord affected.

Myg'ale, a genus of *Arachnida* or Spiders having large hairy bodies, four breathing sacs, and only two pairs of *spinnerets* or silk-secreting organs. The eyes or *ocelli* are eight in number. The M. excavates holes in the earth, and closes its dwelling by means of a movable lid. Among the various species may be noticed *M. avicularia* of Surinam, which captures small birds; *M. cancerides*, or the great crab spider; *M. nidulans* of the W. Indies, which makes a trap-door to its nest; and *M. Hentzii* of America.

Myhere' (*Maihár*), the capital of a native state of the same name, in connection with the Baghelcund Agency, Central India, 128 miles S.W. of Allahabad by rail.—The *state* of M. has an area of about 400 sq. miles; pop. 70,000; revenue, £8000. The title of Rajah was conferred on the chief, who belongs to the Jogi or mendicant class, in consideration of losses sustained by him from the construction of the E. Indian Railway.

Myhi Caunta (*Mahí Kántá*), the generic name given to a group of native states in Gujerat, India, which are subordinate to one political agency in connection with the Bombay government. They number seventy-nine altogether, of which by far the most important is Edur (q. v.), and cover a total area of 4000 sq. miles, with a pop. (1872) of 447,000. By treaty with the

British in 1812 they pay a tribute to the Guicowar of Baroda of £13,840, which is collected and guaranteed by the Imperial Government. Many reforms have lately been introduced. The inhabitants mostly belong to the wild tribe of Bheels.

Mylab'ris, a genus of beetles allied to the blister beetles (*Cantharis*). Some species have also blistering properties, and are used under the name of 'blister-flies' to produce vesication. *M. Cichorii*, found in India and China, and *M. Fuesselini* of S. Europe, are thus used.

Mylodon (Gr. 'grinder-teeth') a genus of extinct *Edentata*, the remains of which occur in recent deposits in S. America. The M. attained a length of eleven feet. It had five upper and four lower flat-crowned molars on each side. The front feet were five-toed; the hinder feet had only four toes; and the two outer toes of the hind feet were nailless. *M. robustus* is a familiar species.

Mymensing' (*Maimansinh*), the chief town of the district of the same name in Bengal, British India, on the left bank of the Brahmaputra, 160 miles N.E. of Calcutta. Pop. (1872) 8253. It is also known as Nussirabad.—The *district* of M., which lies between the river and the hills of Assam, has an area of 6293 sq. miles. Pop. (1872) 2,349,917. It is extremely fertile, and forms the great jute-producing tract of Bengal. The external trade is entirely carried on by river. In the year 1875–76 the registered exports were valued at £1,300,000, including £576,000 of jute and £266,000 of rice; the imports were £835,000, chiefly piece-goods, salt, sugar, spices, and timber. The chief centres of trade are Bhyrub, Bazar, and Kerimgunje. The staple food-crop is rice.

Myn'ias, erroneously for **Minyas**, the ancestral hero of the Minyans, a race of nobles in Orchomenus of Bœotia. He is said to have built the first treasury.

Myn'pooree (*Mainpuri*), the chief town of the district of the same name, N.W. Provinces, British India, on the E. Jumna Canal, 727 miles N.W. of Calcutta, and 71 E. of Agra. Pop. (1872) 21,177. During the Mutiny of 1857, the treasury was preserved by the bravery of a single officer, Lieut. de Kantzow; and the Europeans escaped safely to Agra.—The *district* of M., which is bounded S. by the Jumna, and also watered by the canal, has an area of 1696 sq. miles. Pop. (1872) 765,845. The crops are wheat, barley, rice, millets, pulses, and sugar-cane. The exports by rail to Calcutta include wheat, raw cotton, and indigo.

Myo'pia is the term used in ophthalmic medicine to denote short-sightedness or near-sightedness. It is the opposite condition of *Presbyopia*, or long-sightedness.

Myoso'tis. See FORGET-ME-NOT.

Myr'cia, a large genus of *Myrtaceæ*, natives of the tropics of America. The fruits of *M. lanceolata* have a strong turpentine odour, and are used by the Indians for making necklaces. *M. acris* produces berries that have an aromatic smell and taste, for which reason they are utilised in the W. Indies for culinary purposes, as are also the more pungent ones forming the fruit of *M. pimentoides*.

Myriap'oda (Gr. 'myriad-footed'), a class of *Arthropoda* or higher Annulosa (q. v.), distinguished by the large number of legs, the possession of two antennæ or feelers, and the absence of wings; by breathing being carried on by means of *trachæ* or air-tubes; and by the head alone being distinctly marked. The bodies may consist of from 10 to 200 segments. The M. as a whole present very many points of affinity to Insects (q. v.), and especially to the larval stages of some of the latter animals. Newport long ago pointed out this fact, and added that the nervous system of the M. was even more nearly related to that of the *Annelides* or worms than to that of the larval insects. The head in the M. bears two antennæ, and mandibles—provided with poison-fangs in centipedes—and there are maxillæ as in insects. The legs are disposed two to each segment of the body, but, as seen in the *millepedes*, two segments may unite, and four legs thus come to be borne on an apparently single joint. The *digestive system* includes a gullet, stomach, and intestine; there are also salivary glands and biliary tubes. The *heart* consists of a dorsal vessel, divided into a series of chambers, the blood-current being propelled forwards, or in the direction of the head as in insects. The *breathing organs* consist of *trachæ*, or air-holes opening externally by *stigmata*, and resembling in all essential points those described in insects. The *nervous axis* exists as a double cord in *Chilopoda*, of which group the Centipede (q. v.) is a familiar example, but is more usually found as a single cord. The organs of sense comprise *simple eyes* or *ocelli*, and the antennæ already mentioned. The *generative system* in the females is a long tubular ovary opening posteriorly in the centipedes, but anteriorly in the millepedes. The male organs are also tubular, but are more complicated than those of the female. The M. are divided into two orders—Chilopoda and Chilognatha.

Fossil M. first occur in the coal measures, and two genera, *Xylobius* and *Archiulus*, are found associated with fossil coal-plants which they doubtless inhabited.

Myr'ica. See CANDLEBERRY and GALE.

Myristica'ceæ, a small natural order of Dicotyledons, consisting of trees with simple alternate leaves, small flowers in panicles or racemes, and a one-seeded fleshy fruit covered with an arillus. They are chiefly natives of tropical Asia, and possess aromatic and acrid properties. A red pigment made from *Pyrrhosa tingens* is used in Amboyna for staining the teeth. For the most important species see NUTMEG.

Myris'tic Acid ($C_{14}H_{28}O_2$) occurs as a glyceride in nutmeg, butter, and otoba fat. From the latter it is obtained purest, and that most easily by saponification. It is insoluble in water and ether; but dissolves in hot alcohol, from which in cooling it crystallises in white shining laminæ. It forms myristates with metals.

Myrmecoph'aga. See ANT-EATER.

Myrob'alans are the astringent fruits of *Terminalia Chebula* and *T. Bellerica*, two large Indian trees belonging to the natural order *Combretaceæ*. Those of the first are smooth and oval; those of the second obscurely five-angled, and covered with silky down. Both kinds are largely imported for tanning purposes, and for the production of a permanent black in calico printing. Emblic M. are the fruits of a euphorbiaceous tree named *Emblica officinalis*. In the East they are eaten raw, made into a sweetmeat, or pickled. The bark is used for tanning, and for dyeing black; and the seeds, fruit, and leaves are employed for various medicinal purposes.

Myrrh, an aromatic gum-resin, of which three distinct varieties are known to the trade. Its origin is still enveloped in some mystery, but it is nearly certain that it is an exudation from the bark of one or more species of Balsamodendron, growing as scrubby spiny trees in S.W. Arabia, and about the African coast from S. Abyssinia to Cape Guardafui. One species has been called *Balsamodendron Myrrha*. M. has been an article of commerce from the most remote period. According to Scripture, it was highly esteemed more than 3500 years ago. It was primarily valued for burning as incense in temples and public worship; but by Hippocrates it was used medicinally in several diseases. At the present day it is used in incense, and medicinally as a stimulant, aromatic, and tonic. It is also applied externally as an ingredient in dentifrices, and is considered a useful application for ulcerated gums, caries of the teeth, and similar affections.


Myrrh.

Myraina'ceæ, a natural order of evergreen shrubs or small trees, with alternate, simple, firm, smooth, entire, or spiny leaves; flowers in lateral spikes or loose umbels, and fruit a firm hard berry. They are widely distributed, abounding in the islands of the Pacific and Indian Oceans, and extending southwards to New Zealand, and N. to the Azores. None are European. The

order is in the same alliance as the holly and jasmine families. They possess no special medicinal qualities, but many are ornamental as hothouse and greenhouse plants, such as sundry species of *Ardisa*, *Jacquinia*, and *Myrsine*.

Myrta'ceæ, a large, important, and interesting order of trees or shrubs with opposite, rarely alternate leaves, which are usually smooth, and entire, bear pellucid dots, and frequently have an intra-marginal vein. The flowers vary considerably, and the fruit is either a fleshy drupe or berry, or a dry hard capsule, opening by fissures at the apex. They are distributed over all tropical countries, abound in Australia, and are doubtfully represented as European by the genus *Myrtus*. Many of the species yield an aromatic volatile oil, others furnish valuable timber, and various well-known fruits and spices are the produce of the order. See ALLSPICE, BRAZIL-NUTS, CLOVES, EUCALYPTUS, EUGENIA, GUAVA, LECYTHIDACEÆ, MYRTLE, POMEGRANATE, &c.

Myr'tle (*Myrtus*) the typical genus of *Myrtaceæ*, principally distinguished from its allies by its kidney-shaped seeds being enclosed in a two or three-celled berry crowned with the calyx lobes. The species are widely scattered. It is doubtful whether the common M. (*M. communis*)—so well known by its shining evergreen leaves, and scented white flowers, and by the frequent reference to it in ancient and modern writings—is really indigenous in Europe. At any rate it is now thoroughly established, and even in the S. of England if well protected is sufficiently hardy to stand the climate. The dense and knotty wood is esteemed in turnery; the aromatic, pulpy, black fruits are eaten fresh or dried as a condiment; the flowers, leaves, and a prepared oil are used in perfumery; and a Tuscan wine is manufactured from it. It is also in requisition for bridal ornament. *M. Luma*, a tree of the forests of S. Chili, grows fully 100 feet high; the wood is very hard and heavy. *M. Nummularia*, a trailing, cranberry-like plant of Fuegia, &c., produces berries of an agreeable flavour. *M. tomentosa* is a showy shrub of India and China; the dark purple berries have an aromatic sweetness. Various other species of different warm countries also yield edible fruits.

My'sis, a genus of *Crustacea* (q. v.) belonging to the order *Stomapoda* (q. v.), and represented by species popularly named 'Opossum Shrimps,' from the fact that the females carry the young under the tail during the earlier stages of development. The eyes are stalked; and hence the name *Podophthalmata*. *M. relicta* is found in the lakes of Sweden and N. America; and another species is the *M. Chameleon* of our own coasts. *M. flexuosus* is a northern species, devoured in large numbers by salmon and other fishes.

Mysore' (*Maisúrú* = buffalo town), a state in Southern India. It is surrounded on all sides by British territory, and by districts of the Madras Presidency, except on the N.W., where it is touched by the Bombay districts of Dharwar and N. Canara. It occupies the broken plateau extending from the E. to the W. Ghauts. The general elevation is 2000 feet, and *drugs*, huge isolated rocks on which former chieftains placed their forts, are everywhere conspicuous. Mountains cover a large area, infested by tigers, elephants, bisons, and wild dogs, but productive of teak and sandal-wood, and now in some parts cultivated with coffee, cardamoms, and a little cinchona. The highest peaks reach a height of more than 6000 feet above the sea-level. The rivers are the Cauvery and its tributaries, and the Tunga and the Bhudra, tributaries of the Kistna. There are several beautiful waterfalls. The average annual rainfall is not much over 30 inches, though in the W. Ghauts 180 inches have been registered in the year. Irrigation, therefore, is a necessity, which was recognised of old by the Hindu rulers. It is practised from canals cut along the river valleys, and from tanks. The total number of tanks is 37,682, but many of these are in disrepair. The largest is 40 miles in circumference. The drought of 1876–77 affected M. more severely than any other part of S. India, and in Bangalore itself the mortality from actual starvation was very great. The staple crop is *ragee* (*Eleusine corocano*); other crops are rice, gram, oilseeds, coffee, sugar-cane, cotton, and the areca and cocoa-nut palms. In 1874, 111,597 acres were under coffee, of which less than one-third was owned by Europeans; the export was 2749 tons, valued at £305,000. In the same fear, 43,798 acres were under cotton. There is a famous breed of cattle called the *amrit mahal*, the property of Government, which is said to have been instituted by Hyder Ali for military uses, for which purpose it is unrivalled. Sheep also are largely bred for their wool, and a Merino cross has been introduced. The total area is 29,325 sq. miles, divided into three administrative divisions, and subdivided into eight districts. The pop. (1871) is 5,055,412, or an average of 187 to the square mile. Hindus form 96 per cent., and there are 26,000 Christians. The languages spoken are Canarese, Telugu, and Hindustani. A native force is maintained, apart from the British cantonments at Bangalore, of 2000 cavalry, called *silladars*, and 2400 infantry. The police numbers 6044 officers and men. In 1874 there were 2310 government, aided, and unaided schools, attended by 46,212 pupils. The total revenue amounts to £1,020,972 per annum, of which three-fourths come from the land, which is settled individually with the cultivators at a money rent, for a term of thirty years, according to the Bombay method. The general system of administration is similar to that of the Madras Presidency. The seat of government is Balangalore (pop. 142,513). M. town is the residence of the Rajah; and Seringapatam is the historic capital. A branch of the Madras Railway runs to Bangalore. The chief manufactures are cotton-weaving, blanket-making, brass and copper ware, and iron. Gold is supposed to exist in considerable quantities. The total exports are estimated at £1,500,000, chiefly coffee, betel nuts, rice, and cotton goods; the imports at £2,300,000, chiefly European piece-goods, salt, wheat, and silver.

The Hindu dynasty of M., which is of the Yadu caste, akin to the Rajput, and whose family name is Wadeyar, dates from about 1400. It rose to prominence in 1609, when Seringapatam became the capital, and it was overthrown by Hyder Ali in 1766, to be restored by the British after the death of Tippu Sultan in 1799. In accordance with the conditions of the treaty of 1799, Lord William Bentinck, the Governor-General of India, intervened in 1832 to restore order to the finances and peace to the country. The state has ever since been directly administered by British officials; but it has been announced that when the present Rajah, who was born in 1862, shall attain the age of eighteen years, the government will be conditionally intrusted to him. The European officers of the administration are now being gradually superseded by natives. See the *Annual Administration Reports of M.*, and the *Gazetteer of M.*, by Lewis Rice (Bangalore, 1876); Buchanan's *Journey from Madras through Mysore, Canara, and Malabar*; Wilks' *Historical Sketches*.

Mysore, capital of the preceding state, lies in a valley between two ridges, 10 miles S. of Seringapatam, has a pop. (1871) of 57,815. It was founded about 1524 as the first capital of the existing Hindu dynasty. Tippoo Sultan attempted to raze it to the ground, but it was rebuilt after his death. The fort contains the palace of the Rajah, which is ornamented with wood and ivory carving. Here is an old throne, the national emblem of royalty, made of fig-wood overlaid with ivory and gold and silver. The British Residency is a large building, in the house is still pointed out where the Duke of Wellington lodged. The only manufacture is cotton-weaving.—The *district* of M., which occupies the extreme S. of the state, has an area of 4128 sq. miles; pop. (1871) 943,187. It is traversed by the Cauvery river. Wild elephants are abundant, and the breed of cattle is famous. There are special manufactures of refined sugar, leather, blankets, carts, a tannery, and works for cotton-pulping.

Mys'tagogue (Gr. *mystēs*, 'one initiated,' and *agōgos*, 'a guide'), a name borrowed from the ancient Greek religion, in which it signified one who assisted those who were being initiated into the *mysteries*, in the early Christian Church was sometimes applied to the priest or catechist who prepared Catechumens (q. v.) for baptism and confirmation. Hence *Mystagogia* was a name sometimes applied to the ceremonies and services of baptism and the eucharist.

Mys'teries (Gr. *mysteria*, from *mueō*, 'I initiate;' *cf.* *myein*, 'to be shut') originated in that love of speaking in parables, or conveying esoteric doctrines by outward signs and ceremonies, that is common to all times and to all places, but is more especially familiar to the Eastern mind. The Eleusinian and Egyptian M., the rites of the Idæan Zeus in Crete, and of Dionysus at Thebes and Delphi, the formulæ of Rosicrucianism and Freemasonry, alike present the feature of a something hidden from

the profane vulgar, and revealed only to the initiated. What that something was it is now almost impossible to determine. Some historians have believed that the Eleusinian M. (q. v.) were local in their significance, and enshrined the elements of an older Pelasgic faith, much as the Knight-Templars were suspected of Crypto-Judaism. Others, again, have sought to trace the M. of Egypt, Greece, Syria, and India to the common root of nature-worship, maintaining that the adoration of the *linga* of the Hindus—answering to the Gr. *phallos* and the Heb. *ashera* ('grove' in A. V.)—underlay the rites of Isis, Adonis, Thammuz, &c.; while the corresponding symbol of the *yoni* or *argha* ('boat') reappears, they tell us, in the myth of Argo, and consequently in the Dionysiac worship. Our knowledge of the gross licentiousness prevailing in the M. of Isis, which caused their prohibition at Rome, is certainly a confirmation of this theory. See Lecky, *History of Rationalism* (vol. ii.); Grote, *History of Greece* (part i. ch. i.); and Milman, *History of Christianity* (vol. i. ch. i.).

Mys'teries, Mir'acle Plays, and **Moral'ities** are the names given to certain theatrical representations which were popular during the Middle Ages, and before the rise of the modern drama in Europe. Mysteries were religious dramas which dealt with cardinal events in Scripture, and especially with the mystery of the Nativity, Passion, and Resurrection of Christ; Miracle Plays set forth incidents in the lives of the saints of the Catholic Church; while Moralities or Moral Plays were dramas intended to inculcate ethical lessons by means of abstract and allegorical characters. But in many cases no sharp line can be drawn marking off the one class of plays from the others, and while in France the term *mystère* was applied to all religious dramas, in England the word *mystery*, as applied to a play, was never in use. Some have endeavoured to connect the mediæval religious plays with the classic Greek drama, to which, it has been said, they are linked by the plays ascribed to Gregory Nazianzen, in which scriptural subjects are cast into the forms adopted in Greek tragedy. But this view is probably incorrect, the true origin of Mysteries and Miracle Plays being found, in all likelihood, in the half-dramatic performance of the liturgy of the mass. Soon after Christianity had become the prevalent religion in the Roman Empire tableaux were established in churches, setting forth scriptural scenes; besides dumb show, dialogue, and lyrical interludes were afterwards introduced; and gradually genuine religious plays were elaborated—the Latin tongue, in which these dramas were at first couched, giving way to the vernaculars of the various countries in which the plays were performed, and gorgeous dresses and costly theatrical appliances superseding the simple stage accessories of earlier times. Tableaux representing scriptural events were adjuncts to public worship in the 5th c., but the earliest Mysteries proper with which we are acquainted were composed in France, and belong to about the time of the 11th c. They are in Latin. The earliest Miracle Plays of English origin are those based partly on the New Testament, partly on the legends of St. Nicholas, ascribed to Hilarius, a monk born in England about the beginning of the 12th c. Mysteries were generally written in short verses with alternate rhymes, and were not divided into acts, but into days of representation; a connected series of Mysteries or Miracle Plays being generally exhibited at the great festivals of Whitsuntide and Corpus Christi, the entire performance occupying four or sometimes even eight days. At first these plays were solely under ecclesiastical management, but afterwards they were performed by the members of the trades or guilds, and by such associations as the *Confrères de la Passion* in France. In England, the parish 'clerks' (clergy) took a large part in Performing Miracle plays—*Clerkenwell* in London deriving its name from performances of religious dramas by the parish clerks of London in 1390 and 1409. Chaucer says of his clerk Absolon:—

> 'Sometimes to show his lightness and maistrie
> He playeth Herod on a scaffold high.'

Of the various sets of plays performed by the English guilds, three great collections remain, known as the *Chester Plays*, the *Wakefield Plays*, and the *Coventry Plays*. The *Chester Plays*, twenty-four in number, were written by Ralph Higden, a monk of St. Werburgh's, Chester, and were first acted in 1327. An edition of these plays, edited by Mr. Thomas Wright, was published by the Shakespeare Society in 1843 and 1847. The *Wakefield* or *Towneley Plays*, thirty-two in number, were written, it is supposed, by an Augustinian monk of Woodkirk, near Wakefield, and display a humour, liveliness, and pathos that render them superior to the other collections. An edition of these, accompanied by an excellent glossary, was issued by the Surtees Society in 1836. The *Coventry Plays*, a series of forty-two, were mainly written about 1470. An edition of them, edited by Mr. J. C. Halliwell, was published by the Shakespeare Society in 1841.

In general, Mysteries and Miracle Plays were disfigured by ribaldry and coarse buffoonery; and a purely comic interlude, styled *The Shephera's Play*, was generally introduced between the Old Testament and the New Testament portions of the series. Miracle Plays retained popularity in England down to the 16th c., one of them being acted at Coventry in 1580. In France, on the other hand, these dramas early gave way to witty, bright, and reckless farces satirising the clergy, which were performed by lay companies or by vagrants; while in Southern Germany the old religious drama is not yet wholly extinct, a Miracle Play being represented in the present century at intervals of ten years by the peasants of Ober-Ammergau (q. v.).

The *Moralities* must not be regarded as marking a distinct stage in the growth of the drama, as connecting the English Elizabethan plays with the mediæval Mysteries. The love of allegory, which prevailed during certain epochs of the Middle Ages, found scope in the creation of these symbolical pieces, or interludes as they are frequently termed, which grew up alongside of the Mysteries and Miracle Plays, but never rivalled the popularity of the latter. Moralities first became generally known in England as a form of entertainment in the reign of Henry VI., and attained their greatest literary merit as well as their widest popularity in the reign of Henry VIII., when this form of the drama was adopted by several of the Reformers as a vehicle for satire on the abuses of the age. A salient feature of the Moralities was the part played in them by the characters styled the *Devil* and the *Vice*, the latter being a kind of demoniacal jester, whose function was to beat and flout the superior fiend for the amusement of the audience. The Vice is alluded to by Shakespeare as 'the old Vice,' 'the formal Vice, Iniquity,' &c. He is also alluded to in Jonson's *Staple of News*. Among the oldest existing Moralities in English are *The Castle of Perseverance*, belonging to the reign of Henry VI., which relates the siege of the *Humanum Genus*, in the Castle of Perseverance by the Seven Deadly Sins; *The World and the Child*, a play written about 1520; *Every Man*, an earnest Catholic piece produced about 1531; *Lusty Juventus*, composed by one R. Wever, in the times of Edward VI., a very interesting play reflecting the spirit of the Reformation; and John Skelton's *Magnyfycence*, a vigorous, lively piece distinguished by the writer's characteristic ingenuity in rhyming and wealth of racy diction. *Magnyfycence* was written about 1520, and is included in Dyce's edition of Skelton's works (2 vols. 1843). But the best of all the Moralities produced in England or Scotland is Sir David Lindsay's *Satire of the Three Estates*, produced in 1535. (See LINDSAY.) The Moralities survived in England until the beginning of the 17th c., though they had long before that been completely eclipsed by the rise of the true English drama. In the reign of Elizabeth they began to vary considerably in their character, real historic personages being introduced amid their allegorical figures, as, for example, in Bale's *King Johan*. The term *Morality* was applied in France to plays partly similar to their English namesakes, but in general far sprightlier, and more audaciously satiric. They give valuable glimpses of the old French society, and are farcical rather than didactic. They sometimes contain scriptural personages as well as personified qualities among their characters. They were popular during the 14th and 15th centuries, and were represented by the dramatic fraternities of the *Basoche* and the *Enfants sans souci*.

Collections of French Mysteries and Miracle Plays have been made by Monmerqué and Michel (Par. 1839) and Jubinal (Par. 1837). Mone has done the same service for Germany in his *Deutsche Schauspiele des Mittelalters* (Quedt. 1841). See Ward's *History of English Dramatic Literature* (Lond. 1875), Hazlitt's edition of *Dodsley's Select Collection of Old English Plays*, Collier's *History of English Dramatic Poetry*, Wright's *Early Mysteries and other Latin Poems* (Lond. 1838), Gidel's *Histoire de la Littérature Française* (Paris, 1875), Wilkens' *Geschichte des geistlichen Spiele in Deutschland* (Gött. 1872).

Mys'ticism has been defined as the Christian form of Pantheism. A *mystēs* was one initiated into a knowledge of the Greek mysteries—one to whom secret things had been revealed. Hence a mystic came to mean one who claimed to know, either by intuition or by inward revelation, what was hidden from other men. And as these two methods have generally been assumed to be identical, M. includes 1. 'All those systems of philosophy which teach either the identity of God and the soul, or the immediate intuition of the Infinite.' In this sense the pantheism of the Brahmins and Buddhists, the theosophy of the Sufis, the Egyptian and many forms of the Greek philosophy, as well as the modern system of Spinozism, are all mystical. 2. Evangelical Christians, who believe in a supernatural influence of the Holy Spirit, and recognise a higher form of knowledge, holiness, and fellowship with God as the effect of the influence, are regarded as mystics by those who discard the supernatural from religion altogether. 3. The epithet of mystic has been applied to any system of philosophy or religion which, like Schleiermacher's, assigns more importance to the feelings than to the intellect. 4. M., as known in Church History, has generally been a reaction against the dogmatism of the Church. Mystics in this field have been divided into two classes: Theosophists, 'whose object is knowledge, and with whom the organ of communication with God is the reason;' and Mystics proper, 'whose object is a pure and happy life, and with whom the organ of communication is the feelings.' There was a good deal of M. in the first forms of Monachism (q. v.), as well as in Montanism (q. v.). The father of thoroughgoing M., however, was the Pseudo-Dionysius (q. v.), whose writings appeared about 523. His theology, which was founded on Neo-Platonism (q.v.), had much influence on the religious thought of the Middle Ages. The originators of the later M. were those Schoolmen who endeavoured to reconcile the claims of speculative piety with those of scientific theology, and have hence been called the Dialectical Mystics. These Mediæval Mystics have been divided into three classes: I. The Mystic Scholastics, who held to the orthodoxy of the Church, *e.g.*, Bernard of Clairvaux, Norbert, Hugo and Richard of St. Victor, &c.; II. The Heretical Mystics, *e.g.*, Scotus Erigena (pantheistic), Eckhart, Ruysbröck, &c.; III. The Latitudinarian Mystics, an intermediate class, *e.g.*, Von Cölln, Tauler, Suso, Gerson, Thomas à Kempis, &c. The mystical school of writers was continued in the 16th c. by such men as Paracelsus, Weigel, Boehme, &c., and in more recent times by Swedenborg, Heinrich, Stilling, and Lavater. Special forms of M. are noticed under PIETISM and QUIETISTS. See Hodge's *Syst. Theol.* (Edinb. 1873), Hagenbach's *Lehrb. d. Dogmengesch.* (Eng. trans. 1847), Ullman's *Reformers before the Reformation* (Eng. trans. 1856), *Bampton Lectures* for 1824.

Mythol'ogy, Compar'ative. Wherever speech is uttered, tales are told—tales that, whether couched in stately epic or lowly nursery rhyme, narrated by an Andersen or in a Bushman's *kraal*, whether beautiful or grotesque, repulsive or sublime, have all one common feature—their indefinable antiquity. The Arthur of Tennyson is the same Arthur from whom the everlasting hills received their names; Lafontaine's milkmaid had broken her pot in India two thousand years before; and the siege of Troy forms the subject alike of Homer's *Iliad* and of a Suffolk 'horkey ballad.' To solve the origin of these tales or myths (Gr. *mythoi*), as they are called, is the problem of the science of M. Bacon, with many of the old philosophers, read in them allegories invented by priests for the conveyance of esoteric doctrines. The Sphinx, he explains, is science; her talons, arguments and axioms; while Œdipus' lameness hints how through overhaste men fail in the solution of her riddles. The Euhemerist, or historical theory again, regarded the Centaurs as skilled horsemen, Atlas as a great astronomer, Priam as an Eastern, and Woden as a Western king. Bochart, Vossius, and Huet belonged to this school, only that they sought in classical M. for traces, not of profane, but sacred personages, identifying Saturn with Noah, Vulcan with Tubal Cain, and Typhon with Og the King of Bashan. So, too, Mr. Gladstone, its latest and ablest exponent, discovers in myths the relics of a corrupted revelation, granted by God to man before the dispersion of Babel; Zeus, Hades, and Poseidon representing the Christian Trinity, Athene and Apollo dividing the Messianic attributes, and Leto, their mother, shadowing forth the woman whose seed should bruise the serpent's head (*Homer and the Homeric Age*, and *Juventus Mundi*). The clue to a third system of investigation was furnished by Comparative Philology. The science that had traced a connection between the Gr. *mylē*, the Lat. *mola*, the Eng. *mill*, and the Erse *meile*, detected the identity of names in mythologies so widely remote as the Sanskritic and Celtic, the Norse and Hellenic, the Slavonic and Iranian. Dyu, Zeus, Jupiter, and Tyr, Varuna and Ouranos, Sarvara and Cerberus, Pani and Paris, Sarámâ and Helene—these and a host of other names phonetically identical, even in their accent, showed that the mythologies of the Aryan races were, like their languages, the descendants of a common stock. But as in fiction such names as Verisopht, Deuceace, or Bareacres suggest the characters of those who bear them, so does the mythic nomenclature convey to the philologist a no less pregnant meaning. One common concept—that of the powers of nature—is seen to underlie the names of gods and heroes in the *Iliad*, the *Zendavesta*, and clearest of all in the *Veda*, as there oftenest are those names used, not merely as proper names, but as appellative nouns—Ushas (Gr. *Eōs*), Saranya (Gr. *Erinys*), and Ahanâ (Gr. *Athenē*) all signifying the 'dawn;' Marut (Lat. *Mars*), the 'storm-cloud;' Varuna (Gr. *Ouranos*), the 'sky,' and so on through a hundred other instances. How comes it, though, is the next question, that the early myths dwell on nature to the exclusion of all other subjects? Because to primeval man, set naked in an unknown world, nature was all in all. He hailed the warmth and radiance of the sun; like a child, he dreaded the horror of night's darkness, and all his emotions of hope and fear centred around the glowing disc, for which his struggling faculties of speech devised a hundred names—the Bright, the Warm, the Riser, the Setter, the Victor, and the Vanquished. In rude and early languages there is always a wealth of synonymes, some of which by a process of natural selection, either drop wholly out of use, or lingering on in a corner of the brain, give rise thereafter to countless misconceptions. Thus epithets, originally synonymous, applied by man to his vague conceptions of nature's divine phenomena, were certain to give rise to polytheism; just as the phrase Daphnē flies from Apollo,' i.e., the dawn fades before the rising sun—first used, not as a conscious metaphor, but as the nearest expression of a visible fact—would invest Apollo, regarded as a god, with anthropomorphous attributes. A source of further error arose from the identification of words similar in sound, but of a different meaning—of *daphnē*, 'the dawn,' with *daphnē*, 'a laurel;' of the seven *ṛikshas* or 'bright stars,' with seven *rikshas*, or 'bears,' and later with seven *rishis* or 'sages;' of *leukos*, 'shining,' in Lykaon 'with *lukos*, 'a wolf' (whence the were-wolf superstition); and in more recent times of *fairies* with *Pharisees*, and *barnacle* shells with *barnacle* geese. We may distinguish, therefore, four stages of myth-making—(1) The Unconscious, when man first used such phrases as 'The brilliant dawn is dead;' (2) The Polyonymous, when he might either say 'The brilliant (*daphnē*), or the sea-born (*aphrodite*), dawn is dead;' (3) The Anthropomorphous, in which 'dead' would cease to be the figurative language of childhood; and (4) The Homonymous, when Daphnē would be metamorphosed into a laurel. Not that these stages were ever perfectly distinct. Like the Stone, Bronze, and Iron Ages of Palæontology they overlapped one another; and the primary signification of the Aryan *dyu* survived in the phrases *Dii hydōr poici* and *sub Jove* long after Zeus and Jupiter had taken their places in the Hellenic and Roman pantheons. Other important elements in the later development of M. were—Change of surroundings; the localisation of myths; and their poetic embellishment. That the Aryan nations went forth at their dispersion carrying with them a common M. is attested both by corresponding nomenclatures, as we have already seen, and by countlessly recurring episodes. For instance, Arthur's Excalibur answers to the swords of Theseus and Odin; and the Greek Achilles, the Persian Isfendiyar, and the Norse Baldur are alike invulnerable save in a single spot. But as the languages of southern differ from those of northern Europe, though springing from the same stock, as the devil of the negro is white, and the hell of the Eskimo a region of frost and snow, so little wonder if in the Edda and Volsung Tale we recognise the warring, not of the sun with night, but of winter with summer, if spring replaces dawn, and dwarfs—not giants—are the guardians of the hidden treasure. Secondly, in numerous myths we light on mention of real places and historic personages—Troy and Caerleon, Arthur and Karl the Great. Therefore, say the Euhemer-

ists, these myths enshrine the germs of history. But is not the scene of *The Virginians* laid mainly in London, and do not General Wolfe and Dr. Johnson walk through its pages? Only when the mythologist can dissever the true and fictitious in Thackeray's novel without a previous knowledge of English history, may he hope to do the same in the Iliad, the Nibelungen, or the Arthurian Cycle. Still, M. had undoubtedly been at all times deeply tinged by past and passing events, by man's fondness for patching new cloth on old, although to what extent can be shown only by external evidence. And this conducts us to our closing argument. To listen to many advocates of the solar-mythic theory, one would imagine that no incident could be historical because enshrined in a myth, or that every mythic episode was necessarily solar in its origin. A fallacy like his who should fancy that, because the first conception of a pillar was borrowed from the trunk of a tree, therefore every succeeding pillar must reproduce the bark and knots, and nothing else; or that the *Paradise Lost* of Milton contains nothing but what may be found in the Book of Genesis! Whately satirised the extravagances of this school in his *Napoleon a Solar Myth*, where nApoleon = Apollon, the sun-god, who rises in the eastern and sets in the western waves; but the parody falls short of reality, as contained in De Gubernatis' *Zoological M.* (2 vols. Lond. 1872) and the works of sundry of his followers. No, we cannot refuse to the poets of antiquity a power that must needs be conceded to Tennyson and Morris, of clothing a mythic skeleton in the flesh and blood of the poet's new thoughts and experiences, of adding and taking away, blending and harmonising, until his work, substantially the same as Homer's or Malory's, grows to a new creation. We have dwelt exclusively on the myths of the Aryan races, because theirs alone have been adequately investigated, and of theirs alone do we possess ancient, and therefore more typical, records. But other mythologies—Accadian, Semitic, Turanian, and Iberian—exist or have existed; and what their character was, whether solar or otherwise, is a question affecting the Aryan M. itself. That mixed mythologies are, like mixed languages, a thing impossible, that the Persians can have borrowed nothing of the Assyrians, the Greeks of the Egyptians, or Christendom of Judaism is at least opposed to probability; and why, if the Basque folklore of to-day is purely French, should not the Celts have conversely adopted something of the M. of the conquered Iberians? A word as to what M. was not. It was never identical with religion, one whit more than Legend (q. v.) forms an essential part of the Catholic system. In Homer and Hesiod we recognise, amid all their fantastic pantheon, a one Zeus, 'omniscient and omnipotent,' who 'can do all things,' and 'fulfils the prayer that man utters' (Od. iii. 26; xiv. 444, &c.); but that the mythic Zeus, the intriguer and adulterer, swayed the Hellenic mind for good or ill is nowhere more apparent than that the legend of the Holy Grail had any influence on the doctrine of the Eucharist, or the Alsatian folk-tale of St. Peter and the Lamb's Liver upon the dogma of the Infallibility. See Max Müller, 'Comparative Mythology' in vol. ii. of *Chips from a German Workshop*, and vol. ii. of the *Science of Language*; G. Cox, *Mythology of the Aryan Nations* (2 vols. Lond. 1870); Kelly, *Indo-European Folklore*; Grimm, *Deutsche Mythologie* (Gött. 1835); Tylor, *Primitive Culture* (2 vols. 1871); Dasent, *Popular Tales from the Norse* (Edinb. 1857); Welcker, *Göttenlehre* (3 vols. Gött. 1857–62); Creuzer, *Symbolik der alter Völker* (4 vols. 1810–12); Fiske, *Myths and Mythmakers* (Lond. 1873); Sayce, *Principles of Comparative Philology* (Lond. 1874); and Goldziher, *M. among the Hebrews* (Eng. trans. Lond. 1877).

Myx'ine. See HAGFISH.

N.

N the fourteenth letter in the English alphabet, corresponding to the Greek *nu* and the Semitic *nun*, is formed by the tongue at the junction line of the upper teeth and palate, and passes mainly through the nose. It is therefore a nasal liquid, and an imperfect mute. N is interchangeable with *l*, as *luncheon*, *nuncheon*; is mute after *m*, as *hymn*, and often before *v*, as Covent (for Convent) Garden; and is extremely liable to be improperly affixed or taken from words, as *nonce* for *once*, *adder* for *nadder*, &c. With the Romans N stood for 900, and with a stroke over it for 9000; while as an abbreviation it now usually signifies North. It also appears in N. B. (*nota bene*), N. S. (new style), &c.

Naaf, a small river or rather arm of the sea in the E. coast of the Bay of Bengal, running due S., and forming the frontier separating the Bengal district of Chittagong from that of Akyab in British Burmah.

Naas (Irish Gael. *Nás*, 'a fair,' or 'meeting place'), the second largest town in county Kildare, Ireland, on the Grand Canal, 20 miles S. W. of Dublin, and 3 S. of the railway station of Salins. It was anciently the residence of the kings of Leinster, and, according to bardic history, was founded by Lewy of the long hand. The great mound of the royal palace still remains just outside the town. See Joyce's *Irish Names of Places* (vol. i. 1869). N. received charters from Henry V., Elizabeth, and James I., but in recent times it has greatly declined, though still a municipal and assize town, with a court house, infantry barracks, a workhouse, &c. Pop. (1871) 3660.

Nabathæ'ans. In Scripture history Nebajoth was the first-born of Ishmael (Gen. xxv. 13; 1 Chron. i. 29), and father of a tribe in Western Arabia beside the tribe of Kedar (Isaiah lx. 7). This tribe is by Josephus (*Ant.* i. 12, 4) and Jerome (Gen. *in loc.*) identified with the N. or Nabateans, who, according to these writers, gave their name to all the region from the Euphrates to the Red Sea, and who in the time of the Maccabees (about B.C. 160) occupied the same region (1 Macc. v. 25, ix. 33–37; Jos. *Ant.* xii. 8, 3). During the height of their power the country of the N. embraced the whole of Edom, from which they drove the Edomites (see EDOM), and the plain of Arabia between the northern half of the Red Sea and the Mountains of Nejd, being bounded on the west and north by Palestine and Bashan. Besides being rich in flocks and herds, nearly the whole commerce of Western Asia was in their hands. From their capital of Petra, the ruins of whose rock-hewn buildings yet testify to their great wealth and civilisation, caravan tracks radiated in all directions: to Palestine, Phœnicia, Damascus, Palmyra, Mesopotamia, to the ports on the Persian Gulf and the Red Sea, and to Egypt. The first mention of a king of the N. is about 166 B.C. (2 Macc. v. 8). All their kings bore the title of Aretas or Obodas, and the country was called Arabia Petræa or simply the kingdom of Arabia. Herod Antipas married a daughter of the Aretas of the time (Jos. *Ant.* xviii. 5, 1), probably the same who captured Damascus and governed it by an Ethnarch (2 Cor. xi. 32). The first blow to their prosperity was received when a new route between the east and west was opened through Egypt. The kingdom was annexed to the Roman Empire in A.D. 105, and the cities ruined by the Mohammedan conquest.

That the N. were Ishmaelites has been disputed in modern times. There is an Arab tribe, the Beni Nabat, believed by Oriental scholars to be of Aramean or Syro-Chaldean origin, who in the time of their early prosperity inhabited Chaldea and Mesopotamia, and were celebrated for their knowledge of agriculture, magic, astronomy, medicine, and science. For numerous considerations which cannot here be given, it is believed by the best authorities that the N. are identical with this ancient nation of Nabat.

Nablus', or **Nabulus'** (Gr. *Neapolis*, 'new city'), the ancient *Shechem*, and former capital of Samaria, a town of Palestine, in the valley of Erd-Mûkhna, 1½ miles W. of Jacob's Well, and 30 N. of Jerusalem. The valley, one of the richest in Palestine, produces abundance of figs, grapes, oranges, and olives, and the town has manufactures of oil, cotton, soap, &c. Pop. about 10,000, of whom 500 are Christians, 150 Samaritans, 100 Jews, and the rest Moslems. See the Rev. J. Mills, *N., a Narrative of a Three Months' Residence* (Lond. 1877).

Nabob, an English corruption of NAWAUB (q. v.).

Nabonass'ar, Era of, in Babylonian chronology, commences with February 26, 747 B.C. It seems to have been invented by Ptolemy, as it is not the system of the Cuneiform inscriptions, nor do its dates agree with established historic facts, such, for instance, as the destruction of Nineveh.

Nach'imov, Paul Stepanovitch, a Russian admiral, born in 1803, in the government of Smolensk, circumnavigated the globe under Sasarev (1822–25), was present at the battle of Navarino (1827), and commanded a corvette in the blockade of the Dardanelles (1830). Appointed, on the outbreak of the Crimean War, to the command of the Russian fleet in the Black Sea, he annihilated a Turkish squadron off Sinope (November 30, 1853), and having played a gallant part in the defence of Sevastopol, was raised to the rank of Admiral (April, 1855). On the 10th July of the same year he was struck by a bullet, and died the following day.

Nach'od, a town in Bohemia, on the Mettau, near the Prussian frontier, 21 miles N.E. of Königgrätz, famous as the scene (27th June 1866) of the first of the struggles between the Prussians under Von Steinmetz and the Austrians under Ramming, which ended in the battle of Sadowa.

Nacre. See MOTHER OF PEARL.

Na'dir is the point of the heavens vertically below us. It is thus diametrically opposite to the Zenith (q. v.), and geometrically is one of the poles of the true horizon.

Nádir Sháh, the hero of Persian independence, and the last of the great Mohammedan invaders of India, was born near Khelat, November 11, 1688. He commenced life as a robber chief in Khorassan, but, though himself belonging to a Turcoman tribe, became the national leader of the Persians in their successful attempt to throw off the yoke of the Afghans and to recover Armenia from the Turks. At first he permitted the restoration of the old royal family, but in 1736 he had himself crowned Shah. N. extended his conquests over Georgia and Afghanistan, and in 1738 occurred his celebrated invasion of Hindustan. He sacked Delhi, and is related to have brought back with him a treasure of twenty millions sterling, including the Kohinûr diamond and the peacock throne. On his return his character is said to have changed. He became avaricious and tyrannical, and he was assassinated June 20, 1747. N.'s dynasty perished with him. His son finally became an officer in the Austrian service, and his wealth was carried off by his treasurer, Ahmed Shah Abdali, who founded the Durani dynasty in Afghanistan.

Nae'vius, Cn., is really the earliest of the Roman poets whose writings evince genuine power and originality. On the authority of Aulus Gellius (i. 24), who characterises his famous epitaph as 'plenum superbiæ Campanæ,' he is believed to have been a Campanian. Klussmann, one of his most careful editors, thinks he was a Roman; but the above expression could scarcely be applied to any one but a native of Campania. N. was, however, thoroughly Roman in character and sympathies. He came to Rome early, but from the uncertainty attaching to the date of his birth—some time between 274 and 264 B.C.—it is impossible to say definitely in what year. N. served in the first Punic war, which began in 264 B.C. and lasted 24 years. He produced his first play in 235 B.C. Like the writers of the old Attic comedy, he employed the stage as the arena for popular invective and political warfare. He was a keen partisan of the plebeians, and a sworn foe to the senatorian party. In addition to his dramatic works he wrote an epic poem on the first Punic War in the Saturnian metre—a work of which a few unimportant fragments remain. N. also wrote 'ludi' or 'satiræ.' These were probably the vehicle of his attacks on the aristocracy. For a lampoon on the Metelli, preserved by Asconius (see *Cic. Verr.* i. 10), he was indicted by one of the family. By the laws of the Twelve Tables a libel was a capital offence. N. escaped with his life, but was handed over to the custody of the triumviri capitales. Confinement brought the poet to a recantation of his imputations, but his repentance can hardly have been sincere, as a fresh offence had soon to be expiated by exile. N. died at Utica, his self-chosen place of banishment, in 204 B.C., according to Cicero, Varro and Hieronymus say two years later. See Klussmann's *Life and Remains of N.* (Jena, 1843); M. J. Berchem *de Cn. Nævii. Poetæ Vita et Scriptis* (Munster, 1861) and Sellar's *Roman Poets of the Republic* (Edin. 1863).

Næ'vus, or **Erec'tile Tu'mour**, known popularly as **Mother's Mark**, consists essentially in an excessive development of the vascular tissue of a part, arterial, capillary, or venous. *Arterial* N., commonly called *aneurism by anastomosis*, is an irregular, lobulated, pulsating tumour, into which numerous large vessels can be traced, and in which a considerable *bruit* can often be heard. The usual seat of such tumours is the scalp and lip. Small tumours may be cured by ligature, and large ones by the galvanic cautery. *Capillary* N. are slightly elevated, but flat spots on the skin of a bright red or purplish tint, entirely confined to the skin, congenital, and though at first small may attain a large size, and involve the whole of the face. *Venous* N. are usually subcutaneous; but those in which the skin and cellular tissue are affected simultaneously are usually of the mixed kind, and large veins may be seen passing away from them. The venous N. are of a dark purple or reddish colour, smooth and ovoid, or somewhat lobulated, and often of considerable size. N. may be cured (1) by exciting adhesive inflammation in them, so as to produce plugging and obliteration of the vascular tissue, as by vaccination or injection of perchloride of iron; (2) by agents that destroy the growth, as nitric acid; (3) by removal with the knife or ligature.

Nä'fels, a village of Switzerland, in the canton of Glarus, on the Linth, 5 miles N. of Glarus by rail. Here on the Rautifelder 1500 Swiss defeated 8000 Austrians, April 9, 1388. The battle-field is marked by eleven stones, and the people of the surrounding villages come yearly on the second Thursday of April to celebrate the anniversary of the victory which secured their independence. Pop. (1870) 2490.

Na'gari' (an adjective derived from the Sanskrit *nagara*, a town), the term applied to the character used in writing the Sanskrit alphabet, and to its modifications in Hindi, &c. It is sometimes written Devanagari (*deva*, signifying 'divine'). See NUGGUR.

Na'ga's, a wild race of Aborigines, bordering on Assam, in the N.E. frontier of British India. They are divided into many tribes, some of whom are inoffensive and trade freely with British subjects. Their exports are cotton, caoutchouc, timber, and beeswax. Other tribes are very warlike, and are notorious for their practice of carrying off as trophies the heads of their enemies. Since 1866 a British officer has been stationed in political charge of the N. tribes between the State of Munnipur and Assam, who exercises a general control but no direct government. The area of the tract held by the N. is 4900 sq. miles; the pop. (1872) 68,918. In 1875, and again in 1876, officers were murdered who were engaged beyond the frontier on survey duties, but the prestige of the British name has now been restored.

Nagasak'i, a town of Japan, on the N.W. side of the island Kiu-Siu. Its excellent harbour was the only place in Japan where, under severe restrictions, the Dutch were allowed to trade for nearly two centuries, but since 1859 N. has been freely open to foreign commerce. It is famed for its figured porcelain, which, on account of its extreme thinness is called 'eggshell china.' The imports are chiefly cottons, woollens, metals, arms, and ammunition; the exports, coal, tea, dried fish, tobacco, camphor, copper, and vegetable wax; and the total value of the former in 1875 amounted to £317,727; and of the latter to £449,855. In the same year there entered the port 296 foreign ships of 276,415 tons, and of these 120 were British ships of 67,791 tons. A great coal mine on the island of Takashima, which is under the superintendence of English engineers, employs some 3000 natives, and yields 600 tons daily of excellent coal (124,930 tons in 1875). N. is retarded much by the want of good roads leading to the surrounding tea-districts. Pop. of town, 80,000; of the Ken (1875), 668,974.

Nagelfluе. See MOLASSE.

Nagóde or **Ucheyra**, the capital of a native State of the same name, in connection with the Baghelcund Agency, Central India, 110 miles S.W. of Allahabad. The State of N. has an area of about 450 sq. miles, and a pop. of 75,000. Revenue, £15,000, of which half is alienated in feudal or religious grants. The Rajah received an accession of territory for services during the Mutiny.

Nágpúr (*i.e.*, Snake-town), the capital of the Central Provinces, British India, and of the district of the same name, on the left bank of a stream called the Nag, 520 miles E.N.E. of Bombay by rail. Pop. (1872) 84,441. It lies in a hollow round the fort and European station of Sita-baldi. The cantonments are at Kampti (q. v.), 9 miles N.E. Outside the city are handsome tanks and gardens, constructed by the Mahrattas. The streets are well laid out, and the houses are ornamented with wood carving. Conservancy arrangements are good, and the city is healthy. The palace of the Bhonslas, built of black basalt, was burned down in 1864. Tombs of the former sovereigns are numerous, but not magnificent. There are the usual large buildings of British civil administration. As a railway terminus, N. is the centre of a great and increasing trade. The chief imports are grain, salt, and European goods; total value, about £500,000. The grand article, both of manufacture and export, is fine cloth; total value of exports, £120,000. N. city was founded about 1700 by Bukht Bûlund, one of the last of the Gond dynasty, whose descendants still survive as state pensioners. The Mahratta family of the Bhonslas conquered the country in the middle of the 18th c. They were powerful enough to overrun Bengal, and permanently occupy Orissa; but they were defeated by Wellington at Assaye and Argaum. Nevertheless they continued to give much trouble to the British until the state of N. was annexed by Lord Dalhousie, after the death of Raghoji III. without heirs in 1853.—The *district* of N., which presents great variety of surface, has an area of 3734 sq. miles; pop. (1872) 631,109. The staple crop is wheat, and of late years cotton has been extensively grown. There is a peculiar breed of trotting bullocks, that will draw a light cart 30 miles in five hours. Weaving is carried on in every village, and the finer sorts of cotton and silk cloths are in demand throughout India. The balance of trade is in favour of the district, and the banking firms of Marwaris or Jains make large profits. During the Mutiny of 1857, the Madras sepoys at Kampti stood firm, but it was found necessary to disarm the cavalry regiment of N. irregulars. See Grant Duff's *History of the Mahrattas* (Lond. 1826), and Grant's *Gazetteer of the Central Provinces* (Bomb. 1870).

Nag's Head Consecration. When Elizabeth revised the Prayer Book and passed the Act of Supremacy, Convocation protested against these things; and when she desired to have Matthew Parker consecrated Archbishop it was found that only five of Edward's hierarchy had survived the Marian persecutions, Llandaff having apostatised. It requires three bishops to conse-

crate an archbishop, and Kitchen and Bale being both disreputable persons, the Queen summoned Barlow of Bath, Scory of Chichester, Hodgekins of Bedford, and the venerable Miles Coverdale to impose hands at Lambeth on 17th December 1559. This was duly done according to the ordinal of Edward VI. The stupid story that on account of a prohibition from Bonner, Scory performed the consecration by laying a Bible on Parker's head in Nag's Head Tavern, Cheapside, probably arose from the fact that after the *congé d'élire* was originally issued, and several bishops summoned, they refused to officiate or tolerate the oath of supremacy, and were therefore deprived. Accordingly, the consecration was actually carried through by bishops, some ordained according to the Roman Pontifical, and others according to the reformed ordinal; and the Queen's second mandate bears a clause supplying all deficiencies there might be in the proceeding according to the statutes of the realm or the laws of the Church. (*Lingard*, v., p. 631.)

Nagy (pron. *Nadji*), a Magyar word signifying 'great,' prefixed to the names of several Hungarian towns. Of these Banya, Karoly, and Kikinda are given under those headings, and N. Varad and N. Szombat under their German names Grosswardein and Tyrnau.

NAGY-ENYED, a town of Transylvania, on the Maros, 18 miles N.N.E. of Karlsburg by rail, has a celebrated Calvinist academy. Pop. (1869) 5779.

NAGY-KOKOS, a market-town in the comitat of Pesth, 55 miles S.E. of that city by rail, with a large gymnasium, and a trade in sheep, cattle, and wine. Pop. (1869) 20,091.

NAGY-SAROS-PATAK, a market-town in the comitat of Zemplin, on the right bank of the Bodrog, contains a Calvinist college, with a fine collection of minerals, and a library of 25,000 volumes. Pop. (1869) 5366, who make wine and manufacture cloth.

NAGY-SZENT-MIKLOS, a market-town in the comitat of Torontal, on the Aranka, 37 miles E.S.E. of Szegedin by rail, has an Agricultural Institute, and a trade in wine and grain. Pop. (1869) 9205.

Na'hum (Heb. 'consolation'), the Hebrew prophet, is styled in the superscription of his book the Elkoshite, *i.e.*, a native of Elkosh, understood to be Elkesæi in Galilee, or according to some, Elkosh on the E. of the Tigris. The Book of N., which is the seventh of the 'minor' prophets, is all directed against Nineveh and its king, both being threatened with destruction for their hostility to Jehovah and his people. As to the *time* of the prophet, there is hardly a reign from that of Jehu to Zedekiah under which he has not been placed by some critics. The majority make him a contemporary of Hezekiah, and his prophecy to have been delivered soon after the siege of Jerusalem by Sennacherib, about B.C. 711 (Isa. xxxvii. 36).

Nahun, or **Sirmûr**, the capital of the native state of the same name in N.W. India, at the foot of the Himalayas, 128 miles N.E. of Delhi. It is a particularly well-built and clean town; the houses are of stone, and the streets paved. The palace is handsomely carved.—The *state* of N. ranks first among the hill states of the Punjaub; it is crossed by the Giri River, and lies between the British districts of Dehra Dûn and Umballa. Area, 1096 sq. miles; pop. 90,000; revenue, £28,500. The Rajput dynasty dates from the 11th c. They were restored by the British after the Goorkha War of 1803, and were loyal during the Mutiny.

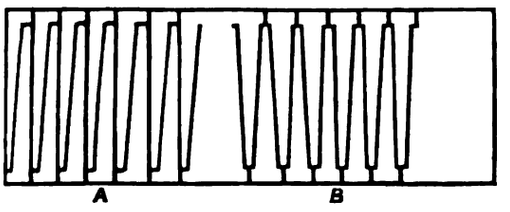
Naiada'ceæ, or **Juncagina'ceæ**, a natural order of monocotyledonous submerged fresh, or salt-water plants, found in all climates of the globe, and numbering about twenty genera and 100 species. The flowers, with few exceptions, are inconspicuous, and the properties of the order may be classed as unimportant. In Britain there are numerous representatives, but they only have an interest to the botanist. The riband-like leaves of the grasswrack (*Zostera marina*) are sometimes used for packing purposes, and by upholsterers for stuffing mattresses and cushions; a patent has also been taken out for their manufacture into paper. The Lattice-leaf (q. v.) of Madagascar is an attractive curiosity. The Cape pondweed (*Aponogeton distachyon*) is grown as a fragrant ornamental aquatic, and at the Cape the starchy tubercular rhizome is roasted for food, and the flowering tops are used as a pickle, and as asparagus.

Nai'ads, the general designation of the nymphs of the fresh water, whether of lake, river, or fountain. Certain waters or springs presided over by the N. were supposed to inspire those who drank therefrom, hence these nymphs were thought to be possessed with oracular power, and to impart to mortals the gifts of prophecy and poetry. From this circumstance seers were sometimes termed *nympholēptoi* (nymph-struck). The N. were an inferior order of female divinities, designated, nevertheless, Olympian, and described as the daughters of Zeus. As conferring life and blessings they were worshipped with Dionysus and Demeter; in their prophetic character with Apollo; while as tenants of lake and stream, they mingled on green bank and vale with Pan, the Sileni, and the Satyrs, in the gamesome revel and the dance. They are usually represented in works of art as lovely maidens, nude or nearly so. Goats, lambs, milk, and oil were offered to them, but never wine. See NYMPHS.

Nail (Old Eng. *naegel*, comp. Ger. *nagel*; allied to Lat. *unguis*, Gr. *onyx*, Sansk. *nakha*), the name given to the horny plate forming a skin appendage in *vertebrate* animals. It is a typical example of the *horny tissues* of the body, in the chemical composition of which an albuminous substance in combination with sulphur is found. There is a larger proportion of the latter element in horny tissues than in albumen or fibrine. A N. consists essentially of an arrangement of the *cells* of the Epidermis (q. v.) or outer layer of the skin. In vertical section it is composed below of rounded or elongated cells; those of the upper part of the N. being flattened and more markedly horny than the under. The N. is formed, like the epidermis itself, as a secretion of the *dermis* or true skin, the N.-producing surface being termed its *matrix*. The *root* of the N. is the part lying next the matrix, and is embedded in a semicircular groove in the latter. The *bed* of the N. is the somewhat flattened part of the skin on which it rests, and is composed of a number of parallel ridges, forming the cells of the N. The N. thus grows in length from behind—new matter being formed by the *matrix*—and in thickness from below through the new material contributed by its bed. Hoofs, claws, and like organs are merely modifications or excessive developments of nails. *Ingrowing* nails are a troublesome affection requiring skilful surgical treatment.

Nail, an implement of almost universal use, but varying so much in size, material, and application, as almost to defy general definition. A common N. is, however, a tapering spike of iron, headed at the thick end, employed in joining and fastening together all kinds of joinery and woodwork. The N. has been known and used from the most remote antiquity, and indeed, considering its simplicity of form and indispensable utility, it may almost certainly be said to be coeval with the use of metal in any form. Nails are of three leading kinds—handmade or forged nails, cast nails, and machine-made or cut nails. In the hand-made N.-trade, again, three subdivisions are recognised, these being 'thousand' work, 'hundred' work, and farriery, or horse-shoe nails. 'Thousand' work consists of nails of a small size, while 'hundred' work includes heavy nails, spikes, &c. The work is conducted at the homes of the operatives, attached to which are small smithy hearths termed 'N.-shops,' and the material—'N.-rods'—is supplied by the N.-masters, or middlemen, called factors or 'foggers.' Women and small children perform much work of a character unsuited for them, and the social condition of the nailers or N. villages is of the most wretched description. The great centre of the N. trade of Great Britain is in the Midland hardware district, and in Dudley, Walsall, Bromsgrove, and Halesowen it forms with chainmaking the leading industry, while it is also prosecuted extensively in Birmingham, Wolverhampton, and other towns. Hand-made and farriers' nails are also extensively made in the village of St. Ninians, near Stirling, but there the men are industrious, sober, and prosperous. Cast nails are of limited application, and are principally used for studding the soles of boots and shoes. For the manufacture of 'cut' or machine-made nails a great variety of ingenious and complex machinery has been adopted, and by far the greater proportion of the nails now in common use is made by machinery. For some machines the iron is heated to a forging heat, while in others the operations of cutting and heading are performed on metal rods or plates in a cold condition. The machinery invented in 1873 by Mr. Whittle of Harborne, near Birmingham, is the best yet devised for the manufacture of hot wrought nails. The quantity of nails turned out in a given time is double that at-

tained by any previous machinery, while the tear and wear of the cutting instruments have been greatly reduced. Nails and brads are also punched out of plate iron, the punches being so



arranged that headed nails are cut out without any loss of metal, as shown in the accompanying diagram, in which *A* shows brads with heads on one side, and *B* represents nails with a head projecting over both sides.

Nain de Tillemont. See TILLEMONT.

Nain Singh Pundit, a native of India, on whom the Royal Geographical Society conferred its gold medal in 1877, on the ground that he had 'added a greater amount to our positive knowledge of the map of Asia than any individual of our time.' He is a native of Kumaon, and commenced his career as an explorer in 1856 with the brothers Schlagentweit, the Himalayan travellers. Subsequently, as a subordinate in the Trigonometrical Survey, he traversed the whole plateau of Thibet, and fixed by observations the upper course of the Brahmaputra and the site of Hlassa. He has now retired on a pension of £50 a-year.

Nairn, a royal burgh, and chief town of its county, is situated on the W. bank of the river N., where it enters the Moray Firth, 15 miles N.E. of Inverness by rail. It commands splendid views of the opposite coast of Ross-shire, distant 8 miles, and attracts a great number of visitors in summer by its excellent sea-bathing and artificial baths. The town, which has a good harbour, a museum, newspaper, &c., unites with Inverness, Forres, and Fortrose in sending a member to Parliament. Pop. (1871) 3751. In the vicinity is Cawdor Castle, where, according to tradition, King Duncan was murdered by Macbeth.

Nairne, Caroline Oliphant, Baroness, a Scottish poetess of rare genius, was the third daughter of Laurence Oliphant of Gask, and was born at the mansion-house of Gask, in Perthshire, 16th July 1766. Her beauty was such that she was called the 'Flower of Strathearn.' In June 1806 she married William Murray Nairne, then an officer in the British army, who in 1824 succeeded to the title of Baron Nairne, which had been attainted since the Rebellion of the Forty-five. The Baroness survived her husband fifteen years, dying at Gask, 27th October 1845. During the last years of her life she evinced a deep interest in religion, and was particularly attached to the Free Church movement, though her charities, which were numerous and varied, took no sectarian shape. Except to a very few friends, she never divulged the secret of her authorship; and while all Scotland was ringing with the *Laird o' Cockpen*, *The Land o' the Leal*, *Bonnie Charlie's now awa'*, *The Auld House*, *There grows a Bonnie Brier Bush*, *The Hundred Pipers*, &c., she remained absolutely unknown to her countrymen. There is an exquisite womanliness in her lyrics. Everything, whether humorous or serious, is tenderly, delicately, graciously touched; and everywhere there is stainless purity in word and sentiment. In 1850 Paterson & Sons, Edinburgh, published the first edition of the Baroness N.'s *Lays from Strathearn*, with pianoforte accompaniments by Finlay Dun. The seventh edition of this most beautiful collection appeared in 1876. See Charles Rogers' *Memoirs and Complete Lyrical Compositions of the Baroness N.* (Lond. 1869).

Nairnshire, a county in the N. of Scotland, bounded N. by the Moray Firth, S. and E. by Elgin, and W. by Inverness. Area, 137,500 statute acres; pop. (1871) 10,225. It is rugged and mountainous in the S. and E., and is drained by the rivers Nairn and Findhorn. The formation in the N. is mainly old red sandstone, in the S. gneiss, and in the W. granite. Agriculture is in an advanced state, and part of the soil is light and sandy. In 1876 there were 9614 acres under corn crops, 4856 under green crops, 9973 in clover, sanfoin, and grasses, and 1586 in permanent pasture, exclusive of mountain and heath. N. had in the same year 1220 horses, 6443 cattle, 15,089 sheep, and 820 pigs. The chief crops are barley, oats, wheat, turnips, and potatoes. The climate is singularly mild and steady; the rainfall does not exceed 26 inches. Besides the chief town of Nairn, the county includes the villages of Cawdor and Auldearn, the former celebrated for its great monthly cattle 'tryst.' N., together with Elginshire, sends one member to Parliament.

Nairs, the dominant Hindu tribe on the Malabar or W. coast of S. India, to whom the Zamorin of Calicut belonged. They are a warrior caste, claiming to be second only to the Brahmins. In old times they never went abroad without a knife or crooked sword, which they were ready to draw on all inferiors. They do not recognise the marriage tie; and consequently all descent and inheritance to property is traced through the female line—a custom which still governs the succession to the throne in the native states of Travancore and Cochin on the Malabar coast.

Nais and **Naïdidæ**, a genus and family of *Annelida* (q. v.), or worms related to the Earthworm (q. v.). They are found in freshwater streams. A familiar example is the *Tubifex rivulorum*, a worm that occurs in the mud of ponds, and is about half an inch in length. It has a bright pink body. The N. have the power of increasing by *gemmation* or *budding*. A bud thrown out near the middle of the body becomes a new individual, and the parent body may also separate into two or more distinct creatures.

Naiss'ant, in Heraldry, an epithet applied to an animal rising from the middle of an ordinary, thus contrasted with *Issuant*, which is applied to whatever comes from the bottom of a chief.

Naja, a genus of *Colubrine* snakes, belonging to the *Venomous* section of the latter group, and represented by the Cobra da Capello (*N. tripudians*) of India, and by the Egyptian Cobra (*N. haje*). They are among the most deadly of their kind, and have *canaliculated* poison-fangs in the upper jaw, with small solid teeth behind. See COBRA.

Naked-Eyed Medusæ. See MEDUSIDÆ.

Nakhichevân', a town in Russia, government of Ekaterinoslav, on the river Don, 28 miles from its mouth, and 45 miles E. of Taganrog by rail. N. was founded in 1780, is the seat of an Armenian archbishop, and manufactures silks, cottons, Morocco leather, and brandy. Pop. (1870) 16,258.

Nakoo, a name applied to the Gavial (q. v.).

Nàlàgarh ('brook-fort'), the capital of a native state of the same name in N.W. India, among the lower slopes of the Himalayas, 1094 miles N.W. of Calcutta. It is a place of considerable strength, and was bombarded and taken by General Ochterlony during the Gurkha war of 1803.—The *state* of N., which is also known as Hindur, forms one of the hill states of the Punjaub; it lies N. of the British district of Umballah. Area, 400 sq. miles; pop. 70,000; revenue, £9000; tribute, £500.

Nama'qualand, the name of an extensive region in S.W. Africa, divided into Great and Little N.—(1.) **Great N.** extends from Walvisch Bay in 23° S. lat. to the Orange River in 28°30' S. lat., and from the Atlantic eastwards to the Kalahari Desert (q. v.), an area computed at 100,000 sq. miles. The northern portion of this region consists of a plateau varying in height from 3000 to 5000 feet above the sea-level, and tolerably fertile. By far the most of the country, however, is a sterile, rainless tract, nearly devoid of vegetation. The geological formation is chiefly gneiss and granite, the latter when it rises into hills being rounded or flattened, and not in sharp peaks. Streams are few and insignificant, what drainage there is being carried off by watercourses whose beds are often dry. Of these the chief is the Great Fish River, which after a course from N. to S. of 450 miles unites with the Orange River, about 90 miles from the mouth of the latter. The coast is a dreary waste of sandy plains, but vessels may anchor in safety in Walvisch Bay, Sandwich Bay, and Angra Pequena. Ichaboe Island, and others on the coast contain guano, and a whale-fishery is also carried on. The country is rich in copper ore, and deposits of argentiferous lead are also known to exist, but neither are yet worked, on account of the cost of transport. Lions, rhinoceroses, giraffes,

and the larger antelopes are still numerous, though decreasing in numbers since the natives obtained firearms, and the hippopotamus is found in the N. The pop. of Great N. probably does not exceed 50,000.—(2.) **Little N.** is an electoral division of Cape Colony, of which it forms the N.W. portion, and is divided from Great N. by the Orange River. Up to 1865 it formed part of the division of Clanwilliam. Little N. has an area of 21,000 sq. miles, with a pop. estimated in 1876 at only 10,000. The seat of government is at Springbok Fontein. The coast region is buried in sand, and is succeeded by rugged mountains which attain a height of 5300 feet, and expand to the eastward into grassy plateaux. Scarcely any rain falls, and settlement is consequently confined to the neighbourhood of the Orange River, and one or two other streams. The climate is liable to great extremes, the range of the thermometer frequently being as much as 60° in twenty-four hours. The country is chiefly of value for its deposits of copper, which, although they were worked for a time by the Dutch 200 years ago, have only been remuneratively worked since 1853. The principal mine is at Ookiep, 60 miles from Port Nolloth in Robbe Bay, the place of shipment, with which it is connected by rail. The Ookiep ore is of the first quality, and the quantity seems to be unlimited. The larger kinds of game have been exterminated in Little N., with the exception of ostriches.

Nama'quas, the name given by Europeans to the Hottentot tribes inhabiting Great Namaqualand, though they call themselves Topnaars and Oerlams. They possess the physical peculiarities of the Hottentots (q. v.), but are a much finer race than the Bosjesmans (q. v.). They own cattle, goats, and sheep, and lead a half pastoral, half predatory life, yielding allegiance of a modified kind to a number of petty chiefs. The northern tribes, under their chief, Afrikaner, long carried on a war of extermination against their neighbours the Damaras. Morally, the N. are a low race, Andersson declaring that 'they possess every vice of savages and none of their noble qualities.' Idleness and ingratitude seem to be their principal characteristics; while, until the missionaries came among them, they had scarcely any idea of the existence of a Divine Being, and they are still largely under the sway of sorcerers. Polygamy is universal among them, and tattooing is also common. The N. probably do not number more than 50,000, and they are gradually disappearing before the advance of the Griquas.

Name (Old Eng. *nama*; comp. Ger. *name*, Lat. *nomen*, Gr. *onoma*, Sansk. *nâman*, from a root meaning 'to know;' hence 'that by which you are known'). The primitive rule in naming seems to have been 'one name one person.' Surnames and the multiplication of names came later. The baptismal was given at birth, or at a certain period after, at puberty; the power of selecting being in the father, subject to customs, such as that in Greece which pointed to the N. of the paternal grandfather. In some savage nations, *e.g.*, the Samoans, the N. is given long before birth, no difference being observed in naming the sexes. Marriage produced important effects: at Rome, the woman taking the feminine of her husband's prænomen; in Spain both surnames are retained, so that children have a choice: elsewhere the maiden surname is dropped from colloquial use, though not from legal designation, but the maiden Christian name remains unaltered. The Jews were the fruitful creators of single proper names, nearly all of them expressing the strong domestic or religious affections of the people. Greek names bear more frequent reference to personal appearance or the features of the human character, and were often supplemented by the occupation, place of birth, or a nickname. In the Roman prænomen, gentilicium, cognomen, and agnomen (Publius Cornelius Scipio Africanus) we have the individual (there was a very slender stock of *prænomina*), the gens, the familia, and the public distinction; but colloquially, only the first and third were used. With regard to the names of modern Europe, it may be observed that tradition gives us very little aid in tracing their origin. The stories about Turnbull and Lockhart are unfounded. The Latinisation of names, too, is very misleading; as when Armine is attempted to be made into Sancta Ermina, or Dimoak into De umbra quercu. In fact, the study of English names embraces a wider field than that of the English language, because while the spoken dialects of Old English were fused into one, the names were not. Some of the shorter names are of extraordinary antiquity; *e.g.* Seymour (Sigirner, father of Arminius, a name also surviving in Siggs); Nibbs, probably connected with Neibelung and Neville. These names are partly derived from original surnames (which did not come into settled hereditary use much, if at all, before the Conquest).* All of them, though not changing with the general body of the language, have been subject to phonetic mutations, but so partially that we find existing together the different stages of their development; as Hagle and Hail (Old Eng. *hægl* or *hagel*), Wegg and Way (Old Eng. *weg*), Gum and Groom (Old Eng. *guma*). Names which approximate to an apparent meaning are readily corrupted into a familiar sound; as Ashketele, Goodluck, Thoroughgood, for Asketil, Guthlac, and Thurgood. This is sometimes done consciously from superstitious motives; as when Maria Theresa, whose minister Tunicotto's name had been corrupted into Thunichtgut, altered it to Thugut. Even in such cases as Bastard, Harlott, Wanton, Outlaw, Scullion, Coward, Vassal (all names in actual use), it is almost certain that the apparent meaning is only a coincidence. Again such names as Purchase, Pardon, Vinegar, Power, Pilgrim, Marigold, Dandelyon, are distinctly compounds. The simplest and most ancient forms consist of one syllable with a terminal vowel, *a*, *i*, or *o*: Ella, Coll, Hanna, Bynn, Betti, Cuddi, Dodo, Odo, most of which may be seen in the Domesday Book or Liber Vitæ of Durham. These root names are variously modified by the seven diminutives (*k*, *l*, *kin*, *lin*, *s*, *us*, and *m*), as in Garrick, Wilkin, &c., by phonetic additions, such as *n* or *r* at the end of a simple N. or some liquid in the middle of a compound N. *Ing* and *son* are the great German and Scandinavian patronymics; the final *s* being more frequently a phonetic. Most compound names have no meaning at all—*e.g.*, Arnulf (eagle wolf), Zeizolf (darling wolf)—they are merely two proper names put together. Of course, many of the terminations of compound names have been common substantives, as *am* or *iam* from *helm*, helmet; *bert* from *beorht*, bright; *red*, *rat*, or *ret* from *red*, counsel, &c. The usual changes between High and Low German take place, as *t* for *d*, *s* or *z* for *t*, *sch* for *s*, *b* for *v*, *p* for *b*, and *k* for *g*. The Frankish dialect often turns the aspirated *l* or *r* into a distinct *e*, while the German often prefixes or affixes a *g*. But it is impossible to do more than suggest the causes which have brought names into their present condition. A very large number of French names, both Christian and surnames, are German. A large class of names, suggested by mann, carl, guin, aba, &c., simply refer to man as the type of power. The family names, apparently formed from women's names, are often just ancient men's names, and do not indicate illegitimacy. The sacred animals, wolf, bear, boar, and horse, contribute a good many names; but, as in the case of trades, so in many cases of apparent derivation from animals the names come from a totally different source. Among birds, the eagle, the raven, and the crow give most names. The word god, with its Scandinavian relatives *as* or *os* and *ans*, and the forty-nine titles of Odin are responsible for a large number. So with the other gods and heroes; the names which, like Hild, Gund, Hub, Coll, Bald, &c., suggest the warrior and his arms. Another series, of which Frid, Wine, Liub, Bil, Dod or tot, Bul, Geben, are examples, expressed originally ideas of protection and friendship. Others again clearly refer to all the relations of kinship. Many names represent nationalities, or the more general idea of 'guest' or 'sojourner,' and have therefore been given to strangers by those among whom they lived. The associations of sea and sea-life; the relations of ruler and prince; the ideas of wisdom, knowledge, fame, wealth; all the personal features of a man, both bodily and mentally; his station in life and trade; herbs, metals, &c., always with some figurative reference, also furnish names. Of course the Christian Church introduced a great many Scripture names; but many apparently scriptural names (the familiar diminutives of some which are really so) have a different origin. Names of places are often taken from persons and then given back to persons: as Dodd's worth, Grim's By; and this process may be repeated twice over, as in Montgomery. The principal local surnames are Bank, Bech, Bower, Cross, Dale, Frith, Gill, Hedge, Hill, Ing, Moss, Orchard, Pitt, Pool, Ridge, Slade, Street, Wall. On the other hand, House, Inn, Home, Wood, &c., are probably from ancient baptismal names. Some names of parishes, as Burnard,

* The earliest known English surname is *Hatte*, though prefixes like *a* and *hilde* may have been used by noble families before, and partly from ancient single or baptismal names.

Guthrie, Jellybrands, Lockhart, Osborn, Sibbald, and Thorbrand, all in Scotland, seem to be the names of men. The local terminations, ton, ham, burg, by, den, force, garth, gate, gill, holt, hope, howe, hurst, over, shaw, sted, stow, ster, thorp, thwaite, toft, wick, vidr, are all pretty well known. Finally, this subject is not without its comicalities. In the London Directory there are five dealers in potatoes named Mash; in Paris there are wine merchants named Porte, Claret, and Champagne, a physician named Verjus, a hair-dresser named Saladin, a tailor named Clovis, and a grocer named Milord. Minerve is a lemonade-seller, Thais the lady-superior of a religious order, and Madame Mizery keeps a hotel. See Förstmann's *Alt-deutsches Namenbuch* (1856); Pott's *Die Personennamen* (1853); Kemble's *Names, &c., of the Anglo-Saxons* (1846); Lower's *English Surnames* (1849), and *Patronymica Britannica* (1860); Yonge's *History of Christian Names* (1863); Taylor's *Names and Places* (1864); Ferguson's *Teutonic Name-System* (1864); Innes' *Scotch Surnames* (1860); Joyce's *Irish Names of Places* (2 vols. 1869–75); and Bardsley's *English Surnames* (2d ed. Lond. 1875).

Namur' (Flem. *Namen*), a province of Belgium, bounded N. by Brabant, N.E. by Liége, E. and S.E. by Luxemburg, S. by France, and W. by Hainault. Area, 1417 sq. miles; pop. (1874) 316,331, chiefly Walloons. N. is watered by the Maas (q. v.) with its affluents the Lesse and Sambre, and is finely diversified with well-wooded offsets of the Ardennes. In the S.W. part ('La Fagne') are wide moors; in the N. and E. ('Condroz') rich pastures and cornlands. N. abounds in coal, iron, lead, zinc, manganese, sulphur, alum, lime, and marble. It is traversed by two main and several branch lines of railway. Already in the 10th c. N. was an independent county, and was successively united to Hainault, Luxemburg, and Flanders (1261). In 1420 it was sold by Johann III. of N. to Philipp of Burgundy for 132,000 gold crowns. After this it was one of the seventeen Netherland provinces. At the Peace of Lunéville (q. v.) N. fell to France, but from 1814 it formed a province of the Netherlands, and in 1831 was transferred to the new kingdom of Belgium.—**N.**, a fortified town in Belgium, capital of the province of N., lying between two hills at the confluence of the Maas and Sambre, and at the junction of five lines of railway, 36½ miles W.S.W. of Liége by rail. It is a bishop's see, and has seventeen churches, of which the finest are the cathedral, or church of St. Aubin (1772), and the Jesuit church of St. Lupus, dating from the beginning of the 17th c. The chief industries of N. are the manufacture of cutlery, hardware, leather, and chemicals, and the working of coal and marble. Pop. (1873) 23,380.

Nan'a Sah'ib (*Nana* = a maternal grandfather), the name by which the infamous instigator of the Massacre of Cawnpore is known in history. His real name was Dundhu Punt, and he was born about 1820, of Brahmin descent, and a near relation of the Peishwa (q. v.), the dispossessed hereditary prime minister of the great Mahratta confederacy, by whom he was adopted. On the death of his adoptive father in 1853, the British Government, in accordance with the strict letter of the original treaty, refused to continue in his favour the pension of £80,000 per annum which the ex-Peishwa had received. N. S., despite many memorials and a mission to London, was only allowed to hold rent-free the site of the palace of Bithur, 10 miles W. of Cawnpore. There is no doubt that he forthwith commenced intrigues against the British power in India; but he was so little suspected, that on the outbreak of the Sepoy Mutiny at Cawnpore in May 1857, his treacherous offer of assistance was accepted by the British general. He immediately placed himself at the head of the mutineers, and was proclaimed Peishwa with great magnificence. After a month's siege, the Europeans at Cawnpore capitulated to N. S. on a promise that they should be sent down the Ganges in safety; but before they had all got on board the boats, the premeditated massacre began. The men were shot down, and the women and children taken back to Cawnpore, to be miserably cut to pieces in the following month, by the direct orders of the Nana, after his defeat by Havelock. Four Englishmen alone fought their way to safety, of whom Colonel Mowbray Thomson is now the sole survivor. The Nana fled into Rohilcund; and after a series of engagements he is known to have been driven across the frontier into Nepaul, but there all direct knowledge of him ceases. Some say he perished of fever in the jungle; but the general opinion is that he escaped into Central Asia. More than once in recent years his capture has been announced. As late as 1875 Scindiah, Rajah of Gwalior, arrested with his own hand a person whom he asserted to be N. S., but who turned out to be a mere fanatic, though a strong suspicion exists that the real personage did then pay a visit to Gwalior. See Sir J. Kaye's *History of the Sepoy War*, Col. M. Thomson's *Personal Reminiscences*, and *Cawnpore* by G. O. Trevelyan.

Nancy (from the Celt. *Nant*, 'a brook,' or 'valley through which flows a brook'), the chief town of the department of Meurthe-et-Moselle, France, on the left bank of the Meurthe, 35 miles S. of Metz by rail. Surrounded by a rich wine-growing country, it is one of the finest cities in France, entered by several imposing gates, and having many spacious streets lined with magnificent houses, and various public squares adorned with gardens and fountains. It has celebrated schools of medicine, pharmacy, and forestry, besides a lyceum, a library of 26,000 vols., valuable art and scientific collections, and manufactures of embroidery (400 factories), cottons, woollens, linens, candles, &c. Pop. (1872) 52,978. N. was the residence of the Duc de Lorraine from the 13th c., and in the vicinity a battle was fought between Charles the Rash and René II., in which the former was defeated and slain, 5th January 1477. Stanislas Leszczynski, the ex-king of Poland, did much to beautify the town, and on his death in 1766 Lorraine fell to France. N. was captured by Blücher in 1814, and after the retreat of Mac-Mahon's army surrendered to the Germans, 12th August 1870, but was restored at the peace.

Nandu' (*Rhea Americana*), a species of *Rhea* or American ostrich, a Cursorial bird inhabiting S. America, especially La Plata. It attains a height of five feet, and is of a dark grey colour, the upper parts being blackish. The wing-quills are white, and the neck is encircled by a black band, and feathered. As in other Cursorial birds, the feathers are destitute of webs. Their barbs are loose and disconnected. The N. is gregarious, the flocks numbering from fifteen to thirty. The food consists of grasses and roots. The eggs may number twenty-two. The N. is readily tamed. This name is also given to other species of *Rhea*, as the *R. Darwinii* and the *R. macrorhynchus*.

Nankeen', a buff coloured or brownish yellow calico manufactured in China from a variety of cotton naturally possessed of that particular colour. In European countries the colour is artificially produced by dyeing white calico with a tannin solution after mordanting with alum and clearing with nitro-muriate of tin.

Nanking' (*i.e.*, 'Southern Court'), the former capital of China, and the chief town of Kiang-Su, is situated in a marshy, unhealthy plain, on a branch of the Yang-tse-Kiang, 3 miles above the point of confluence, and 200 miles from the mouth of the greater stream. The remains of its ancient wall have a circumference of 35 miles, and according to Chinese accounts the population at one time amounted to 4 millions; the modern wall is 40 feet high, and 18 miles in circuit, but great part of the area is now a dreary ruin-encumbered waste. N. was the court of the Ming dynasty from 1369, till Yung-lo removed it to Peking in 1410, after which the city began to decline. Still it not only retained the outward show of grandeur in its splendid architecture, but continued to be a famous seat of learning, with great libraries and other institutions, as well as the centre of a wealthy commerce. It was taken (19th March 1853) by the Tai-pings, who held it as a stronghold of rebellion for eleven years. When recovered by the Imperialists (19th July 1864) its glorious monuments had been wrecked, and its sources of wealth scattered to the winds. The rebels had totally destroyed the world-famed Porcelain Tower, an octagonal structure 322 feet high, built of coloured bricks, lighted by 140 lanterns, and supporting 144 bells, erected by the emperor Yung-lo, 1413–32. Most of the ancient palaces have wholly disappeared, but outside the city are the splendid remains of the imperial Summer Palace. Another object of interest is a singular avenue of colossal statues of camels, elephants, &c., leading to the imperial tombs. The government has made several attempts to revive the prosperity of N., but with little success. It is, however, the residence of the viceroy, the chief seat of literature in the empire, and the headquarters of a large military force; and although its commerce is comparatively slight, it has an arsenal on a European model, and some manufactures of the once famous *nankeen*

cloths, satins, silks, crape, and paper. Pop. 300,000. The treaty between England and China, by which European merchants and a British consul were allowed to reside at the five 'treaty ports' was signed here, 29th August 1842. The British, under Major Gordon, helped to crush the Tai-pings in 1864.

Nantes (named from the *Namnetes*, Celt. 'the dwellers in the river-valley'), a city of N.W. France, capital of the department of Loire-Inférieure, lies on the right bank of the Loire, at the confluence of the Erdre and Sèvre with that river, 33 miles from the sea, and 58 miles S.S.E. of Rennes by rail. It is noted for the beauty of its streets and public buildings. Of the five suburbs of N., three will bear comparison with the finest parts of Paris. Numerous bridges connect the banks of the river with the islands in its channel. The most noteworthy buildings are the cathedral of St. Pierre, dating from the 14th c.; the castle of the Dukes of Bretagne, built in 930, whence Henri IV. issued the Edict of N.; and the churches of St. Nicholas, Ste. Croix, St. Louis, St. Clement, St. Donatien, and Ste. Anne; the Bourse (1809); the theatre (1787); the hospital of St. Jacques; the Hôtel-Dieu; and the Salorges or great warehouses for colonial goods. N. has numerous schools and museums of art and science, a library of 90,000 vols., and the best provincial picture gallery in France. At N. the tide rises only five feet, hence the largest vessels unload at St. Nazaire (33 miles off), and their cargoes are conveyed to N. by rail or in barges. Through recent improvements of the river-bed, ships that could formerly only reach Paimbœuf can now enter the harbour of N., which has room for 200 vessels. In 1876, there entered and cleared 66 British ships of 9747 tons. The chief industries are sugar-refining, shipbuilding, and the manufacture of cannon, ship's boilers, linens, cottons, sailcloth, flannel, chemicals, leather, and brandy. The yearly exports of N. are worth 2¼ million (corn above one million), and exports 2¾ millions sterling. In 1876 there were imported 54,476 tons of raw sugar, and exported 8106 tons of refined sugar. On an island 6 miles W. is the large government steam-engine factory of *Indret*, and in the S.E., near the Sèvre, is *Palet*, the home of Abelard. Pop. of N. (1872), 118,517.

Nantes, The Edict of, was signed by Henri IV. at that city, April 13, 1598, and received the assent of the French Parliament, February 25, 1599. In ninety-one public, and fifty-one secret articles, it allowed to the French Protestant Church (q. v.) the free exercise of its religion, except in certain towns, as Rheims and Soissons; it threw open to Protestants all offices of State; and it assigned a yearly sum of upwards of £6000 to the support of their pastors. The Edict was confirmed by Louis XIII. in 1614, and again in 1622, and though often infringed by Richelieu and Mazarin, remained in force until, in 1684, Louis XIV., at the instigation of Madame de Maintenon and Père La Chaise, commenced that system of persecution known as the Dragonnades (q. v.), which finally resulted in the formal revocation of the Edict, October 23, 1685. See Ruthière, *Éclaircissements Historiques sur les Causes de la Révocation de l'Édit de Nantes* (2 vols. Par. 1788), and Smiles, *The Huguenots* (Lond. 1874).

Nantuck'et, an island off the coast of Massachusetts, 28 miles S. of Cape Cod peninsula, is 15 miles long by 4 wide, and with four smaller islands has an area of 60 sq. miles. Its soil is light, and almost treeless. The town of N., in the S. of the island, has nine churches, two banks, and one weekly newspaper. Pop. (1870) 4123.

Nant'wich (Cym. *nant*, 'valley,' and Scand. *wic*, 'saltworks'), a market-town of England, in Cheshire, on the Weaver, 20½ miles S.E. of Chester by rail. The chief buildings are the cruciform church of Sts. Mary and Nicholas (restored 1866), the town-hall (1858), mechanics' institute, grammar-school, &c. The once famous saltworks of N. have been totally abandoned, and shoemaking and the manufacture of gloves, leather, and cotton are now its leading industries. Pop. (1871) 7234.

Nanuk', the founder of the Sikh religion, was born near Lahore in 1469, of the Rotri or trading caste. He travelled widely as a religious devotee, and studied the religious books both of Hindus and Mohammedans. 'Several Korans and Puranas had he read, but one God had he not found.' Finally he abandoned the garb of an ascetic, returned to his family, and passed the remainder of a long life in teaching men to worship the One Almighty Invisible God, to live virtuously, and to be tolerant of the failings of others. He admitted the authority of Mohammed and also of the Hindu incarnations, and inculcated alike veneration for the cow and abhorrence of the hog. He died in 1539, but his spirit is believed by the Sikhs to have been transmitted to each successive *gooroo* (q. v.). Many of his sayings are embodied in the Grunth (q. v.) or Holy Book of the Sikhs. Outside the Punjaub his followers are often called Nanukshahis. See Cunningham's *History of the Sikhs* (Lond. 1853).

Naph'tali was one of the twelve tribes of Israel, numbering at the first census 53,400 fighting men, and at the second 45,400 (Num. i. and xxvi.), which had its territory in the extreme north of Canaan. It is held by some Biblical scholars that the writer of Genesis xxix. and xxx., who gives a detailed account of the birth of Jacob's sons, with an explanation of all their names (N., 'my conflict,' that is, in prayer with God for his mercy, which had seemed to be restricted to Leah), had the definite purpose before him of assigning to each of the *tribes* its proper rank and importance. According to this theory N., the son of Rachel's slave Bilhah, was inferior to the sons of Rachel and Leah, although superior to the two sons of Leah's slave, as Rachel was nearer Jacob's heart than Leah.

Naph'tha (Arab. *nafth*, from *nafatha*, 'to boil') was originally a term applied only to the liquid inflammable hydrocarbons which are obtained from the earth in many parts of the world, and which now are more generally recognised under the name petroleum. At a later period the term covered also the light and volatile oils obtained by the destructive distillation of organic substances, such as wood, bones, caoutchouc, coal, peat, &c. At the present day, although the term N. is frequently applied to all these different products, both technologically and in commerce, the native products are generally termed petroleum, the light oil obtained in the distillation of coal and shale for paraffin manufacture is known as 'spirit' or illuminating paraffin oil. Wood N. is properly known as pyroxylic spirit or methylic alcohol, and it is only to the most volatile product of the distillation of coal tar that the name N. is strictly applied. These various forms of N. all differ in their chemical construction, and agree only in being highly inflammable and very volatile hydrocarbons, and in possessing other physical properties in common. Rock oil or mineral N. will be described under PETROLEUM, and for wood N. see PYROXYLIC SPIRIT, and WOOD, DISTILLATION OF. Coal Tar N., which is here dealt with, is a mixture of light oil or ethereal hydrocarbon obtained as the first product in the distillation of gas tar. The tar yields from 5 to 10 per cent. of this light oil, its richness in N. varying with the class of coal used in the previous gas making. Its constitution and properties depend upon the extent to which the heat is forced and the distillation continued, that which distils over first being richest in benzole, which is the most volatile constituent of N., its boiling point being 177° Fahr. Between the temperatures of 190° and 350° the N. distilled over consists principally of a mixture of benzole and toluole, but contains also other hydrocarbons, constituting what is chemically known as the aromatic series, as enumerated in the following table:—

Base.	Formula.	Boiling Point.	Specific Gravity
Benzole . .	$C_6 H_6$	177°	0·850 at 60°
Toluole . .	$C_7 H_8$	230°	0·870
Xylole . .	$C_8 H_{10}$	259°	
Cumole . .	$C_9 H_{12}$	304°	
Cymole . .	$C_{10} H_{14}$	347°	0·861 at 57°

At higher temperatures what are termed 'middle' or kreasote oils are obtained, and a third series of products obtained from the distillation of coal tar consist of the 'dead' or anthracene oils. From the light or N. oils are obtained the aniline colours of commerce, the middle oil series yields carbolic acid and the phenol colours; and from the third or dead oil is obtained anthracene, the commercial basis of artificial alizarine. For the manufacture of coal N., large iron stills capable of holding from 800 to 1500 gallons of coal tar are employed; and the distillation is effected by the direct application of steam. The rough or crude N. obtained in this first distillation is a very impure substance, containing a certain proportion of 'middle oil,' and

possessed of a powerfully disagreeable smell, owing to the presence of certain organic bases. From these organic contaminations it is freed by treatment with strong sulphuric acid in iron tanks, which, on intimate mixture with the crude N. attacks the impurities, and forms with them a tarry sludge, which, falling to the bottom, can be removed. The partially purified N. is again treated with sulphuric acid, and finally to remove all traces of the acid which may remain caustic soda is added to the N. After removal of the caustic liquor, the N. is rectified by redistillation, and it then forms the ordinary coal N. of commerce. The middle oil is separated from the light or N. oil by fractional distillation; and by the same method the commercial N. can be made to yield up the benzole and other hydrocarbons higher in the series, as enumerated in the above table. It is thus by fractional distillation that the commercial benzole, which forms the basis of the aniline manufacture, is obtained. N., and more especially benzole and the other volatile constituents of the substance, are powerful solvents, and as such are used extensively under various fanciful names for removing grease, oil, and paint spots from all kinds of textile fabrics, and for other similar purposes; but its principal use, as indicated above, is found in the aniline manufacture.

Naph'thaline (C_{10} H_8), a hydrocarbon obtained in large quantities as a bye-product in the preparation of coal gas. By boiling with alcohol the last portions of the heavy oil which pass over at the close of the distillation of coal tar, and then allowing to cool, N. crystallises out in brilliant pearly flakes, which may be further purified by sublimation. It melts at 80° C., and boils at 212°. It is insoluble in cold water, slightly soluble in boiling water, and easily dissolved by alcohol and ether. In itself N. is not very interesting; but its reactions with bromine and chlorine have thrown much light upon theory, and indeed suggested the now accepted doctrine of chemical substitutions, which is, that an element may be replaced in a given compound by an equivalent quantity of another element of a different chemical character. In the particular case of N., each hydrodgen atom may be replaced successively by an atom of chlorine or bromine; and series of compounds may thus be obtained which show a progression in their properties as well as in their composition.

Na'pier, a town in the N. Island of New Zealand, situated in 39° 22′ S. lat., 177° E. long. It was the capital of the former province of Hawke's Bay, and is the outlet of a thriving district, wool being the staple export. It possesses a small harbour, known as the Iron Pot, which vessels of 200 tons can enter, larger vessels anchoring in the roadstead. Pop. (1877) 5000.

Napier, a distinguished Scotch family, which can be traced back to the 13th c. The most notable members of it are (1) **John N.**, or **Naper of Merchiston**, who was born at Merchiston Castle, near Edinburgh, in 1550. Except that he studied at St. Andrews University, and travelled for several years upon the Continent, we know nothing of his doings till 1594. A letter of this date to Tycho Brahe from Dr. Craig, a Scotchman, mentions that N. was constructing a table of Logarithms (q. v.). How long previous to 1594 his mind had been occupied with this discovery, upon which N.'s fame as a mathematician mainly rests, we have no means of telling. The principle of logarithms was no novelty in the mathematical world at the time N. lived; but the knowledge was practically useless until methods were supplied for calculating logarithms of *all* numbers. This was the service which N. rendered. His tables were published under the title *Mirifici Logarithmorum Canonis Descriptio* (1614), and being intended to facilitate trigonometrical calculations contained only the logarithms of the natural sines to each minute of the quadrant, and to a radius = 10^7. The principle of their construction was withheld, but was published in a posthumous work edited by his third son Robert, and entitled *Mirifici Logarithmorum Canonis Constructio* (1619). In spherical trigonometry he facilitated calculation by his famous *Rules* or *Analogies*. His *Rabdologiæ seu Numerationes per Virgulas* (1617), describing his *Bones*, was his last literary production. As a theological writer he distinguished himself by a curious fanciful work upon the Apocalypse, in which he denounced the Pope as Antichrist, and assigned the destruction of the world to the year 1786. He died at Merchiston, April 3, 1617, old style. See Mark N.'s *Life of N. of Merchiston* (1834).—(2) **Sir Charles James N.**, G.C.B., the conqueror of Scinde, and the favourite of the British army, was a descendant of the fifth Lord N., and was born in London, 10th August 1782. He entered the army in 1794, and was present at the battle of Coruña. Subsequently he served through the Peninsular War, being severely wounded in several battles. In 1818 he was appointed Governor of Cephalonia, one of the Ionian Islands; and in 1841 Commander-in-Chief of the Bombay army. In this latter capacity it became his duty to effect the conquest of Scinde (q. v.), though he ever disapproved of the political consequences which that conquest involved. The battle of Meeanee (q. v.) is one of the most brilliant actions in the military annals of the British in India. After the surrender of the Ameers of Scinde, Sir Charles N. was nominated the first civil administrator of that province, on which, amongst other benefits, he conferred the establishment of the port of Kurrachee. In 1849, by the unanimous voice of the British nation, he was called to the command of the Indian army, on the arrival of the news of the disasters of the second Sikh War; and he left England on a day's notice to take up that post. However, before his arrival in India, the victory of Gujerat had concluded the war. Owing to a difference with the Governor-General, Lord Dalhousie, he resigned in 1851, and returned to England. He died at Oaklands, near Portsmouth, 29th August 1853. A man of brilliant and daring genius, of great personal valour, with a passionate humanity and sense of justice, he was supremely fitted to subdue disorder, to inspire his enemies with terror, and his troops with confidence and admiration. The chief defect in his character was a certain rash and irritable jealousy, which at times brought him into fiery collision even with the ablest Indian officials. A statue has been erected to his memory in Trafalgar Square, London, the bulk of the cost of which was subscribed by private soldiers.—(3) **Sir William Francis Patrick N.**, brother of the preceding, was born at Castletown, in the county of Kildare, December 17, 1785, entered the army (1800), and obtained his captaincy (1804). He was present at the bombardment of Copenhagen (1807), and at seven of the great battles in the Peninsular War (1808–14), being wounded at Almeida and Cazal Nova. He became major (1811), lieutenant-colonel (1813), colonel (1830), major-general (1841), lieutenant-governor of Guernsey (1842), and lieutenant-general (1851), having been knighted in 1848. He died at Clapham, February 12, 1860. He wrote a *History of the War in the Peninsula* (6 vols. Lond. 1828–40), in which he was assisted by his wife, a niece of Charles James Fox, and for which Wellington and Soult furnished materials; *Conquest of Scinde* (Lond. 1845); *Administration of Scinde* (1851); *English Battles and Sieges in the Peninsula* (1855); and the *Life and Opinions of General Sir Charles James N.* (4 vols. 1857).—(4) **Admiral Sir Charles N.**, a grandson of Francis, the fifth Lord N., was born at Merchiston Hall, in the county of Stirling, March 6, 1786, and was educated at the High School of Edinburgh (1793). He entered the navy (1800), was promoted lieutenant (1805) and commander (1807), had his thigh broken in an action with a French corvette (1808), captured Fort Edward at the siege of Martinique, and displayed the utmost gallantry and seamanship in a running fight with the *D'Haupoult* (1809). Created post-captain, but put on half-pay, he attended lectures at the University of Edinburgh; and then, 'unwilling to be idle,' joined Lord Wellington's army in Portugal, and was wounded at Busaco (1810). Commander of the *Thames* (1811), and of the *Euryalus* (1813), he served with Gordon in the 'unparalleled' enterprise up the Potomac (1814), was made a C.B. (1815), and being paid off, married a Mrs. Elers, a widow with four children. After a tour in France, Italy, and Switzerland, N. settled at Paris (1818–27), where he sunk all his capital in an unfortunate steamboat speculation, and in 1829 was appointed to the *Galatea*. Under the *nom de guerre* of 'Don Carlos de Ponza,' he took command of the Portuguese Constitutional fleet (1833), and sailed in quest of the Miguelites, whom he defeated off Cape St. Vincent (July 5) with three frigates, a schooner, and a brig, capturing two sail-of-the-line and two frigates. Created full admiral and Viscount Cape St. Vincent, he set himself to the fruitless task of reforming the Portuguese Navy, and co-operated in the land campaign which terminated in the Convention of Evora (May 26, 1834) and the establishment of Donna Maria on the throne of Portugal. Returning to England, N. was appointed (1838) to the *Powerful*, on the Levant station, and in 1840 received orders to

dispossess Mehemet Ali (q. v.) of Syria, and re-establish the authority of the Sultan. Landing, he took Sidon (September 25), and defeated Ibrahim Pasha at Boharsef (October 10). Next at sea, he led the van in the attack on Acre (November 4), and assumed (November 21) the command of the fleet engaged in the blockade of Alexandria, which he ended by the Convention of November 27, 1840. On his return home, N. was created a K.C.B., presented with the freedom of the City of London, and elected member for Marylebone (1841). As Rear-Admiral (1846), he commanded the Channel Fleet (1847–49), and on the outbreak of the Crimean War (1854) received the command of the Baltic fleet. With ill-manned ships and a total lack of gunboats and pilots, tied hand and foot too by red tape, N. accomplished little beyond the capture of Bomarsund (August 16), and on his arrival at Portsmouth (December 22) was ignominiously deprived of the command, while his applications for a court-martial remained unheeded. He refused the Grand Cross of the Bath (1855), but in the same year was returned to Parliament for Southwark. He visited St. Petersburg (1856), laboured successfully for navy reform (1857–59), and died at Merchiston Hall, his seat in Hampshire, November 6, 1860. N. was author of *An Account of the War in Portugal* (2 vols. Lond. 1836), *The War in Syria* (2 vols. Lond. 1842), *The Navy: Its Past and Present State* (Lond. 1851), and other works. See his *Life*, by his step-son, Major-General Elers N. (2 vols. Lond. 1862).—(5) **Robert Cornelis, Lord N. of Magdála**, one of the ablest of living English generals, was the son of an Indian officer, and was born in Ceylon 6th Dec. 1810. He entered the Bengal Engineers in 1826, first distinguished himself in the Sikh campaigns, especially at the siege of Mooltan (q. v.); and subsequently, in a civil capacity, planned and executed the roads by which the newly-acquired province of the Punjaub was held. During the Mutiny of 1857 he was conspicuous at the sieges of Delhi and Lucknow, and was in command at the engagement of Powri, for which he was made K.C.B. He then served in the Chinese War, and from 1865 to 1876 was successively Commander-in-Chief of the Bombay and Bengal armies. In the former capacity he conducted in person the successful Abyssinian expedition, being the first engineer officer in British military history who has been intrusted with such an important command. In 1868 he was created a peer, with a pension of £2000 to himself and his next heir-male. Lord N. is now (1877) Governor of Gibraltar.

Napier's Bones, the name given to an invention of Napier of Merchiston, by which the operations of multiplication and division might be facilitated. The more important discovery of Logarithms (q. v.), however, rendered their use very limited; and now they are merely historic relics.

Naples, Kingdom of (Ital. *Sicilia Citeriore* or *Dominj di quà dal Faro*), the continental part of the Kingdom of the Two Sicilies, comprised all Italy S. of the river Tronto in the E., and Capo Circello in the W. Area, 32,475 sq. miles; pop. (1851) 6,612,892. This territory, anciently inhabited by Samnites, Marsi, Lucanians, Bruttii, Campanians, and the Greek colonists of Magna Græcia, became a Roman province (272 B.C.), and on the fall of the Western Empire (476 A.D.) was conquered by Odoacer, whose power in turn gave way before the invasion of the East Goths under Theodoric (489). Annexed by Belisarius and Narses to the Byzantine Empire (535–553), it was governed by seven dukes appointed by the emperor, and subject to the Exarch of Ravenna. The Lombards founded the duchy of Beneventum (571), but the maritime towns remained Greek, and from the close of the 8th c. were ruled by a Patricius, resident in Sicily, whence the phrases 'Two Sicilies' and 'Territories on this side the Strait.' The conquests of the Saracens (842) and the reconquests of the Greeks (890) were wrested from both by Norman adventurers, headed by the sons of Tancred of Hauteville. Robert Guiscard, receiving investiture of present and future acquisitions as a fief of the Holy See (1057), established the duchy of Apulia, Calabria, and Sicily, which under Roger II. became the feudal Kingdom of the Two Sicilies (1139). On the death of Guillaume II., the last legitimate member of the Norman line, in 1189, the Emperor Heinrich VI., his son-in-law, made himself master of the kingdom. It remained with the Hohenstaufens till 1266, when Charles of Anjou, defeating Manfred at Benevento, and beheading Konradin (1268), founded the Angevin dynasty. The Two Sicilies, severed by the Sicilian Vespers (1282), were reunited under Alfonso V. of Aragon (1442), but again separated at his death (1458), N. falling to his natural son Ferdinand I. In 1495 it was conquered by Charles VIII. of France, and in 1501 by the united forces of Louis XII. and Ferdinand the Catholic, the latter expelling the French in 1504, and forming the Two Sicilies into a Province of Spain. The central episode of the Spanish rule was Masaniello's insurrection (1647). The Treaty of Utrecht (1713), terminating the War of the Spanish Succession, apportioned Sicily to Savoy and N. to Austria; but by the Peace of Vienna (1738), the Two Sicilies (reunited in 1720) were ceded to a younger son of the Bourbon Philip V. of Spain. He ascended the throne as Charles I., but himself becoming King of Spain (1750), vacated it to his third son, Ferdinand. The entrance of the French Republicans (1798) and the erection of the Parthenopean Republic were followed by a loyalist rising of the lazzaroni under Cardinal Ruffo and the return of the king, whose vindictive and reactionary policy of the next six years evoked Napoleon's manifesto: 'The dynasty of the Bourbons in N. has ceased to rule.' The reigns of Joseph Bonaparte (1806) and Murat (1808–15) were a period of savage guerilla warfare between the French and the Calabrian brigands, but during them began an intellectual movement, only fully developed some thirty years later, which would never have arisen under the numbing despotism of the Bourbons. After Ferdinand's restoration by the Congress of Vienna, N. was virtually a dependency of Austria. The liberal constitution won by the Carbonari in 1820 was overthrown by an Austrian invasion suggested by Ferdinand himself. Francis I. (1825–30) established the Swiss Guards, with whose aid Ferdinand II. (1839–59) withdrew in 1848 the liberties granted four months before, and strove to reduce Sicily to obedience by bombarding Messina. Shortly after the accession of Francis II. a law of the Swiss Confederation reduced these troops to 800 men; the National party at Turin seized the opportunity; Garibaldi's landing at Marsala (May 11, 1860) was followed by a series of unbroken successes. Francis, finding concessions useless on the part of a king who in twelve months had arrested 5000 *attendibili* ('suspects'), and seeing himself deserted by his followers, sailed for Gaeta (September 7); and on October 21, 1860, the Two Sicilies were declared by the vote of the people—1,742,320 ayes against 10,769 noes—to be henceforth a part of the kingdom of Italy, one and indivisible. Victor Emmanuel made his entry into Naples, November 7; and Gaëta capitulated, February 13, 1861. See Camera, *Annali delle due Sicilie* (Nap. 1841); Reuchlin, *Geschichte Neapels während der letzten 70 Jahre* (Leipz. 1862); and Di Sivo, *Storia delle due Sicilie dal 1846 al 1861* (Rome, 1863).

Na'ples (N. *Neapolis*; Ital. *Napoli*), the largest city of Italy, and one of the most picturesquely situated cities in the world, extends for some 3 miles round the N. side of the famous Bay of N., rises on the face of several low hills, and is divided into two unequal parts by a ridge, which is marked by the heights of Capodimonte, S. Elmo, and Pizzofalcone, and terminates in the rocky promontory supporting the Castello dell' Ovo. From the bay it has a singularly beautiful appearance, its clusters of high and narrow houses, with their flat roofs and their countless campaniles, standing out boldly against the hilly background, relieved here and there by luxuriant gardens and tree-shaded terraces. From the heights above the prospect is fairer still, stretching away across the purple waters of the bay to Ischia and Capri, and the shining points of Castellamare, while it is confined landwards by the tragic cones of Somma and Vesuvius. On the other hand the interior of the city is disappointing on account of its mean domestic architecture, its narrow and dingy streets, and its dearth of handsome public buildings, while it is rendered distasteful by the incessant clatter of vehicles, braying of donkeys, shouting of hawkers, and importunities of drivers, guides, and beggars. Still above the commonplace din occasionally rises the shrill song of the improvisatore, and the light-hearted crowds that for ever swarm in the streets and present a quickly shifting study to the artist, are interesting at once for their rich variety of costumes, their facility of gesture, and their deft use of the Neapolitan dialect, which is a mixture of Italian and Spanish, and *par excellence* the language of badinage. Thousands of visitors are annually attracted hither by the delicious climate, no less than by the beautiful situation, and quite a modern town has sprung up for their accommodation on the W. side of the city

proper. Here the gay Riviera di Chiaja, the Rotten Row of N., skirts the bay, flanked on one side by the Villa Nazionale, and on the other by fine hotels and other buildings. The Villa Nazionale, the principal garden and promenade in N., is beautifully laid out with orange, acacia, and myrtle groves, and contains several palms and a grand avenue of oaks. Adjoining it is the 'Zoological Station,' established chiefly by the munificence of Dr. Dohrn, the German naturalist, in connection with which an aquarium was opened in 1874. In the old part of the city the main street, the Toledo (officially since 1870 the Via di Roma), extends nearly 1½ miles from N. to S., and presents a busy scene at all hours. There are many fine public squares, of which the principal are the Piazzi St. Caterina, Dello Spirito Santo, and Di Plebiscito, the Corso Vittorio Emanuele, and the Piazza del Mercato. Among the chief secular buildings are the Palazzo di Capodimonte, on the height of the same name, begun by Charles III. in 1738, but not completed till 1834–39; the Palazzo Reale ('royal palace'), begun under the Viceroy Count di Lemos in 1600, and restored 1837–41; the Museo Nazionale, which was the home of the university from 1615 to 1780, and which now contains the Farnese collections from Rome and Parma, and is unrivalled for Pompeian antiquities, bronzes from Herculaneum, and other art objects; the poorhouse (Albergo dei Poveri), begun 1751, and capable with its dependencies of accommodating 5000 persons; the Palazzo Gravino (1500), now the General Post Office, and the finest building of the kind in N.; and the Teatro San Carlo, founded 1737, one of the largest opera-houses in Europe, containing six tiers of boxes. N. can boast of few Græco-Roman remains, but of Middle Age construction it has, besides several churches, five forts—Castello St. Elmo, Dell Ovo (named from its 'egg' shape), Nuovo, Del Carmine, and Capuano—and two gates, Porta del Capuano and Carmine. Many of the churches are rich in paintings. The principal are the cathedral of St. Gennaro (see JANUARIUS), founded 1272, but now completely modernised, and the churches of St. Domenico Maggiore, a Gothic structure of 1285, but altered in 1850–53; St. Filippo Neri, built in 1592, and overloaded with ornament; St. Maria del Carmine, modernised in 1769, and containing the tombs of Konradin and Friedrich of Austria; and Santa Chiara, dating from 1310, but partly rebuilt in 1752. The university, founded by the Emperor Friedrich II. in 1224, is one of the oldest in Europe, and possesses five faculties, twenty-five professorial chairs, a large library, and valuable scientific collections. The monastery connected with the Church of St. Severino e Sosio contains the archives of the former kingdom, which are among the most valuable in the world, comprising 40,000 parchment MSS. and documents relating to the Norman, Hohenstaufen, Anjou (alone 380,000 in number), and Spanish periods. Beside an observatory and botanic gardens, N. has a music conservatory, founded in 1537, which has sent forth many eminent composers. The catacombs, parts of which date from the pagan era, are of great extent, and surpass those of Rome in the width and height of their passages. Adjoining the ancient Molo of 1302 are the extensive harbours—on the right the Porto Militaire, or government harbour, and on the left the Porto Mercantile. The former, 5 fathoms deep, is protected by a strong breakwater 429 yards long, and is a frequent station of the Italian ironclads. N. manufactures some silks, linens, and woollens, but the specialties are gloves, gold wares, musical instruments, ornaments in coral, tortoise-shell, and lava, artificial flowers, copies of Etruscan vases, and maccaroni. There is an extensive trade, chiefly in wine, oil, almonds, and sulphur. In 1875 the imports amounted to £6,428,656, and the exports to £1,609,142. Of the imports, £2,367,586 worth were from Great Britain; of the exports, £1,017,537 went to France and Algeria. The climate is more equal than that of Rome and Florence, the mean temperature being 63°, or ranging from 27° to 104°. The coldest weather is from 12th December to 12th March; from April to September the sky is generally bright and cloudless. Spring water is neither good nor abundant, and the new water-works now (1878) in progress will not be completed for some four years. Cisterns have in modern times taken the place of the ancient aqueducts. Pop. (1874) 415,549. N. was a Greek colony, and was called *Neapolis* ('new city') to distinguish it from the neighbouring *Parthenope*, known subsequently as *Palæopolis* or 'old city.' After the Roman Conquest N. was allowed to retain its municipal freedom and Greek constitution. Lucullus and Virgil were among the many Romans who resided here. Stormed by Belisarius in 536 AD., and again by the Eastern Goths in 543, N. was for only a brief period under Byzantine supremacy. Subsequently its 'duca' or doge maintained its independence against the Lombard princes, but after a long siege it succumbed to the Normans in 1130. It was made the capital of the kingdom by Charles I. of Anjou, and among its later benefactors were Ferdinand I. of Arragon, the viceroy Don Pedro de Toledo, and Charles III. of Bourbon. Although so bountifully favoured by nature, N. has rarely attained even a transient reputation in politics, art, or literature.

Naples Yellow, a valuable yellow pigment, the basis of which is antimony, equally useful in oil painting, and for enamel colour, and porcelain painting. Chrome yellows are now much used as a substitute for N. Y.

Napoleon Bonaparte, Emperor of the French, second son of Charles Bonaparte, an Italian lawyer, who, in 1771, formed one of 400 Corsican families constituted a nobility by Louis XV., was born at Ajaccio in the island of Corsica, 15th August 1769. Through the influence of the Comte de Marbeuf N. was admitted in his tenth year to the military school at Brienne, where he remained until 1784, and it was afterwards remembered of him that he was shy and obstinate, though he made rapid progress in mathematics, history, and geography. In 1785, having spent a year at the Royal Military School of Paris, he was appointed sub-lieutenant of an artillery regiment, and the outbreak of the Revolution found him stationed at Valence. His sympathies at that time were democratic, and in a visit paid to the island of Corsica in 1792 N. opposed General Paoli in his scheme of abandoning the Convention and allying himself with England. Obliged to escape from Corsica, N. resided for about a year at Marseille, where with the rank of captain he assisted in a cannonade of the town federalists. At the siege of Toulon he dealt his first stroke in military strategy (December 1794), the surrender of the town being due to a suggestion made by him after the failure of other attempts. The Committee of Public Safety rewarded him by a generalship of brigade, with a commission in the army of the S., from which he was shortly cut off on suspicion. He was on the point of offering his services to the Ottoman Porte when the necessities of the Convention suggested him as a suitable commander for the troops in its service. On the 4th of October 1795 he vindicated his right to the position by routing the National Guard in their attempt upon the Tuileries. He was then appointed general of division, and having married Josephine, widow of Vicomte de Beauharnais (March 1796), he set out to take the command of the army in Italy. His troops numbered about 35,000 men, but their clothes and shoes were worn out, there was little money to buy them with, and they had to forage for their food. N. had only received 2000 louis in money wherewith to meet immediate expenses, and the scandals which attach to the department of his commissariat were due to the fact that it was superintended by a speculative contractor. But the men were young and hardy, having already a large experience of war among the Pyrenees and Alps; and among their generals were Masséna, Augereau, Laharpe, Serrurier, and Berthier, each of them with special qualifications for the service. At first N. was regarded with some jealousy. 'He was,' says M. Thiers, 'considered far too young to command the army. Of a short, slight figure, without any peculiarity in his appearance beyond Roman features and his steady and piercing eye, there was nothing in his person or past life that seemed remarkable. He was received without any great show of attention.' His first address, however, filled the army with enthusiasm. 'Soldiers,' said he, 'you are ill-fed and almost naked. The government owe you much, but can do nothing for you. Your patience, your courage, do you honour, but procure you neither benefit nor glory. I am going to lead you into the most fertile plains in the world; you will there find large cities, rich provinces; you will there find honour, glory, and wealth. Soldiers of Italy, would your courage fail you?' It is the first of a series of harangues delivered by N. at hazardous moments, and in them French criticism has discovered so much literary point, force, and eloquence, as to raise them to the rank of creative genius among the productions of literature. Between the months of March 1796 and December 1797, with a force which at the outset he found in a condition of utter disorganisation, N. faced and destroyed five powerful armies. He was victorious at

Voltri, Montenotte, Millesimo, Dego, Ceva, Vico, Mondovi, and Cherasco, after which the army of Beaulieu was scattered and the Piedmontese separated from the Austrians. Before the end of June many of the chief cities as far S. as the States of the Church were plundered, tribute to the extent of 50,000,000 francs was exacted, and a committee of *littérateurs* selected for transference to France what was best from the artistic treasures of the country. The army of Marshal Würmser, numbering 70,000, was next encountered and worsted at Castiglione, Roveredo, and Bassano by September 1796. Marshal Alvinzi and General Davidovich by the 14th January 1797 had been put to flight at Arcola, Rivoli, and Mantua, whilst the Archduke Karl with an army poorly equipped was chased from the Tagliamento, beaten at Ungmarkt, and permitted to make peace at Leoben (April 17). On the 17th October 1797 this peace was ratified by the Treaty of Campo-Formio, under which Venice was attached to Austria, whilst the Netherlands and Lombardy went to France. Throughout the course of those campaigns N. proved that his administrative was as strong as his military genius. The success of the French arms was, however, materially assisted by the social condition of Italy. Touched with the revolutionary spirit, the population of the country turned against their rulers, overset their governments, and welcomed the French as the pioneers of Republican freedom. They had soon to learn that it was not Italian but French republics that N. desired to set up. Before returning to Paris he had organised the Cisalpine Republic, which included Lombardy, Parma, Modena, Papal States of Bologna, Ferrara, Romagna, and the Venetian territory as far as the Adige; and the Ligurian, Cispadane, and Tiberine Republics, with Genoa, Bologna, and Rome as their capitals. On the 5th December 1797 he returned to Paris, and at once became the darling of the populace. On the 10th December he was the hero of a triumphant *fête* given in his honour by the Directory at the Luxembourg, and in the severe simplicity affected by N. his contemporaries subsequently called to mind that they felt 'the indescribable sensation of genius and authority which he impressed upon the imagination.' He lived in a plain and unpretending way in the Rue Chartereine, and amidst the festivities and pomp 'he appeared simple and affable, but constrained, almost insensible to pleasure, seeking among the crowd the useful and celebrated man, in order to converse with him on the art or science in which he was known to excel.' In a few months he had not only made the acquaintance but earned the esteem of the most distinguished *savants* of France, and was elected to a vacant place in the Institute. But the Directory soon found fresh work for him to do. Being at peace with the rest of Europe it was determined to strike a blow at England through Egypt. It was one of the sayings of N. that 'great names are only made in the East,' and dreading the stagnation of civil life, he threw himself with animation into the fulfilment of an enterprise which had long occupied his dreams. In addition to the military equipment, he associated with himself scientific men, artists, engineers, draughtsmen, and geographers. Monge, Bertholet, Fourier, Dolomieux, Desgenettes, Larrey, and Dubois were among the number. N.'s design was, by the conquest of Egypt, either to make it a colony whereby he could turn the Mediterranean into what he called 'a French lake,' or to use it for establishing a navy in the Red Sea, by which the English settlements in India might be harassed, if not destroyed. Preparations were conducted with the utmost secrecy, and on the 19th May 1798 a fleet sailed from Toulon. On the 1st of July N. was before Alexandria with his army of 30,000 men, having reduced Malta in his passage across the Mediterranean. Alexandria fell on the 4th, and Cairo on the 24th July, the march between the two cities being distinguished by the famous address of N. in sight of the Pyramids, 'Soldiers! remember that from these Pyramids forty centuries contemplate your deeds.' At once he commenced to consolidate the French power in Egypt. He established tribunals of commerce in the four leading cities, and encouraged industrial enterprise in the shape of mills and manufactories. A police was organised in the different towns. Mamelukes and Arabs were entitled, by special decree, to serve in the French army. An Institute of Egypt was founded, and scientific *séances* were held from time to time, the notes and observations of the corps of learned men who accompanied him being then submitted for consideration. Alliances were struck up with the Bey of Tripoli and other neighbouring potentates, and N. even sent an emissary to Mysore in order to rouse the Sultan into rebellion against the English government. The Battle of Aboukir (August 2) annihilated the French fleet, but N. pursued the conquest of the country, put down with rigour a revolt in Cairo, marched to meet the Turks in Syria, taking El-Arish, Gaza, and Jaffa (March 1799), but was checked at Acre, where Djezzar Pasha and Sir Sydney Smith opposed him with a mixed force of Turks and English. At Aboukir (25th July) N. retrieved his position by driving an Ottoman army into the sea, and next month he set sail for France, his arrival at Fréjus (October 9) being made the occasion for the most extravagant manifestations of joy. Allying himself with Sieyès, on his return to Paris N. brought about the abolition of the Directory and became the chief of the consular commission, with the title of First Consul, taking up his official residence (19th February 1800) at the palace of the Tuileries. By the new constitution, which was mainly the result of the meditations of Sieyès, N. practically became Dictator of France. Representation, however, by the people, was reduced to the merest name, as they were only allowed to vote for the notables of the Commune, who, in turn, elected one-tenth of their number notables of departments, from which a tenth were re-elected as notables of France, and from them again were nominated the Legislative Assembly. At once the firm stamp of N.'s personality was felt in all the public departments; prefects, sub-prefects, and mayors were established throughout the country; local courts and the higher tribunals of justice were rearranged on a new basis, and the administrative system which survives to-day was for the most part brought into existence at that time. But a new ambition had begun to take hold of him. 'Well, Bourrienne,' he observed to his secretary on the day after his transference to the Tuileries, 'here we are at the Tuileries! and we must now stop here.' In May he was again in the field, conducting 35,000 men across the Alps in a brilliant movement which brought him, as he planned, on the rear of the Austrian lines. He entered Milan on June 2, and on the 14th was fought the battle of Marengo, in which the Austrians were defeated. N. regained thereby all that had been lost in Italy during his absence in Egypt. After the battle of Hohenlinden, however, the Peace of Lunéville (February 1801) was signed with Austria, and at Amiens (March 27, 1802) a treaty was made with England. By affirmative suffrages exceeding three millions and a half N. was proclaimed (2d August 1802) Consul for life. During this period he showed his consummate capacity for administration by the unflagging industry with which he turned his attention to every branch of civil life. Agriculture, commerce, manufactures, education, public works, and law were each passed in review. To his initiative was due the execution of the *Code Civil*, which reduced to uniformity the heterogeneous mass of legal customs and traditions. At the same time, though he was probably indifferent to religion, by a Concordat with the Pope he restored the Catholic Church as the religion of the majority of Frenchmen. He took that step against the advice of his colleagues, supporters, and friends, who had all been concerned in the deposition of the old system of worship. It was represented to him that he was laying at the feet of Rome the dignity of his government. N. declined to maintain an attitude of indifference on the ground of the utility of putting an end to religious differences and divisions. He drew up a scheme of reconciliation between the French Republic and the Roman Church. There was to be no longer a clergy endowed with landed property. They were to receive their incomes from the State, and to devote themselves solely to their professional duties. Regulations of places of worship were to be transferred to the State, and clerical jurisdiction to the Councils of the State. The new clergy was to be formed from every ecclesiastical party, and the bishops to be nominated by the First Consul. In 1802 N. became President of the Italian Republic and 'Grand Mediator of the Helvetic Confederation.' On the 13th of May 1803 the English ambassador left Paris, and N. was again at war with England. A flotilla of 2000 sail was collected for the purpose of invading England, and a line of camps stretched from Havre to Ostend. During these preparations the life of N. was threatened by a conspiracy of Royalist refugees, which, on the discovery of the plot, induced him (20th March 1804) to hasten the secret execution of Duc d'Enghien, a step which he afterwards vindicated as 'necessary to the safety, the interests, and the honour of the French people.' By this time N. had made up his mind to change his

form of government. 'Fouché,' writes M. Thiers, 'in the ardour of his zeal made himself the spontaneous agent of the change which was preparing. He accosted the First Consul, whose secret wishes he had already divined, represented to him the need of taking a prompt and decided part, and the urgent necessity for terminating the anxieties of France and putting the crown upon his head, thus consolidating definitively the results of the revolution. He showed him how all classes in the nation were animated by the same sentiment, and impatient to proclaim him emperor of the Gauls or of the French, as was most agreeable to his policy and taste.' Through secret agents Fouché was able to spread reports in the English journals to the effect that peaceably-disposed people in France wished for an hereditary sovereignty. The French papers reproduced these articles and the signal was given. It was soon settled that the First Consul should be proclaimed emperor, that male should succeed male in the order of primogeniture in his family, and that in default of adopted descent the transmission of the crown be permitted in the collateral line of his brothers Joseph and Louis. N.'s brothers and sisters received the rank of princes and princesses, the former with a million francs per annum each. The plot was thus made the pretext for a declaration in behalf of imperialism, and on the 15th May 1804, by an 'organic senatus consultum,' N. was elected to found a dynasty. On the 2d December 1804 he crowned himself in presence of the Pope; on the 26th of May 1805 he assumed at Milan the Iron Crown (q. v.) with the title King of Italy. The year 1805 was distinguished by a fresh European coalition against N., but by October he had removed his army from Boulogne to the Rhine, forced the Austrian general to lay down his arms at Ulm, and entered Vienna (13th November). On the 22d he crossed the Danube, and after some days of masterly manœuvring he gained the battle of Austerlitz (2d December) over an Austro-Russian force, the result of which was that the Venetian States, the Tyrol and Suabia, were alienated from Austria. In October 1806, Prussia, goaded to indignation by the studied insults of N., put an army of 150,000 men into the field under the Duke of Brunswick. N. met and overwhelmed it with defeat (October 14) at Jena, entered Berlin (19th), gave up its galleries and museums to plunder, and issued a decree promulgating 'the Continental system,' by which all trade with England, under heavy penalty, was interdicted. Following up his victory, N. directed his next movements against Russia, but was defeated (January 1807) at Eylau, a defeat which he retrieved (June 14) at Friedland. A treaty was then signed at Tilsit, and by one of its conditions Jerome Bonaparte became King of Westphalia. Joseph had already been appointed King of Naples, and Louis King of Holland. On his return to France, encouraged by the universal worship of the people, he systematised his tyranny with more compactness, abolishing the liberty of the press, annulling the Tribunate, establishing a system of education whose highest aim was to turn out conscripts. The year 1808 witnessed his ruinous interference with Spain and Portugal in order to enforce 'the Continental system.' By the 14th of December N. entered Madrid in triumph, the reigning dynasty was deposed, and his brother Joseph abandoned the crown of Naples for the new royalty. But on the 3d of January 1809 N. was called away owing to a fresh rupture with the Emperor of Austria, who determined to strike a blow at France when her forces were scattered. On the 22d of April N. encountered and defeated the Austrians at Eckmühl, was himself defeated at Aspern (May 23), but triumphed at Wagram (July 6). The Emperor Francis was compelled to acknowledge the sovereigns of N.'s creation, and to adopt the prohibitory system of commerce. Besides, at the solicitation of N. he handed over his daughter Maria Louisa, with whom, the Empress Josephine being divorced, a marriage was celebrated at the Tuileries (April 2, 1810). For two years events had a calmer aspect, though N., by his infatuation in behalf of a prohibitory traffic, annexed Holland, the Hanseatic towns, and the N. German coast between Ems and the Elbe, rousing thereby the hostility of Sweden and Russia, who at length declared war (January 1812). With an army of 450,000 men of different nations N. set out for Russia in July, drove his enemies from Smolensk (August 17), caused them to retire from Borodino (September 11), and from Moscow a week later. Famine, frost, and snow fought for the Russians, and N. was compelled to retreat (19th October), his army reduced to about a fourth of its original size. He was in Paris on the 18th December, having left Murat to conduct the retreat to a conclusion. In the spring of 1813, by a stringent conscription, he had an army at his disposal of 350,000 men. Between May and August he conquered in the fields of Lützen, Bautzen, and Dresden, but a great day of reckoning came on the plains of Leipsic. The allies confronted his 140,000 men with 230,000. He tried to negotiate an armistice on the night of the 16th October, but his attempt failed; he was worsted in battle, and on the 17th he commenced his retreat towards France. Meanwhile the campaign in Spain had been disastrous for the French generals, and Joseph was no longer king. N. demanded from the Senate a fresh levy of 300,000 men, which was granted. But the armies of Austria, Silesia, and Russia closed round Paris, and on the 31st of March 1814 defiled through the city, whilst the people cheered them as deliverers. *Asses de Bonaparte* was the general feeling. On the 2d of April the Senate decreed that N., by his violation of the rights and liberties of the people, had forfeited his throne. He signed the Treaty of Fontainebleau on the 11th, retaining under it the title of Emperor for life, with the sovereignty of the Isle of Elba and an income of 2,000,000 francs. But on the 20th of March 1815 he reappeared in Paris, awakened some of the old enthusiasm, gathered round him an army of 125,000 men, and led them to the Flemish frontier to do battle with the allies. On the 16th of June he repulsed the Prussians at Ligny, but on the 18th was fought the battle of Waterloo, the result of which shattered the cause of N. for ever. Again his forfeiture of the throne was decreed, with the added penalty of banishment. Driven to the last extreme, N. finally delivered himself up to the captain of an English frigate, and Great Britain, with the sanction of the allies, banished him to the island of St. Helena, where he remained in restless misery until death took him off, 5th May 1821. His body was interred with great pomp (15th December 1840) beneath the dome of the Church of St. Louis, at the Hôtel des Invalides, Paris. During the course of his life N. wrote much, but his connection with literature was more an accident of his position than anything else. M. Geruzez has said, however, that he was as capable of painting as of gaining battles, and does not hesitate to compare some of his descriptions with those of Cæsar, and his military harangues with the orations of Mirabeau. Among the works of his youth are *La Calotte*, a pamphlet setting forth the rules of a regimental society; *Lettre à M. Matteo Buttafuoco*, in which, with great force and exuberance of language, he attacks a Corsican deputy for his treasonable leanings to aristocracy; *Histoire de la Corse*, concerning which Mirabeau is reported to have said that 'it seemed to announce a genius of the first order;' *Le Souper de Beaucaire*, which contains a defence of the Convention and its committees. By far the most important of his contributions are his letters and reports, scattered through different volumes. The *Collection Générale* and *Correspondence Inédite*, though they require to be read sceptically, contain the best of them. N. not only inspired the press, but frequently wrote for the *Moniteur Universel*, which he chose as the organ for giving expression to the information and views he desired to have in general circulation and belief. M. Thiers says his articles were easily detected at the time for their incomparable vigour. N. certainly caught some of the fire of his own actions, and expressed it in his prose, but when the qualities of rapidity and precision, which occasionally rose into a strain of eloquence, are mentioned, everything has been said to which his work in that line is justly entitled. History, ancient or modern, produces no figure whose claims to greatness on the score of military genius surpass those of N. He had every quality essential for command. His knowledge of strategy was profound, and it was supplemented by a creative impulse on the field which devised surprises and suggested combinations unknown to men who led according to precedent and routine. He was of undaunted courage, of immaculate coolness, fertile beyond measure in resource, ever prepared against the unforeseen accidents of battle, and seldom, in consequence, taken by surprise. Nor, though indifferent to human life, was he actively cruel in disposition. In administration his ability was conspicuous, and in all departments of it he showed an infinite capacity for taking pains. Up to the period of his assumption of the First Consulship his aims were in harmony with the best aspirations of the Revolution. Anarchy he always hated, but the reorganisation of society on a democratic basis was one of the articles of his earlier creed. N. was morally ruined by the outward splendour of his own career. He became

a portentous tyrant, an enemy to his own country and the best interests of Europe, and the world breathed freely for the first time for many years when his illimitable ambition landed him at last on the rock of St. Helena.

The literature to which N. has given rise would form a vast library. It is written in every European tongue, and embraces every feature of his policy, every circumstance of his career, and every aspect of his character. It is impossible even to faintly indicate its extent or variety. N.'s own *Œuvres* first appeared at Paris in 6 vols. 1821–22. In connection with these may be mentioned Generals Gourgaud and Montholon's *Mémoires pour servir à l'Histoire de France sous N., écrits à Ste-Helène, sous la Dictée de l'Empereur* (8 vols. Lond. and Par. 1822–24), and the *Correspondance de N. I.* (15 vols. Par. 1858–66), published by command of Napoleon III. Among the innumerable memoirs written by those who knew or served the Emperor, we may specify those of O'Meara, Las Cases, Antommarchi, Hudson Lowe, Bausset, Durand, Bourrienne, Abrantes, Montholon, Masséna, Ney, Belliard, Marmont, Miot, and Beugnot. Of histories proper, in which N.'s life forms part of the history of his time, the chief works in French are those of Jomini (q. v.), Laurent, Thibaudeau, Saint-Hilaire, Michaud, Regnault, Thiers (q. v.), and Lanfrey; in English, Scott (q. v.), and Hazlitt (q. v.); in German, Kolb, Schlosser, Becker, and Roth. The latest and most iconoclastic biographer is Pierre Lanfrey, whose *Histoire de Napoleon Ier.* (5 vols. Par. 1867–76) is the most formidable assault on the character of N. ever made in or out of France.

Napoleon III. (Charles Louis Napoleon Bonaparte), Emperor of the French, was born at the Hôtel of Queen Hortense, Rue Cérutti, Paris, 20th April 1808. He was the son of Hortense Eugénie Beauharnais, wife of Louis Napoleon, third brother of the First Napoleon. At the time of his birth, owing to the law of succession, which, in default of direct heirs male of the emperor, vested the crown in the families of Joseph and Louis, N. was at once regarded as the imperial heir. Fêtes were ordered to be observed in his honour throughout France, and on the 10th November 1810 he was baptized, the emperor and Maria Louisa acting as godfather and godmother. After the accession of Louis XVIII., Hortense, who had been separated from her husband in 1810, retired to Geneva, and it was at the castle of Arenenberg, near Lake Constance, that N. received his earliest education. At the Augsburg gymnasium he showed a distinct bias towards military study, and became a proficient in swimming, riding, and fencing. Joining the federal army of Switzerland as an officer, he pursued with enthusiasm the sciences of artillery and engineering. On the accession of Louis Philippe to the French throne, N. applied for permission to return to France, but his application was rejected. Along with an elder brother he then threw himself into the insurrectionary movement in Italy, was seized with a severe illness at Ancona, and driven back in disguise to France, from which he and his mother were ordered to depart. His brother died at Forli, in Italy. In 1831 N. was in Switzerland, and was understood to have received overtures from the Poles to accept their crown and to lead their army, but with the fall of Warsaw the scheme came to an end. In July 1832, while quietly pursuing historical and other studies, the death of the Duc de Reichstadt, Napoleon II., made him the sole heir to the responsibilities of the imperial traditions. He accepted them with alacrity, and from henceforth his mind was dominated by the single determination that he should win back the throne to his house. His *Rêveries Politiques* contained the fruits of his thoughts about this time, and in their development of the central idea that the republican and military aspirations of France could only be united in a Bonaparte, they reveal the keenness with which he was watching the rise of discontent at the government of Louis Philippe. During the next four years his literary activity was exhibited rhythmically in *Deux Mots*, and in prose of vigour and clearness in *Projet de Constitution, Considerations Politiques et Militaires sur la Suisse*, and *Manuel d'Artillerie*. In October 1836, N. thought the time was ripe for striking a blow in behalf of his dynasty. With the assistance of Comte de Persigny and Colonel Vaudrey he attempted, on the morning of the 30th, to raise the garrison of Strassburg, and being presented at the barracks suitably arrayed in a dress like the emperor's, he might have succeeded had it not have been for the prompt and vigorous action of Colonel Taillandier. He proclaimed N. to be an impostor, turned the current of the enthusiasm, arrested and detained him at Strassburg till November 9, sent him to Paris, where, after brief imprisonment and trial, he was despatched to America. But by the 3d October 1837 he was back in Arenenberg at the death-bed of Hortense. The French Government then demanded the extradition of N. by the Swiss. The latter refused on the ground that he was a Swiss citizen; and had N. not voluntarily retired to England, the Republic would have supported its attitude by arms. In England N. continued his literary industry, and (1839) the *Idées Napoléoniennes* traversed the field of imperial organisation, and connected that *régime* with the revolutions and the sovereignty of the people. The order given by the French Chamber (May 1840) for the entombment of the remains of Napoleon I. at Paris influenced the imagination of N. so much that he planned a second invasion of France. On the 5th of August he embarked on board the *City of Edinburgh* with fifty-five followers, landed at Boulogne next day, unfurled the imperial standard, and was ignominiously beaten back. Being captured, he was tried before the Chamber of Peers, and after he had delivered an ingenious defence, he was sentenced to perpetual imprisonment in Ham, a fortress on the borders. For five years he was kept in durance, and he improved his compulsory leisure by contributing to the democratic press, and by writing several political and historical treatises. His *Extinction du Paupérisme* and *Fragments Historiques* are among the best known of these. By the assistance of Dr. Conneau, N. escaped from Ham (May 25, 1846), and again took up his residence in England. The abdication of Louis Philippe (February 1848) induced N. to hasten to Paris, where he offered his services to the Provisional Government, which not only declined his offer but desired him to return. He did so, but four constituencies elected him as their representative for the National Assembly. A majority decided that he should be allowed to take his seat, but N. executed a fine stroke of policy by placing his resignation in their hands in order that tranquillity might be restored. The sympathy of the country was at once enlisted on his side. In the month of September he was returned to the Assembly by four more constituencies, and on the 10th of December he was, through universal suffrage, elected to the Presidency by a majority over his opponents Cavaignac, Ledru Rollin, Raspail, Lamartine, and Changarnier of four million votes. There then commenced between the President and his Ministers and the President and the Assembly a struggle for repression on the one hand and dominance on the other. Crisis followed crisis, and N. by means of proclamations began to accustom the country to the idea that the Assembly were thwarting his best intentions. At last, however, the *coup-d'état* of December 2, 1851, cut short the connection between the President and the representatives. On the night of the 1st December decrees were posted throughout Paris dissolving the National Assembly, declaring a state of siege, and announcing:—'I no longer wish for an office which is powerless for good, but which makes me responsible for acts that I cannot hinder—chains me to the helm when I see the vessel rushing into the abyss.' These decrees were followed by the infliction of grave indignities upon the persons of the leading representatives, several of whom were imprisoned, whilst all had to submit to expulsion from the Assembly at the point of the bayonet. The Reds of Paris erected barricades, and fought the soldiery, who shed much useless blood by firing right and left into the windows of citizens unconnected with the rising. But the country sanctioned the act by confirming him in the Presidency with more than seven million votes, and in November of the ensuing year the Senate asked him to assume the title of Emperor. An appeal to the plebiscite in November 21st and 22d secured for him nearly eight million affirmative votes. N. married, 30th January 1853, Eugénie Marie, Countess of Montijo, and on the 18th March 1856 a son was born to them. The first fruits of the foreign policy of N. were seen in his attitude towards England, with which he made it an object of ambition to be on terms of friendship. From 1854 to 1856 the progress of the Crimean War cemented this friendship. In 1855 N. was enthusiastically received in England, and three years later the Queen repaid the visit in person. The Commercial Treaty was signed in 1860, and N. became the ally of England in the Chinese War. N. was successful in the Franco-Italian War (1859), but at the request of America was obliged to withdraw his troops from Mexico (1863), though he looked forward to a permanent tenure. In 1865–66 he published 2 vols. of an un-

finished *Histoire de Jules César*, designed as a vindication of Imperialism in politics. In 1870 N. was induced to embark upon the war with Prussia, which terminated in his downfall at Sedan, the overthrow of the Empire at Paris, and his exile in Camden House, Chislehurst, where he died January 9, 1873. His character has been estimated from widely-different points of view, but it is certain that on any theory he had an indomitable belief in his own destiny, was gifted with much practical sense, became unscrupulous through the pressure of circumstances rather than by natural inclination, and was sincere in his aspirations for the greatness of France. See Blanchard Jerrold's *Life of Napoleon III.*, of which the third volume appeared in 1877.

EUGÈNE LOUIS JEAN JOSEPH N., the Prince Imperial, born at Paris, March 16, 1856; accompanied his father to the seat of war in 1870, and at Saarbrück (August 2) received his 'baptism of fire.' After Sedan he escaped to Belgium, and crossing to Dover (September 6) was joined at Hastings by the Empress. He entered the Woolwich Academy (1872), attained his majority (1873), and is generally recognised as the head of the house of N.

Napoleon, Joseph Charles Paul Bonaparte, Prince, cousin of the preceding, second son of Jerome Bonaparte and Princess Frederika of Würtemburg, was born at Trieste, September 9, 1822. His youth was passed amidst feverish travel from Austria to Italy, Spain, and England, but he had some systematic education (1833–35) at Geneva and (1840) at Würtemburg. As Comte de Montfort he was allowed to visit Paris in 1845, when he immediately began to ally himself with the Extreme Left. Being ordered to retire, he did not reappear until 1848, was returned to the Assembly by the Corsicans, appointed Minister Plenipotentiary at Madrid (1849), created a prince of France with a seat in the Senate and Council of State, with the Grand Cross of the Legion of Honour, and the post of General of Division (1853), and commanded so ingloriously in the Crimean War that he earned for himself the title of *Plon-plon*. In 1855 he was President of the Imperial Commission of the Universal Exhibition, in 1858 chief of the ministry for Algiers, and in 1859 served without distinction in the Italian War. He married (January 30th, 1859) Princess Clotilde, daughter of Victor Emmanuel. A speech delivered in 1861 to the senate against the Orleans family drew from Duc d'Aumale a challenge, which N. declined. The contempt universally expressed for him in military circles at this time made a trip to America a convenient change. In 1862 he represented France at the Great Exhibition at Kensington, and acted as President of the Commissioners for the Universal Exhibition at Paris of 1867. A speech delivered at Corsica lost him the imperial favour for a short time, but on regaining it he is understood to have influenced his cousin in the direction of a more liberal policy. When the Franco-German War broke out, N. was refused a command, and sent to Italy upon a confidential mission. On returning to France at its termination, he was ordered to the frontier, but was subsequently permitted to resume residence. He has devoted himself, without success, to rallying round him a new Bonapartist faction. At the October elections (1877) he lost his seat in the Constituent Assembly. N. is a man of extensive culture, is not without political ability, but is absolutely devoid of moral earnestness.

Napoleon d'Or, a French gold coin worth twenty francs, named after the Emperor Napoleon I.

Napoléon Vendée. See ROCHE-SUR-YON.

Napoléonville, or **Pontivy,** a town in N.W. France, department of Morbihan, in a fertile district, on the Blavet and the Canal from Nantes to Brest, 40 miles N.N.W. of Vannes by rail. It contains the castle of the dukes of Rohan, and the best cavalry barracks in France. Pop. (1872) 5136.

Na'poli di Roma'nia. See NAUPLIA.

Napu', a name given to the Javan Musk Deer (q. v.) (*Tragulus Javanicus*), allied to the Kanchil or Pigmy Musk Deer (*T. pygmæus*).

Naraingunje (= market of the Lord, *i.e.*, Vishnu), a town in the district of Dacca, Bengal, British India, on the right bank of the Lakhmia river, just above its confluence with the Brahmaputra, 9 miles S.E. of Dacca, and 155 N.E. of Calcutta. Pop. (1872), with the suburb of Modungunge, 10,911. It has regular steam communication with Calcutta, and is an emporium of the jute trade, and for the through traffic with Assam, Cachar, and Chittagong. In the year 1876–77, the total exports were valued at £957,000, chiefly jute (£478,000) and rice (£138,000); the imports were valued at £1,338,000, including piece-goods (£324,000), salt (£184,000), raw cotton (£122,000), sugar (£95,000), and tobacco (£66,000).

Narbah, the capital of a native state bearing the same name in N.W. India, in political connection with the Punjaub government, 1035 miles N.W. of Calcutta. It contains an old fort.—The *state* of N., which is somewhat scattered, lies mostly between Puttecala and the British district of Loodiana; area, 804 sq. miles; pop. 226,155; revenue, £65,000; army, 1500 men. It was one of the Cis-Sutlej states founded by the Sikhs in Sirhind about the middle of the last c. For services rendered during the Mutiny of 1857 the Rajah of N. was rewarded with an accession of territory. His family is the head of the Sidhu Jat tribe.

Narbonne', a town of France, department of Aude, on the Robine branch of the Canal du Midi, 92½ miles E.S.E. of Toulouse by rail. It contains the 13th c. churches of SS. Just and Paul, an hôtel-de-ville (formerly the archbishop's palace), a museum, and a public library; has breweries, potteries, dyeworks, manufactures of brandy, verdigris, cloth, and candles; and carries on a trade in honey, wines, oil, grain, &c. Pop. (1872) 12,590. The *Narbo Martius* of the Romans, N. was known to the Greeks in the 5th c. B.C., and was colonised by Licinius Crassus (B.C. 118). Under the emperors it rose to be the capital of Gallia Narbonensis, and numerous remains of antiquity attest its former grandeur. Though sacked by the Saracens (719), and by the Northmen (859), N. was still in the 12th and 13th centuries a city with 40,000 inhabitants, and concluded commercial treaties with Alexandria and Constantinople.

Narciss'us, according to a Greek myth, was a son of the river-god Cephissus, and of the Thespian nymph Liriope. Handsome, but inaccessible to love, he caused the death of the kindly nymph Echo, who loved him, but in vain. His vanity brought down on him the indignation of heaven (Nemesis), and he was doomed to fall in love with his own image, which he happened to see reflected in a well. According to some, N. pursued, and gradually perished with love for the shadow, while his corpse was changed into a flower that ever after bore his name. Other mythographers make N. melt away into a well in which he loved to view his image. Ovid, Pausanias, &c., narrate this fable, which, considered in any aspect, is of late birth. See Ovid, Met. iii., 341, *et seq.*; Pausan. ix. 31–6, sec. 6.

Narcissus, a genus of European and N. and W. Asian plants belonging to the natural order *Amaryllidaceæ*. The leaves are linear, flowers with a membranous spathe, solitary or umbellate, large, white or yellow, drooping or inclined, perianth tubular below, segments spreading, mouth surmounted by a circular crown. The number of species was at one time tabulated at 110, but Mr. Baker, our best authority, reduces them to twenty-two. As favourite spring bulbs some have long held a prominent place. Gerard, for instance, in 1596, had ten kinds in his London garden, including the Poet's N. (*N. poeticus*), the Jonquil (q. v.) (*N. Jonquilla*), the Polyanthus N. (*N. Tazetta*), and the Daffodil (q. v.), all of which are in common cultivation at the present day. The common daffodil (*N. Pseudo-Narcissus*) is the only British representative; it is wild in England, and is reported as naturalised in Scotland and Ireland. The *N. biflorus* is also established in some parts of the country as an escape from, or remnant of, cultivation.



Narcissus poeticus.

Narcot'ics (Gr. *narkē*, 'stupor') are medicines which subdue irritation, arrest inordinate secretion, allay pain, and cause stupor or sleep. The principal N. are belladonna, chloral,

chloroform, cannabis indica, hyoscyamus, lupulus, morphia, nitrite of amyl, opium, and stramonium. The action of N. being modified by age, idiosyncrasy, and prolonged use, they should be employed with great caution, and only under competent advice, more particularly in the case of young children. Any one administering chloroform, laudanum, or other stupefying drug, to help him in the commission of a crime, is guilty of felony, and liable to penal servitude for life, under the statute 24 and 25 Vict. c. 100.

Nar'cotine ($C_{22}H_{23}NO_7$), an Alkaloid (q. v.) contained in opium to the extent of 6 or 8 per cent. It crystallises in small colourless transparent prisms nearly insoluble in water. Its basic powers are feeble.

Nar'do, a town of S. Italy, province of Lecce, 22 miles S.S.W. of the town of that name, and 4 from the Gulf of Taranto. It is a bishop's see, and has a cathedral and old feudal castle. N. is the ancient *Neretum* of the Sallentini. From the 10th to the 15th c. it had a university of note. Pop. (1874) 10,220.

Nar'doo, in Botany, the name given by the aborigines of Australia to an acotyledonous plant peculiar to that continent, and belonging to the natural order *Marsileaceæ*. Two or three species are known, the chief being *Marsilea macropus* (Hooker). It bears a considerable resemblance to clover, and grows to a height of from 9 to 12 inches, favouring localities liable to be flooded. The spore-cases are gathered by the blacks when the water has retired, and are pounded by them into a coarse flour or meal, of which they make cakes and a kind of porridge. The food thus obtained, though insipid, is nutritious, and has on several occasions preserved explorers in the desert wastes of Australia from starvation.

Nar'dus, a genus of *Gramineæ*, consisting of a single species (*N. stricta*) common on heaths, &c., in Britain, and ascending to 3300 feet in the Highlands. Botanically an interesting grass, it is practically of little use. Even sheep reject it on account of its hard divaricate foliage, hence its name of 'wire bent.' It is more commonly called 'mat-grass' from growing in dense matlike tufts.

Narev', a river in Poland, rises in the Lithuanian swamps of the Russian government of Grodno, flows past the small towns of N., Tikoczin (where it becomes navigable), Ostrolenka, and Pultusk, and after a W. and S.W. course of 295 miles, falls into the Bug at Sierock.

Narghileh (Turk., Pers. *kalioun*; Hind. *hookah*; Chin. *choué-yin*), a species of pipe much used in the East, consisting of a long serpentine tube connected with a vase, which is half filled with perfumed water, through which the smoke passes before it reaches the mouth.

Narr'a ('a snake'), the name of two of the more important offshoots of the Indus river in Scinde, so named from their tortuous course. The East N. leaves the Indus at Rori, and has a total length of nearly 400 miles. It was formerly only filled in the rainy season; but a permanent artificial connection with the Indus has now been formed for irrigation, and several subordinate channels have been cut. It runs through the Thûr or Sandy Desert towards the Runn of Kutch. The West N. leaves the Indus near Larkhana, and ultimately rejoins it after a course of about 80 miles. During the floods it is much used for navigation, and it also feeds an important canal.

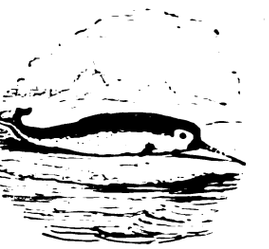
Nar'ses, a great Byzantine general, was born about A.D. 472. A eunuch slave, he appears for the first time in history as the *cubicularius*, or 'groom of the bedchamber,' of the Emperor Justinian at the time of the insurrection of Nika (532), when his services promoted him to the post of keeper of the emperor's privy purse. In 538 he was sent nominally to help, but really to act as a spy and drag upon, Belisarius, whom he joined at the successful siege of Ariminum (Rimini), then held by the Goths. The quarrels of the two generals led to the capture of Milan by the Franks and Burgundians. N. was then recalled to an influential court life lasting 12 years. In 552 he was selected to lead an army of 100,000 for the recovery of Italy from the Goths, who under Totila had occupied almost every place but the port of Ancona. N. marched by the mouth of the Po, Ravenna, and Rimini to Rome, completely defeated Totila at Tagina (Lentaglio), occupied Rome, defeated Teias, Totila's successor, near Vesuvius in Campania, and returning from the siege of Lucca southwards, destroyed at Casilinum on the Volturno a great horde of Franks and Germans, who had ravaged as far as Calatria under the leadership of Lenthariis or Lother and Buccellin. In these battles N. had the help of some Lombard tribes. He now became Exarch of Italy, and for 15 years administered at Ravenna the famous *Pragmatic* of Justinian. By means of provincial governors (*comites*) he kept Italy quiet, but heavily drained it by taxation. On the death of Justinian in 565, Justin II. and his wife Sophia took advantage of the complaints against N.'s extortions to replace him by Longinus. N.'s withdrawal was the signal for the Lombards again to appear (it is said in the *De Gestis Longobardorum* at N.'s suggestion), and Pope John III. persuaded the veteran to return to Rome, where, however, he suddenly died in 568. N. was a man of consummate ability, who triumphed over almost every natural disadvantage; but he lacked the chivalrous greatness and pure patriotism of Belisarius (q. v.). See Gibbon's *Decline and Fall of the Roman Empire*.

Nar'thex, a genus of the order Umbelliferæ (q. v.), yielding a gummy resin and emitting a fetid odour. The species *N. Asafœtida* is found in Persia and Afghanistan, and furnishes the true Asafœtida (q. v.). Its leaves somewhat resemble those of the pæony.

Nar'va, or **Nar'ova**, a town of Russia, government of Petersburg, on a river of the same name, about 9 miles from its embouchure in the Gulf of Finland. The town proper is occupied mostly by Germans; the suburb and fortress exclusively by Russians. N. has a harbour, an arsenal, and an exchange. It carries on an active trade in timber, grain, flax, hemp, &c. In 1872 there entered and cleared 44 British vessels of 14,740 tons. Pop. 5921. N. is memorable as the scene of a battle between 8400 Swedes under Charles XII., and 32,000 Russians under the Duke of Croy, fought 30th November 1700, in which the former were victorious.

Narvaez, Don Ramon Maria, Duke of Valencia, was born at Loja in Andalusia, 5th August 1800, and in the revolution of 1820 defended, as an officer, the constitutional *régime*. In 1822 he distinguished himself in the guerilla warfare of Catalina, but retired for nine years from active service. As captain in the Princess's regiment he contributed by his personal daring to the victory of Mendigorria, and (1836) under Espartero, after a series of forced marches, he drove the Carlist leader Gomez from his position near Arcos. In 1838 he operated successfully against the brigands of La Mancha, and in 1840 was appointed Captain-General of Old Castile and commandant of a reserve force numbering 40,000 men. The same year he headed the insurrection of Seville, and had to take refuge in France, where (1843) he married Mdlle. de Tascher. Through his friendship with Queen Christina, then in France, and a system of intrigue, he succeeded in ruining the government of Espartero, returned to Spain, and was made Duke of Valencia (1844), with the office of president of council, his ministry lasting for two years. In 1847, 1850, 1864, and 1865 he was called back to office, which he held at his death, May 28, 1868. N. was a courageous soldier, but a haughty, immovable, and illiberal man in administration.

Nar'whal, or Sea Unicorn (*Monodon monoceros*), a species of *Cetacean* mammalia, belonging to the dolphin family (*Delphinidæ*). Some of the teeth of the upper jaw are very large. The lower jaw is toothless in both sexes; and in the female the upper jaw is also toothless, for the two incisors found in the young never cut the gum. The upper jaw in the male has two molar teeth, and also two teeth erroneously called *incisors*, since they spring from the *Maxilla* (q. v.), incisor teeth, being those implanted in the *premaxilla*. The right tooth in the male usually remains in a rudimentary condition, while the left is enormously developed, and forms an ivory pole, which may measure from 8 to 10 feet in length.



Narwhal.

This is certainly the large

tooth in the animal kingdom. It is straight but spirally-twisted, grows during the lifetime of the animal, and springs, like the tusks of the elephant, from a permanent pulp. Occasionally *both* teeth in the male N. may be so developed, while the female N. has sometimes a tusk. The N. like all Cetaceans, wants the hinder limbs. Its head is round and convex in front, its colour black above, the sides greyish-white and the under parts white. The body is spotted with dark patches and markings. There is no dorsal fin, and the 'flippers' or fore-limbs are small. The average length is 12 or 13 feet. The food of the N. consists of oceanic molluscs, cuttle-fishes, and the like. It inhabits the Arctic seas, is generally found in flocks, and is highly valued by the Greenlanders, who obtain oil from its blubber, eat its flesh, and manufacture its skin into various useful articles.

Nasa'lis or **Pres'bytes**, a genus of *Catarhine* or Old World Monkeys represented by the *N.* or *P. larvatus*—popularly named the Proboscis Monkey, from the extraordinary size of its nose. This animal occurs in Borneo and other islands of the E. Archipelago. It is also known as the *Kahau*, from its peculiar cry. The nostrils are placed at the tip of the proboscis. The colour of the fur is a light red, and the average height is about 3 feet.

Nase'by, a village of Northamptonshire, 7 miles S.W. of Market-Harborough, and the scene of the third great defeat of the Royalists under Charles I. and Prince Rupert by the Parliamentarians under Cromwell, Fairfax, and Ireton, June 14, 1645. The right wing, commanded by Ireton, was routed by a furious charge of Rupert's horse, but on the left the 'Ironsides' won the day. Artillery, baggage, and 5000 prisoners fell into the conquerors' hands, and the war was ended at a blow. A pyramidal monument marks the field of battle.

Nash, John, an English architect, was born in London in 1752. After serving his time to Sir Robert Taylor, the architect, he began business as a surveyor and builder, and was soon able to retire to a small property in Carmarthen. In 1792, however, he returned to London, and was speedily recognised as a prominent architect. In 1815 he was made Surveyor to the Crown Estates, and is chiefly known as the planner and promoter of the various improvements which resulted in the formation of Regent Street and Regent's Park. Of his more purely architectural designs, Buckingham Palace, Haymarket Theatre, and the Pavilion at Brighton, are the most important. He retired from practice of his profession in 1834, and died at East Cowes Castle, May 13, 1835.

Nash, or **Nashe, Thomas**, born at Lowestoft in Suffolk about 1564, entered St. John's College, Cambridge, and graduated B.A. (1584), but shortly after was expelled the university for his *Terminus et non Terminus*, a satire on the authorities. After rambling awhile on the Continent, N. settled at London (1589), and plunging into the Martin Marprelate controversy, produced *A Countercuffe to Martin Junior*, *Pappe with an Hatchett*, and other caustic pamphlets. He assisted Marlowe in *The Tragedy of Dido* (1590), and his own comedy, *Summer's Last Will and Testament*, was played before Elizabeth (1592). He failed, however, as a dramatist, and in *Pierce Penilesse his Supplication to the Diuell* (1592), and *Christ's Teares over Jerusalem* (1593), describes himself as 'sitting up late and rising early, contending with scarcitie, and cursing the daie of his birth.' A fierce attack on Dr. Gabriel Harvey, *Haue with you to Saffron Waldron* (1596), was suppressed by the archbishop, and a satirical play, *The Isle of Dogs* (1597), lodged N. in the Fleet Prison. He died about 1600. 'A sharp wit, and the master of a scoffing satyricall merry pen,' is Isaac Walton's estimate of this most brilliant of the Elizabethan pamphleteers.

Nash'ville, capital of Tennessee, U.S., on the S. bank of the Cumberland River, 200 miles from its confluence with the Ohio. A railway junction, and the seat of the Fisk (1866), Vanderbilt (1875), and N. Universities, it has a splendid state capitol built of Tennessee granite, a medical college and hospital, thirty-seven churches, and two daily newspapers. It is the chief commercial city S. of the Ohio, having a vast trade in cottons, tobacco, provisions, drugs, &c. The river is navigable below N. for nine months yearly, and is crossed here by two fine bridges. Pop. (1870) 25,865. *N. University*, founded as the Davidson Academy in 1785, embraces ten 'schools' or educational sections, and is attended by from 400 to 600 students. Its medical school is reputed to be among the very best in America.

Nash'ua, a city of New Hampshire, U.S., on the W. bank of the Merrimack, 40 miles N.W. of Boston by rail. It produces cottons, machinery, &c., to the annual value of $7,393,500, and has eleven churches, twenty-eight schools, and two daily and two weekly newspapers. Pop. (1871) 10,543.

Na'smyth, Alexander, the founder of the Scottish school of landscape painting, was born at Edinburgh in 1757, studied art in London under Allan Ramsay, spent several years in Italy, and on his return to Scotland commenced practising as a portrait painter. To the friendship he formed with Burns we owe the only authentic likeness that exists of the national poet. The bent of N.'s genius, however, was to the delineation of scenes from nature; to this branch of the art he ultimately devoted himself, and his works were much in request by the Scottish nobility and gentry. N. died at Edinburgh 10th April 1843.—**Peter N.**, eldest son of the preceding, was born at Edinburgh in 1786, and early showed a remarkable capacity for art. At the age of twenty he went to London, and soon attained a high reputation. His landscapes are thoroughly English, but nevertheless betray the influence of his favourite masters, Ruysdael and Hobbema. N. died at South Lambeth, near London, 17th August 1831.—Another son, **James N.**, born at Edinburgh, August 19, 1808, and educated at the High School of his native city, studied four years at the School of Arts, and entered the University. He came to London (1828), and in 1832 opened a small engineering establishment at Manchester. The year following he removed to Patricroft, 4 miles from Manchester, where he realised a considerable fortune by his Bridgewater Foundry, and retired from business (1856). N. is the inventor of the Steam Hammer (q. v.), a steam pile-driver, and of various improvements in telescopes and ordnance.

Nassau', capital of the Bahamas, on the N. side of the island of New Providence, has a good strongly-fortified harbour, exports cotton, pimento, salt, &c., and attracts visitors by its excellent climate. It is the centre of the trade of the Bahamas, the total value of whose imports in 1874 amounted to £183,993, and exports £130,292. Pop. 9000.

Nass'au, till 1806 a *grafschaft*, and till 1866 a duchy of Germany, was bounded N. by Westphalia, E. and S. by Hessen, and W. by Rhenish Prussia. It had an area of 1795 sq. miles, and a pop. (1861) of 456,567, and is now included in the Prussian province of Hessen-N. (q. v.). The founder of the house of N. was Otto of Laurenburg, a brother of Konrad I. (10th c.), but the title of N. was not assumed by his descendants till 1160. Heinrich II. ('the rich'), dying in 1255, divided his possessions between his two sons, to Walram IV. bequeathing Idstein, Wiesbaden, and Weilburg; to Otto, Dillenburg, Beilstein, and Sieben. The latter, by intermarriage, became the ancestor of the House of Orange (q. v.); the former transmitted to his descendants the *grafschaft* of N. Friedrich August of N.-Usingen, the head of the Walram line, joined the *Rheinbund* (1806), and was rewarded with the title of duke and an accession of territory, which passed at his death (March 24, 1816) to the collateral branch of N.-Weilburg. N. entered the *Zollverein* (1835), was the scene of an insurrection (1848), and having sided with Austria in the Austro-Prussian war, was annexed to Prussia, 8th October 1866, Duke Adolf (born July 24, 1817) receiving a yearly pension. See Schliephake, *Geschichte von N.* (3 vols. Wiesb. 1866–70).

Nasse'ick, the chief town of the district of the same name, Bombay, British India, 106 miles by rail N.E. of Bombay. Pop. (1872) 22,436. For sanctity, it is hardly less revered by the Hindus than Benares; and it also contains many ruins of the Buddhist faith. According to Hindu legend, it is the spot where Lakshmana cut off the nose of the demon Shurpanakha. —The *district* of N., which contains the sources of the Godavery, has an area of 8140 sq. miles, and a pop. (1872) of 734,386. Cotton is cultivated.

Nastur'tium. See CRESS and TROPÆOLUM.

Nas'ua (*N. rufa*), a species of Carnivorous quadruped, allied to the Racoon (q. v.), and inhabiting S. America. It is some-

times known as the Red Coaiti, has a reddish fur, black ears and legs, and a long and pointed muzzle. It feeds on birds, eggs, and the smaller quadrupeds. An allied species is the *N. narica* or Quasje, often known as the Brown Coaiti, also a native of S. America.

Natal', a British colony in S.E. Africa, included between 27° 15′—31° S. lat., and 28° 50′—31° 20′ E. long. It is bounded on the S.E. by the Indian Ocean, on the N.E. by the Tugela and Buffalo Rivers, on the N.W. and W. by the Drakenberg Mountains, and on the S.W. and S. by the Umtamfuna River. The lozenge-shaped area thus defined includes about 18,750 sq. miles. N. owes its name to the fact of its having been discovered by the Portuguese under Vasco da Gama on Christmas Day, 1497. The discovery remained unfruitful for centuries, for except that the Dutch made a brief and unsuccessful attempt to found a settlement at Port N. in 1760, the country remained unvisited by Europeans till 1823. In the latter year two English naval officers, named Farewell and Flynn, started a trading post near the present site of the town of Durban, but the country being nearly depopulated by the murderous forays of the Zulu chief Chaka (see ZULUS), little trade could be carried on. In 1835 an agreement was arrived at between the Zulu chief Dingaan and the British, by which the latter were to be left unmolested. In 1837 an overland immigration of Dutch Boers from Cape Colony commenced, and led to a fierce war between them and the Zulus, who were ultimately overthrown. The Dutch then declared the territory they had seized to be an independent state, with the name of 'Republic of Natalia.' This was opposed by the Governor of Cape Colony, and after fighting in 1842-43, the Boers were reduced to submission, and N. formally declared to be British territory. In 1847 it was proclaimed a part of Cape Colony, and in 1856 it received a royal charter constituting it an independent colony.

N. descends in a succession of steps or plateaux from the Drakenberg range, which on this side rises precipitously to a maximum height of 10,000 feet. The country is thus divided into zones differing in temperature and general characteristics. Thus the central portion, which consists of a grassy plateau from 5000 to 6000 feet above the sea-level, is excellently adapted for sheep and cattle, while the coast region produces sugar, coffee, and other semi-tropical crops. The descent of the land from the watershed being rapid, not one of the fifty rivers is of any use for navigation, and for the most part they flow in rocky kloofs, or gorges, and are interrupted by continual rapids and falls. No lakes exist, and the only tolerable harbour is that of Port N., but though landlocked, it has a rather shallow bar entrance. On the highlands of the interior, the heat, which is excessive on the coast, is much mitigated, and at Pietermaritzburg, on the first plateau ascending from the sea, the annual mean temperature is about 67°. Rain is abundant in summer, falling principally during thunderstorms, which are very frequent. The mean annual rainfall at Pietermaritzburg is 30·11 inches. N. contains large quantities of coal of fine quality, but pending the establishment of railway communication between the coalfields and the coast, the deposits remain undeveloped. Iron is also plentiful, and copper and gold are known to exist in small quantities. Near the mouth of Umzimkulu river, close to the S. frontier, there is a remarkable formation of white marble, covering an area of 30 square miles, and believed to be 1200 feet thick.

The wild animals found in N. are very numerous. The lion, buffalo, and elephant indeed are now scarce, and the giraffe and rhinoceros have wholly disappeared from the country, but the hippopotamus is still common, and hyænas and leopards abound. Of the other larger animals still frequently to be met with, the chief are ten species of antelope, the chacma or S. African baboon, the ant-eater, iguana, and crocodile. The avifauna is varied and interesting, and the snakes include a number of poisonous species, as well as a harmless python, which attains a length of from 16 to 25 feet. Insect life is abundant, but the dreaded tsetse fly is never seen in N. The flora of N. includes a number of valuable timber trees, and amongst its most characteristic forms are the strelitzia, tree-aloe, and giant euphorbia. Ferns are numerous, but the heaths so abundant in Cape Colony are not found in N.

The principal exports of N. are wool, hides and skins, sugar, coffee, ivory, and ostrich feathers, and among those of minor importance at present are cotton and arrowroot. The cultivation of sugar was commenced in 1851, but was much hampered by the want of proper labour, until in 1865 the introduction of coolies from India was commenced. In 1875 there was exported from N. 155,515 cwt. of sugar, of the value of £169,815, besides rum to the value of £4259. The quantity of wool exported in the same year amounted to 8,108,397 lbs., valued at £389,257. The total trade of the colony in 1876 amounted to £1,680,290, the imports amounting to £1,022,896, and the exports to £657,390.

N. is governed by a Lieutenant-Governor appointed by the Crown, an Executive Council composed of four official and two non-official members, and a Legislative Council, consisting in addition to the members of the Executive Council) of eight members nominated by the Government, and fifteen elected by the constituencies. The colony is divided into nine counties, and contains thirteen towns, of which the principal are Pietermaritzburg (q. v.), the capital, and Durban, the seaport. A railway to connect these two places is (1877) in course of construction. Durban is the larger of the two, having in 1877 a population of 10,488, which causes it to rank after Cape Town and Port Elizabeth as the third largest town in S. Africa.

The population of N. is unusually dense for S. Africa, and was estimated to amount at the end of 1876 to about 310,000, of whom the natives numbered 281,000, those of European descent 19,000, and the Hindu and Chinese coolies 10,600. The natives consist of various Zulu tribes, who have crossed the border from their own land on account of the greater security to life and property enjoyed under British rule as compared with that of their own king. Their numbers are yearly increasing, and the immense preponderance of this savage population is the cause of considerable disquietude to the European minority. See *An Address on South Africa and Her Colonies*, by Lieut.-General Bisset (Lond. 1876); *Handbook to South Africa* (Lond. 1876); *Natal*, by H. Brooks, edited by D. Mann (Lond. 1876); *South Africa Past and Present*, by John Noble (Lond. 1877).

Natal, capital of the province of Rio Grande do Norte, Brazil, on the Potengi, has a good harbour, the entrance of which, however, is impeded by a sand-bar. It exports Brazilwood, cotton, and rice. Pop. 10,000.

Natato'res, an order of Birds represented by the various kinds of 'swimmers.' The body is boat-shaped, and the legs being, as a rule, placed far back, are well adapted for swimming, but give an awkward appearance to the movements of the birds on land. The neck is generally long. The toes are webbed; the membrane sometimes uniting all four digits (as in cormorants), or the hinder toe may be free (as in gulls); while in petrels, &c., the hinder toe is only rudimentary. In others again the web is broken up into broad fringes. The body is covered with 'down,' and the 'oil gland' is large, its secretion being used to protect the feathers from the action of the water. The N. are usually *polygamous*, one male mating with several females. The young are able to run about and swim on quitting the egg.

Natch'ez, a town of Mississippi, U.S., on the E. bank of the Mississippi River, 280 miles N. of New Orleans. It has a large river trade in cotton and some timber sawing, and cotton seed oil making. Pop. (1870) 9057. N. is named after a noted Indian tribe of whom some 300 are still living.

Nat'ica, a genus of *Mollusca* belonging to the *Gasteropoda* (q. v.). It is typical of the family *Naticidæ*, in which the shell is globular and consists of a few whorls. The 'spire' of the shell is small, and the outer lip acute. The genus is distinguished by a very large *foot*, and the mantle-lobes cover a great part of the shell.

Na'tional Conven'tion was the representative assembly of France, which met for the first time, September 21, 1792. It was composed of three parties, all of whom held the theory of Republican government. The Girondists or 'Right' were favourable to constitutional law, the Mountain or 'Left' adhered to the most uncompromising principles of the Revolution, the Marsh (*Marais*) voted and spoke sometimes with the one and sometimes with the other, earning thereby the detestation and contempt of both. After it was decreed that 'royalty was abolished

in France,' it became apparent that between the Right and Left a deadly struggle must ensue, and the first six months were occupied in determining the issues of the contest. By the 2d of June 1793 the Girondists were extinguished as a party. During that period Louis XVI. was tried and executed, and war was declared against a complete European coalition. Until the 26th July 1794 the Mountain led, and under it the Committee of General Safety, which afterwards destroyed both itself and the Commune, commanded the N. C. At one time the N. C. had fourteen armies, and 1,200,000 soldiers under arms. It abolished the Catholic religion and established the worship of reason. During its existence Danton and Robespierre both flourished and fell. From the 26th July until the 26th of October 1795, when the N. C. decreed its own dissolution, the struggle was between the adherents of the moderate Republic against both revolutionary and royalist parties. The three years during which the N. C. lasted are the most memorable, not only in the history of France, but in the history of the representative institutions of the world. See Carlyle's *History of the French Revolution*, and the works of Mignet and Thiers on the same period.

National Covenant. See COVENANT.

National Debt. See DEBT, NATIONAL.

National Guard, The, till 1853 the bourgeois militia of France, was founded (1790) in accordance with a proposal of Mirabeau, and was organised by Lafayette. Suppressed in 1827, but revived in 1830, and reorganised in 1831 and 1852, it was finally abolished by the Act of 1872, in consequence of the share 100,000 of its members had taken in the Communist insurrection. By a law of 1868 the N. G. was defined as 'an auxiliary to the active army in the defence of the frontier of the empire, and in the maintenance of order in the interior, liable to be called up for active service only by a special law,' and every Frenchman who had reached the age of twenty-one was obliged to serve either in it or in the active army.

Nations, Law of. See INTERNATIONAL LAW.

Nat'ron, or **Tro'na,** is the native impure sesquicarbonate of sodium $C_2O_3Na_4 + 3H_2O$. Originally it was known as an encrusted deposit obtained on the shores of the soda lakes in the Nile delta of Egypt. Under the name of *Urao* it is found extensively in Venezuela, and now great supplies are obtained in Virginia, besides which it is found to a large extent in many other localities.

Natt'erjack (*Bufo calamita*), a species of Toad (q. v.) common in many parts of England. The hind legs are shorter than those of the common toad, and its eyes more prominent. The legs are banded with black, and a yellow line passes along the middle of the back. The N. appears to be less dependent on moisture than the common toad, and is found in dry places. Its length is about 3 inches.

Nattore', a town in the district of Rajshahye, Bengal, British India, on the N. bank of the Nurud, an offshoot of the Ganges, 196 miles N. of Calcutta. Pop. (1872) 9674. Owing to its unhealthiness, the administrative headquarters were removed in 1822, but it is still the residence of the Rajah of N., the representative of the wealthiest Hindu family in Bengal of the last century.

Nat'ural, in Music (♮), before a note, contradicts a previously governing sharp or flat placed at the beginning of a stave or elsewhere, restoring the note to a place in the natural scale of C (a white key of the pianoforte).

Natural Child. See BASTARD.

Natural History. Probably no term in science has had attached to it so many and diverse meanings as this. Some use it to signify Zoology (q. v.), the science that deals with the animal creation. Others designate by it biology, or the science which deals with organic life (animal and vegetable); while others again employ it to cover the entire range of subjects and sciences connected with the visible world. There can be little doubt that in its true significance, the term should be employed according to the last of these three meanings. A 'history of nature' should comprehend not merely the history of the animated portion of this universe, but of all natural objects. In this sense Aristotle and the ancient investigators were 'natural historians,' pure and simple. Their researches extended over a wide field, and included all the subjects which might be regarded as affording a knowledge of the universe at large. As time passed, however, the N. H. of the ancients became subdivided into many branches, and the term lost its comprehensive meaning, acquiring its present loose and unsatisfactory application. This is to be regretted. It is the first business of science to be exact. When properly used, the term 'N. H.' should indicate the collection of sciences devoted to the examination of the universe and its constitution. The term 'physical sciences' might be held to be synonymous with 'N. H.' in this sense. Leaving out the more subordinate branches of inquiry, and also the multifarious subdivisions into which each science might be divided, N. H. may be said to consist (I.) of the *Organic sciences*, and (II.) *Inorganic sciences*. The first series comprehends *Biology* alone, and this department, dealing with organic or living things, includes (1) *Botany*, or the science of plants, and (2) *Zoology*, or that of animals. The Inorganic sciences include (1) *Chemistry*, (2) *Natural Philosophy* or *Physics*, (3) *Geology*, and (4) *Mineralogy*—this last being rightly enough regarded by many as a subdivision of geology, and also as closely allied to chemistry.

Naturalisa'tion, in Law, is the act of investing an alien with the rights of a born countryman or citizen. See ALIEN, DENIZEN.

Naturalisation. An animal is said to be naturalised when it has become accustomed to a new country or area, and adapted to new environments and surroundings, as if these were 'natural.' N. thus differs from *Acclimatisation* (q. v.) in the fact that naturalised animals return to a state of nature in their new area. Acclimatised animals, on the other hand, are such as live and flourish in a new country, especially under the care of man. Acclimatisation, however, in many instances is a preliminary measure to N. The horse has become naturalised in America, for example, in the most thorough manner, but the animal was at first acclimatised in that continent through human agency. The horse can support itself, and lives indeed in a wild state in America. A case of very complete N. is also presented by the case of the *Dreissena* (q. v.), a foreign mollusc which was introduced into our streams, and which first acclimatised itself, and then became completely naturalised. The same result has followed the chance introduction of some American water-weeds, which have become so thoroughly naturalised in many of our streams as to require repression.

In *Botany*, the word has been so variously and carelessly applied that it has ceased to carry with it any exact signification. It ought to mean that a species originally introduced by man has now become thoroughly established, by seed or otherwise, among the native plants of the country, and exists without human aid in sowing its seeds or in preparing the ground for them. (It is so employed in the articles of this work.) There are in Britain two American plants fully coming up to this definition—*Impatiens fulva* and *Elodea Canadensis*. Few botanists, however, restrict the use of the term to this just and proper meaning, while some even apply it to mere casuals, stragglers from cultivation, with no permanent or certain locality. Mr. H. C. Watson, who has given much attention to the subject, proposes to discard the word 'naturalised,' and he employs in his works the terms Native, Denizen, Colonist, Alien, and Casual, to express a descending series, from the truly wild and prehistorically established species, down to the occasional stragglers of cultivation, or the product of seeds accidentally imported with merchandise, ship-ballast, or otherwise.

Natural Obliga'tion is an obligation which is held to arise from a law of nature; for instance, the obligation of a parent to maintain his child is a N. O., though it is a legal one also. It might be held a N. O. for a wealthy brother reasonably to maintain a poor sister, in which case there is no legal obligation. If we see a fellow creature in danger or distress, and we can relieve him without loss or injury to self, the principle which some authorities have termed 'the Law of Nature' requires us to do so; though, perhaps, the witty saying of Sidney Smith may not be wholly without truth, that 'when A sees B in distress he feels immediately prompted to call upon C to relieve him.'

Natural Theol'ogy, as a branch of theology in general deals with those facts regarding the nature of God and our relation to Him which are deduced from the works of God and the nature of man. With regard to N. T. two leading views are held diametrically opposed to each other. The one that the works of Nature, meaning thereby the external, material universe, afford no trustworthy revelation of the being and perfections of God, the usual ontological and teleological arguments derived from the existence of the universe and the evidences of design which it contains being held to be unsatisfactory; the other, that the revelation afforded by them is so clear and comprehensive as to preclude the necessity for any supernatural revelation. See the works of Paley and Chalmers, and the Bridgewater Treatises.

Na'ture Prin'ting is the name applied to a technical process of causing flat objects, as ferns, mosses, feathers, lace, &c., to engrave themselves by pressure on metal plates, from which impressions may be printed. Kyhl, a Danish goldsmith, seems to have been the first to obtain, about 1833, copies of natural objects by pressure. From 1849 to 1852, several experiments in the art of N. P. were made by Dr. Branson of Sheffield, Mr. Aitken, and Mr. Sturge of Birmingham, and others. Subsequently Mr. H. Bradbury introduced into England a process that had attained considerable perfection in the imperial printing office at Vienna. This process, as improved, consists in embedding, by pressure with steel rollers, any flat object in a plate of pure soft lead. An electrotype facsimile is then taken, from which the impressions are printed off in different colours on a peculiar soft paper. The object depicted on paper has an embossed appearance, and its characteristic markings, even to the most minute, are accurately and faithfully brought out. Several botanical works have been illustrated by means of this art, the first in England being *The Ferns of Great Britain and Ireland*, by Lindley and Moore.

Naudé, Gabriel, born in Paris, February 1, 1600, studied philosophy and medicine at Paris and Padua (1626), and became librarian at Rome to the Cardinals Bagni (1629) and Barberini (1641), and at Paris to Mazarin (1642). Having formed the design of founding a great national library, he made a bibliographical tour in Flanders, Italy, Germany, and England, and thus collected some 40,000 volumes for the Bibliothèque Mazarine, which was opened in 1648. On the dispersion of this library by the Fronde Parliament (Dec. 29, 1651), N. purchased 3500 of its medical works, and withdrew to Stockholm, where Christina appointed him her librarian. Recalled by Mazarin, he died on the homeward journey at Abbeville, July 29, 1653. N. was a voluminous writer, but his works (mostly in Latin) are extremely rare. The principal are *Apologie pour les grands Personnages faussement soupçonnés de Magie* (1625), *Advis pour dresser une Bibliothèque* (1627), and *Bibliographia Politica* (1633). See A. Franklin's *Histoire de la Bibliothèque Mazarine* (Par. 1860).

Naumach'ia (Gr. *naus*, 'a ship,' and *machē*, 'a fight'), literally a sea-fight, but generally the name given to a representation of such by the Romans, as well as to the scene of its occurrence. Such naval battles (*navalia prælia*) were frequently celebrated in the circus (the arena being filled with water). With a view to the celebration of the N., ponds (*stagna*) were dug near the Tiber by Julius Cæsar, Augustus, and Domitian, a grove (*nemus*) being planted around them. Claudius turned the Lacus Fucinus into a magnificent field for such spectacula. Nero converted an amphitheatre to the same purpose. The combatants in these fights were termed *Naumacharii*. They were generally captives or criminals compelled to fight in gladiatorial combats. The ships engaged in such sea-fights were designated by the names of different maritime nations, *e.g.*, Tyrians and Egyptians, Rhodians and Sicilians, Persians and Athenians. The same lavish expenditure which characterised the gladiatorial exhibitions distinguished the N. In the N. exhibited by Titus 3000 men were engaged; while in the '*spectacle*' given by Domitian, two real fleets to a nearness (*pæne justæ classes*) entered the lists. In the combat on the Lacus Fucinus 19,000 combatants engaged—fifty ships a-side (*cf.* Dion Cass. ix. 33).

Nau'mann, Johann Friedrich, a famous German ornithologist, born 14th February 1780 at Ziebigk, near Köthen, and died there, 15th August 1857. His chief works are *Naturgeschichte der Vögel Deutschlands* (2d ed. 12 vols. 1822-44; *Nachträge*, 1846–60); *Taxidermie* (2d ed. 1848); *Haushalt der Nördlichen Seevögel Europas* (1824). In his honour the journal of the German Ornithological Society is named *Naumannia*.—**Karl Friedrich N.,** a well-known German mineralogist, born at Dresden, 30th May 1797, was Professor at Freiberg from 1826, afterwards at Leipsic from 1842 to 1870, and died 26th November 1873. He wrote *Lehrbuch der Krystallographie* (2 vols. 1830, 2d ed. 1858); *Elemente der Mineralogie* (8th ed. 1871); *Lehrbuch der Geognosie* (2d ed. 3 vols. 1857–67).

Naum'burg (a corruption of *Neuenburg*, 'New Town'), a town of Prussia, province of Saxony, on the river Saale, in a hilly wine-growing district, 17 miles S.S.W. of Merseburg by rail. It has a cathedral of the 13th c., in the transition Gothic of the period, and richly adorned with curious sculptures. The industrial products are sparkling wines, chemicals, vinegar, tobacco, spirits, linens, and woollens. The district yields over 100,000 gallons of wine yearly. Pop. (1875) 16,327.

Nau'plia, or Nau'plion (Ital. *Napoli di Romania*), a town of Greece, in the nomarchy of Argolis and Corinth, picturesquely situated on the Gulf of N., 28 miles S.S.W. of Corinth. It is the see of an archbishop, and from 1829 to 1834 was the chief town of Greece. N. has an excellent harbour, capable of holding 600 vessels, and is protected by three forts, Palamidi, Albanitiki, and Itchkali, on a rock 709 feet high. In the suburb Pronia a huge lion cut out of the rock commemorates the Bavarians that fell in Greece. To the N. are the Cyclopean ruins of primeval *Tiryns*, enormous stones of irregular polygonal form rudely piled one above another. Pop. (1870) 3958.

Nau'sea (from Gr. *naus*, 'a ship') literally means sea-sickness, or a similar sickness of the stomach, accompanied with a propensity to vomit. N. is usually accompanied by general languor, muscular relaxation, an increased flow of saliva, a small irregular pulse, and a cool, moist skin. N. may be a *direct* symptom of stomach disease, or of the presence of irritating substances; or it may be an *indirect* symptom of disease in remote organs, as the brain or the kidneys, and it is frequently an early symptom of zymotic diseases. The N. of pregnancy depends on the reflex action of the gravid uterus on the stomach. N. after taking food is a troublesome affection, and to soothe this irritability there are special therapeutic remedies—in addition to careful regulation of the quantity and quality of food—such as creasote and hydrocyanic acid.

Nau'tæ, Caupo'nes, Stabular'ii, the opening words of the well-known edict of the Roman prætor, by which shipmasters, innkeepers, and keepers of stables were made answerable for the safety of the goods of the travellers brought with them into the ship, inn, or stable. The same rule has been adopted by the common law of England and of Scotland. The rule has, however, been modified under various statutes. See under CARRIERS, *Carriers, Wharfingers,* and *Warehousemen,* LAW REGARDING; INNKEEPER, LAW AFFECTING THE.

Nautch Girls, or Nautchis. See BAYADERES.

Nau'tical Al'manac. See ALMANAC.

Nau'tilus, a name given to two distinct and widely different species of *Cephalopoda* (q. v.) or cuttlefishes. Of these the first is the *Paper* N. (*Argonauta Argo*) belonging to the *Dibranchiate* or two-gilled group, in which the shell is external, but single-chambered, the arms number eight, and are provided with suckers, and an ink-sac is developed. The shell of the paper N., however, is not a true shell, as it is not formed by the *mantle* of the animal, but by two of the arms specially modified as shell-secreting organs. The typical N. is the 'Pearly N.' (*Nautilus Pompilius*), the only living representative of the Tetrabranchiate or four-gilled cuttlefishes. This animal has a true external, many-chambered shell, numerous arms, and no ink-sac or suckers. It is one of the rarest of molluscs. Only some four or five specimens have been obtained. It occurs in the Southern seas, and lives at great depths. The shell is well known, and is frequently found in drawing-rooms; the brown and white markings having been obliterated by its surface having been polished so as to give the shell the pearly lustre from which the N. gets its name. The shell forms a flat spiral. Its chambers are completely shut off from each other by septa or

partitions. In the middle of each septum a small aperture exists for the transmission of a muscular tube, the *sipuncle*, which terminates anteriorly in the *pericardium* or heart-sac. The function of the sipuncle is supposed to be that of keeping up a low kind of vitality in the disused chambers of the shell; while others think it acts as a hydrostatic apparatus, enabling the animal to rise or sink in the water by the diffusion of water or gas through the chambers of the shell. The chambered condition of the shell is produced by the successive growths of the animal. In early life the shell consists of but one chamber, but owing to its increase of size, the animal soon leaves the first-formed chamber, constructs a second and larger one, and partitions off the first by a septum. The third chamber is similarly formed and similarly partitioned off from the second when the latter has grown too small to contain the animal; and in this way the convoluted shell is produced. The development of the N. is unknown. It has no 'branchial hearts' such as occur in the cuttlefish; its tentacles are very numerous, and want suckers or *acetabula*. Fossil N. first occur in the Silurian rocks, and are found through the whole fossiliferous series up to the present day. The genus probably attained the maximum of its development in Palæozoic strata.

Nauvoo', a town of Illinois, U.S., on the E. bank of the Mississippi, was founded in 1840 by the Mormons, and after their expulsion became the home of a community of French socialists under M. Cabet. In 1846 it had 15,000 inhabitants, but it has since dwindled into a mere village. Pop. (1870) 1578. N., however, produces yearly about 100,000 gallons of wine.

Na'val Cadets' enter the Royal Navy as such between twelve and fourteen years of age after passing an examination, and serve two years on board the *Britannia*, a training ship at Dartmouth. If they do not obtain first-class certificates at the end of that time, they have to serve for a further period on board a sea-going training ship before taking rank as midshipmen. See MIDSHIPMAN.

Naval Crown, in Heraldry, is a rim of gold adorned alternately with ships' bows and square sails. The origin of the device, according to tradition, goes back to the Emperor Claudius, who instituted it after the conquest of Britain.

Naval Reserve', an auxiliary naval force, which sprung into existence about the same time as the volunteer movement. It is to the navy what the militia is to the army. Formerly, although the abolition of impressment had closed the great source on which Government could draw for the maintenance of the navy in time of war, the only reserve was a body of coast volunteers, who could not be sent more than 300 miles away from their coast. The present force was established as regards the men in 1859, under Act 22 and 23 Vic. cap. 40, and as regards the officers in 1861, under Act 24 and 25 Vic. cap. 129. The number was limited to 30,000 men and 400 officers, though this number has never been actually enrolled. In 1876, 18,000 men were provided for, their wages and allowances being estimated at £134,700. The men, who must be under thirty-five years of age and have served at least five out of the previous ten years at sea, join for five years, and have to train (in periods of seven or more days, or altogether if they prefer it) for twenty-eight days in the year on board one of Her Majesty's ships or with the coastguard, during which period they receive the wages of seamen in the Royal Navy, in addition to a bounty of £6 per annum. On an emergency they may be sent on naval service to any part of the world for a period not exceeding five years. On attaining certain ages, fixed according to special circumstances by the Board of Admiralty, they become entitled to pensions of £12 a year, or to a smaller annual sum payable during the longest lives of themselves and wives. If they have been three years in active service the pension is increased by 2d. a day. Chief mates in the merchant service are eligible as sub-lieutenants in the reserve, receiving 7s. a day during the training period; masters as lieutenants, at 10s. a day. Pensions are granted to these officers if wounded, or to their widows if they are killed in action, at same rates as in the Royal Navy.

Naval Stores Act. By this Act certain marks are appropriated to denote Her Majesty's property in stores. Any one obliterating such a mark is guilty of felony. No one is allowed, without authority, to sweep or search for stores, or dredge in the sea, within one hundred yards of any one of Her Majesty's vessels, or of any dockyard or mooring, under penalty of fine or imprisonment. See BROAD ARROW.

Naval Wills Act. After 1st January 1866, wills of seamen or marines made previous to their entering into service, of wages, prize, bounty, or other allowance payable by the Admiralty, or in its charge, are declared invalid. To make valid a will of money or effects in charge of the Admiralty, it must be executed with the forms prescribed by the Wills Act. If the will be made on board ship, it must be attested by an officer.

Nav'an (Irish Gael. *n'Eamhain*, lit. 'the neck brooch,' so named from a legend connected with the foundation of an ancient palace there), is a market-town in Ireland, county of Meath, at the confluence of the Boyne and Blackwater, 29 miles N.N.W. of Dublin by rail. It has considerable trade in provisions, and manufactures flour, sacking, leather, and spirits. Pop. (1871) 4104.

Navari'no, Bay of, an indentation of the south-western coast of the Morea, in the nomarchy of Messenia, is about 3 miles wide by 2½ deep. The island of Sphagia or Sphacteria lies across its entrance, leaving two narrow inlets, on the upper of which stood the Frankish fortress of Paleo-Avarino (the *Pylus* of Nestor), while on the lower is the strongly-fortified haven of N. or Neokastro, with a pop. (1870) of 1115. In this bay Cleon and Demosthenes defeated the Spartans (425 B.C.), and a Turco-Egyptian fleet was almost totally destroyed by the combined fleets of France, England, and Russia, under Sir Edward Codrington, October 20, 1827.

Navarre (Sp. *Navarra*, a Basque word meaning 'the plain among the hills;' the anc. *Vasconia*), a former kingdom and now a province of Spain, is bounded N. by France, S. by Old Castile, E. by Aragon, and W. by Guipuzcoa. Area, 4044 sq. miles; pop. (1870) 318,687. The wild highland region of the Pyrenees in the N., known as Montaña, attains its highest elevation of 4908 feet in Monte Adi, and is intersected by many beautiful valleys, such as Roncal, Aezcoa, Roncesvalles, and Erro. The lofty Sierra de Andia, the eastern extremity of the Cantabrian Mountains, enters the province in the W., while the centre is occupied by the plain of La Cuença or Pamplona, and along the deep and rapid Ebro, which forms the southern boundary, stretches the level Ribera, famed for its wines, especially those of Veralta, Azagra, and Cascante. Most of the rivers, the Aragon, Zidaco, Arga, Ega, &c., are affluents of the Ebro, and traverse N. in a southerly direction; the Bidassoa, however, after watering the valley of Batzan (Arab. 'garden'), in the extreme N.W., flows towards the Bay of Biscay. The slopes of the mountains are clad with extensive forests of pine, oak, chestnut, and beech trees, and afford pasture to vast herds of cattle and flocks of merino sheep. Among the products that are exported are wheat, timber, wine, brandy, olive-oil, wool, iron, salt, and skins. Seven roads and numerous bridle-paths cross the Pyrenees, and a great deal of smuggling is carried on along the frontier. The Navarrese, a mixed Basque and Gothic race, impulsive, superstitious, and hardy, are born soldiers and sons of the chase. The mountaineers, who have preserved their purity of descent by intermarriage, speak Basque, and are jealous of ancient customs; but the inhabitants of the plains have lost many distinguishing traits, and use the language of Castile.

The earliest known inhabitants of this region, called Vascones ('Basques') by the Romans, were subdued by the Goths about 470 A.D. The Goths and Vascones gradually amalgamated, and were early brought under the influence of Christianity. About the beginning of the 8th c. the country was invaded by Arab hordes, and the inhabitants who escaped the sword fled to the mountains. Choosing as their leader or king a knight named Garcia Ximenes, they sallied from the glens of the Pyrenees, and succeeded in ridding their country of the infidel invaders. A dynasty founded by Ximenes ruled the little kingdom till the middle of the 9th c., and on the extinction of the race, the Navarrese elected Inigo Sanchez, Count of Bigorre, whose descendants reigned for nearly five centuries. The marriage of Joanna I. of N. to Philippe the Fair made the country tributary to France (1285), and on the succession of the family of Valois in 1328, it passed to Joanna II., the daughter of Louis X. In 1442 Juan II. of Aragon married Blanche, daughter of Carlos III. of N., and the alliance led subsequently to a period of fierce family

strife. Ferdinand and Isabella failed in an attempt to procure the hand of Catherine of N. for their son, the Prince of Asturias; a pretext, however, was immediately found for invasion, and Ferdinand in 1562 annexed the part of N. forming the modern province. A small territory called Lower N., on the N. side of the Pyrenees, now included in the department Basses-Pyrenees, was seized in 1572 by Henri IV. of Bourbon, the famous Henri of N., on the ground of descent from Queen Catherine, and formally annexed to the crown of France in 1609. In recent times the Navarrese lent their aid to the Pretender during the Carlist Wars, and in consequence have been deprived of their municipal charters, their *fueros*, and other constitutional privileges.

Nave (Fr. *nef*, from Lat. *navis*), the body or middle of a church, often flanked by aisles, and parted from the chancel by a rood-screen. Its roof is commonly the highest in the building, and it contains the pulpit, lectern, fald-stool, and font, besides chairs or fixed benches for the general congregation. Of English cathedrals, Peterborough has the longest N., 234 feet; and York the widest, 106 feet, inclusive of the aisles.

Navew' is 'a garden vegetable much cultivated in France and other parts of Europe, although little used in Britain. The part used is the swollen root, as in the turnip, but it is rather like the carrot in shape, and its colour is white.' No doubt it is one of the forms of the Protean *Brassica campestris*, as the different kinds of navet or navette of the French are all reckoned to belong to that species in its full Linnæan acceptation.

Navic'ula, the name given to a genus of *Diatomaceæ* (q. v.), from the shape of the flinty or siliceous envelope, which bears a close resemblance to the form of a little ship. This genus includes a large number of common species.

Navic'ular Disease', a lesion affecting the flexor tendon of the foot of the horse, at the portion which lies in relation with the *navicular bone*. The most frequent cause of N. D. appears to be a strain of the tendon, resulting from severe work, sudden exertion, or from being unduly worked on hard roads without careful attention to the state of the feet. The horses which suffer most frequently from N. D. are light draught horses. The *symptoms* consist of a short stepping gait, the affected foot being placed on the ground cautiously, and being quickly raised and replaced by the opposite or sound limb. The muscles of the shoulder undergo waste or atrophy, and the affected limb is usually protruded when the animal is at rest. The treatment to be effectual must be prompt. Rest, removal of the shoe, paring of the hoof in front, and poulticing are measures necessary for successful treatment; while mashes should be given, and aperients are indicated. Cold bathing frequently applied should succeed the poulticing, and if much swelling remain, a blister may be applied round the top of the hoof. Occasionally blistering of the ankle has been followed by relief. The animal, in order to be thoroughly cured, should be allowed to remain at grass for six weeks or two months, so as to ensure the soundness of the limb before a return to the road. Division of the nerve has been practised in this lesion. This latter plan relieves pain, but appears to be of no ultimate benefit.

Na'vies, the war marines of nations, originated in prehistoric times with the Phœnicians, who fitted out hundreds of armed vessels for the protection of their commerce and colonies from piracy. Triremes were first employed by the Corinthians in their war with Corcyra (664 B.C.), and the naval supremacy of Athens dated from a decree of Themistocles (481) for the immediate building of 200 ships-of-war, and of twenty new ones every year from that time forth. At Salamis (480) the total Greek fleet consisted of 300, the Persian of 1000 vessels. In the time of Alexander the Great (330) the Athenian navy alone numbered 300 triremes, most of them 125 feet long by 20 broad, furnished with sails and oars, and with a beak (*embolos*, Lat. *rostrum*) for ramming down the enemy. The average number of the crew and marines was 200. The Roman navy arose during the Second Samnite War (311), but only obtained importance in 260, when 100 quinqueremes and 20 triremes were built to act against the Carthaginians, 200 of whose ships were defeated off the coast of Sicily by the consul Duilius. The Romans, however, were never a truly maritime people, and by means of the *corvus* or grappling-iron, and by the erection of towers upon the decks, converted a sea-fight as nearly as possible into a land engagement. The number of marines on board their vessels was 120. At Actium (31 B.C.) Octavian's fleet consisted of 260, Antony's of 280 vessels. For the first nine centuries of the Christian era, naval science rather retrograded than advanced. The Norsemen and Moorish pirates scoured the European waters, but battles by sea ceased to decide the fate of nations. Then arose the medieval N. of Venice, Genoa, and Aragon, but these powers confined their efforts to the narrow limits of the Mediterranean, and regarded ships as a means, not an end, as instruments rather of transport and commerce than of conquest and discovery. Consequently their galleys were little, if at all, superior, to the vessels of the ancients. The discovery of the compass, the application of artillery to naval warfare, and the opening up of new fields of navigation, gave an immense impulse to the creation of N. Sails gradually superseded oars, and hand-to-hand encounters, like those of Sluys (1340) and Harfleur (1416), became a thing of the past. Columbus' squadron was composed of three ships, two of them undecked, manned by 120 men, but in the next thirty years vessels began to be built of 1000 tons, carrying from 80 to 100 guns, and in 1587 we see the Spanish Armada with its 130 huge galleons, 2500 cannon, 8000 seamen, and 20,000 soldiers. On the downfall of Spain as a maritime power, France, England, and the Low Countries struggled for the supremacy of the sea, but continued to build their ships on the old lines, and Nelson's *Victory* differed in no essential points from the *Great Harry*. The navy of Russia arose under Peter the Great (q. v.), that of America in the War of Independence (1775). Modern N. owe their development to the application of steam to war-vessels (1838), and the invention of the screw-propellor, armour plates, improved ordnance, turret-ships, rams, torpedoes, &c. What possible effects the two last-named may have on naval warfare has been already to some degree instanced in the sinking of the *Vanguard* by the ram of the *Iron Duke* (September 1, 1875), and in the destruction of Turkish monitors by Russian torpedoes in the Russo-Turkish War of 1877. See Benedict, *Geschichte der Schiffahrt der Alten;* Jal, *Archéologie Navale* (Par. 1840); Commander King, *The War Ships of Europe* (Portsm. 1877); and *Gun, Ram, and Torpedo* (Portsm. 1877).

The following statistics of the chief naval powers are for the year 1876, except where otherwise specified:—

Austria has 57 vessels, viz., 10 ironclads (of 7650 tons), 37 unarmed steamers, and 10 sailing vessels, armed with 563 guns, and manned by 408 officers and 5836 men, while the marines comprised 34 officers and 850 privates. On a war-footing the seamen are to number 11,532, and the marines 1500. The term of service is ten years, the two last in the reserve; and the navy is recruited by a general levy from the seafaring population of the empire. Naval expenditure, £1,094,943.

Denmark has 30 steamers, viz., 6 ironclads (of 2355 horse-power), 12 unarmoured vessels, 7 gunboats, and 5 paddle-steamers, armed with 314 guns, and manned by 97 officers and 911 men, who are raised by conscription from the coast population. Expenditure, £265,052.

France has 391 vessels, viz., 52 ironclads (of 30,240 horse-power), 264 unarmoured screw-steamers, 62 paddle-steamers, and 113 sailing vessels armed with 2978 guns, and manned by 1531 officers and crews drawn from the *Inscription Maritime*, which fluctuates between 150,000 and 180,000 men. The marines comprise four regiments of infantry of 16,000 men and a body of artillery of 4500 men. The navy is recruited partly by conscription, partly by voluntary enlistment, and the term of service is the same as in the army. Expenditure, £5,455,400.

Germany has 66 vessels of 83,342 tons, viz., 12 ironclads (of 42,050 tons), 20 unarmoured steamers, 31 gunboats, and 4 sailing vessels, armed with 478 guns, and manned by 255 officers, 5500 seamen, and 1500 marines. Sailors and marines are raised by conscription from the seafaring population, which is estimated at 80,000.

Great Britain on 1st December 1875 had 241 ships in commission; and her ironclad fleet, at the end of 1876, consisted of 47 efficient vessels of 327,665 tons, and armed with 503 guns. The estimates of 1876–77 gave 3059 officers, 30,341 seamen, and 14,000 marines, and the expenditure as £11,091,392. See BRITISH NAVY.

Greece has 14 vessels, viz., 1 ironclad, 6 unarmoured steamers, and 7 sailing vessels, manned by 71 officers and 582 men, raised by conscription and voluntary enlistment. Expenditure, £69,900.

Italy has 81 steamers of 22,150 horse-power, viz., 11 ironclads, 38 screw-steamers, and 32 paddle-steamers, armed with 671 guns, and manned by 1271 officers and 11,860 men, with two regiments of marines, comprising 205 officers and 2700 privates. Expenditure, £1,912,947.

The *Netherlands* have 67 steamers, viz., 22 ironclads (of 4582 tons), 35 screw-steamers, and 10 paddle-steamers, armed with 521 guns, and manned by 627 officers and 4996 men, while the marines comprise 42 officers and 2121 privates. Both sailors and marines are raised by enlistment. Expenditure, £1,136,049.

Portugal has 37 vessels, viz., 1 ironclad, 19 unarmoured steamers, and 11 sailing vessels, armed with 168 guns, and manned by 238 officers and 3475 men. Expenditure, £287,853.

Russia has 108 vessels, manned by 1477 officers and 7217 seamen. Of this number 29 are ironclads, of 74,793 tons, and armed with 184 guns. The Baltic fleet consists of 77, and the Black Sea fleet of 9 men-of-war. The sailors are levied by recruitment and voluntary enlistment, and the term of service is nine years, the two last to be spent in the reserve. Expenditure, £3,586,574.

Spain, at the end of June 1875, had 89 vessels, viz., 7 ironclads, 74 unarmoured steamers, and 8 sailing vessels, armed with 914 guns, and manned by 399 officers, 9750 sailors, and 5500 marines. The navy is recruited from a naval conscription list of 72,000 men. Expenditure, £1,320,000.

Sweden has 131 vessels, viz., 14 ironclads (of 1013 horse-power), 20 unarmoured steamers, 8 sailing vessels, and 89 galleys, armed with 394 guns, and manned by 140 officers, 940 sailors, and 5051 marines (drawn from the naval beväring of 40,000 men); while *Norway* has 123 vessels, viz., 4 ironclads (of 600 horse-power), 28 unarmoured steamers, and 91 sailing vessels, armed with 156 guns, and manned by 104 officers, and 2289 men. Expenditure (1877), £397,300.

Turkey, at the end of 1875, had 20 ironclads, of 10,450 horse-power, armed with 145 guns, and 70 other steamers, manned by 30,000 sailors and 4000 marines. The crews are raised partly by conscription, partly by voluntary enlistment, and the term of service is 8 years. Expenditure set down in budget as £640,000. The actual annual expenditure, however, for naval purposes, including the construction of ironclads, is stated to have reached £3,000,000 in recent years.

The *United States* have 146 vessels, viz., 24 ironclads (of 26,895 tons), 67 unarmoured steamers, and 55 sailing vessels, transports, &c., armed with 1192 guns, and commanded by 776 officers. By the Naval Appropriation Bill (1876) the enlisted force was reduced from 8500 to 7500 men. Expenditure (1877), £2,754,871.

Naviga'tion is the art of directing a ship along a pre-arranged course, and of finding its position at sea at any time. For the first a chart and mariner's compass (see COMPASS) are indispensable, except when the course is along a known coast. Amongst the ancients the compass was unknown, and consequently they were compelled to keep generally in sight of land. Their only guides were the stars, which of course failed them in stormy and cloudy weather. With the application of the magnetic needle to N., a new era began, an era rich in discovery (see GEOGRAPHY). Knowing the direction in which one place lay from another, the mariner could now direct his course from the latter to the former. To obtain this knowledge the chart was necessary; but even a chart would be useless unless the position of the ship at any instant were definitely known. The position of a point upon the surface of a sphere is determined by two co-ordinates. These co-ordinates on the earth's surface are called meridians and parallels, the former being great circles through the poles, the latter small circles parallel to the equator. Each meridian, whose angular distance from a fixed meridian gives the *longitude* of every point upon it, intersects each parallel, which similarly fixes the *latitude*, in one point and one point only. If the latitude and longitude (see LATITUDE AND LONGITUDE) of a point are known, the position of that point is fixed. To determine these co-ordinates is, therefore, the great problem of N., for knowing these the navigator can with the aid of chart and compass steer his course to any desired port or region. Now the latitude is equal to the altitude of the celestial pole above the horizon in whatever hemisphere the observer may be. If there were a star whose position was exactly that of the celestial pole, a single observation of that star would be sufficient to determine the latitude. In neither hemisphere is this the case. In the northern, however, a star of the second magnitude known as Polaris is very near the pole, daily describing round it a small circle of 1° 21′ radius. An observation of this star will therefore give the latitude within 1° 21′ of error.

The meridian altitude of any celestial body (sun, moon, or star), whose distance from the pole at that date is known, gives by a simple calculation the true latitude. The polar distance of the principal heavenly bodies is given in the *Nautical Almanac*. Altitudes are taken by means of the Sextant (q. v.), an instrument invented by Newton, and first constructed by Hadley. The determination of the longitude is a more complicated process, and is obtained by comparison of the local time and the corresponding Greenwich time. Local time is most accurately obtained by observing the instant when the sun or a known star crosses the meridian. At sea, however, this method is not feasible; but instead, the altitude is observed when the heavenly body is out of the meridian. The latitude, which has been already determined, gives by a simple calculation the greatest altitude of the known star; and the difference between the greatest altitude and observed altitude affords the necessary datum for determining the local time. Greenwich time is usually taken from chronometers, but failing these, by 'lunars.' The *Nautical Almanac* gives several years in advance the calculated positions of moon among the stars for every third hour of Greenwich mean time; and by comparing these with the observed positions, the Greenwich mean time is ascertained. Works on N. contain elaborate rules, formulæ, and tables for reducing the observations; but sufficient has been here said to give a general idea of the methods usually employed in determining a ship's latitude and longitude. The value of the latitude, upon which the calculation of the longitude depends, is generally found by Dead Reckoning (q. v.) from previously determined positions; and for long distances dead reckoning is necessarily uncertain. Sumner's method of interpreting an observation of altitude is free from this uncertainty, inasmuch as it disregards totally the true latitude. Here, of course, the *Nautical Almanac* and a knowledge of Greenwich time are as indispensable as in the ordinary method. Knowing the time, the position of the sun, moon, or star at the instant of observation is known. With the point as centre in whose zenith the observed body is at the instant of observation, describe on the terrestrial globe a small circle whose arcual radius is the observed altitude. The vessel lies somewhere on that circle. A similar circle may be drawn for another star simultaneously, or for the same body several hours later; and the position will then be at or near one of the points of intersection of the two circles. Practically, all that is necessary is a portion of each of these circles drawn upon Mercator's projection according to known rules. Sir W. Thomson, by whom the method has been prominently put before the public, has published (1876) stereotyped tables, accompanied by a pamphlet of rules and illustrations for facilitating the application of Sumner's method. See Thomson's *Navigation Lecture* (published by Collins & Co., 1876). The intersection of the Sumner's *lines* gives at once the position, and therefore the latitude and longitude of the vessel. For details regarding the directing of a ship along a pre-arranged course see article SAILINGS. Under SIGNALS, the value of marine signalling is indicated. The best treatises in N. for use at sea are those of Inman, Norrie, and Raper.

Navigation-Laws. The statute of the Long Parliament of 1651, confirmed in 1660 by the Navigation Act of 12 Charles II. c. 18., provides that no merchandise shall be imported into England except in a British built ship, navigated by an English commander, and of which three-fourths of the crew are Englishmen. The aim of this and of other 'protective' provisions of the Act was to encourage British shipping, by securing the carrying trade of the country to British ships and to British subjects. This selfish and short-sighted policy was followed by the United States of America, who passed their Navigation Act immediately on gaining their independence. In the trade between the two countries, it thus followed that the ships of each state were obliged to make the outgoing voyage in ballast. A perception of this waste of time and material at last proved to each country the impolicy of the system. A treaty was entered into in 1815, by which the ships of the two countries were placed on the same footing in the ports of England and of the United States, and all

discriminative duties levied on the goods conveyed were repealed on each side. A few years later five acts were passed which greatly mitigated the severity of our N.-L. with regard to foreign countries generally. Preference duties, however, continued to be levied; but in 1823 Prussia notified that until the British system was changed in favour of its ships, similar duties would be imposed on British ships entering Prussian ports. This led to the Reciprocity Acts, 4 Geo. IV., c. 79, and 5 Geo. IV., c. 1. These statutes authorised the Crown to allow the importation and exportation of goods in foreign vessels, at the same duties as were chargeable on British vessels, in favour of all countries according the similar privilege to British ships. Reciprocity treaties have been entered into between the United Kingdom and Germany, States of S. America, France, Austria, Holland, and Greece. The Merchant Shipping Act (q. v.) of 1854 amends and consolidates the whole statute law relative to merchant shipping.

Nav'igators' Islands. See SAMOAN ISLANDS.

Nawaub' (*Náwáb*, properly the plural of the Arabic word *naib*, 'a deputy,' but used honorifically in the singular), is a term applied throughout India to the viceroy or governor of a province under the Mogul Empire. It denoted the highest office under the Emperor; and consequently is now adopted by those feudatory chiefs in India who are Mohammedans. It is also frequently conferred as a mere title by the British Government upon meritorious Mussulman subjects. The corrupt form Nabob (said to be derived from the Madras pronunciation), was commonly applied about the middle of last century to those Englishmen who brought back easily-acquired fortunes from India by 'shaking the pagoda tree.'

Nawaubgunge ('the governor's market'), the name of numerous villages and towns in India. The largest is the chief town of the district of Barabunki in Oude, 19 miles N.E. of Lucknow. Pop. (1869) 14,489. Another N. in the neighbouring district of Gonda carries on a large river trade with Bengal. In 1876–77 it exported food grains to the amount of more than 10,000 tons, including wheat valued at £28,000.

Nax'os (Mod. *Naxia* or *Axia*), an island of Greece, the largest of the Cyclades, lies E. of Paros, in the Ægæan Sea, nearly half-way between the coasts of Greece and Asia Minor. Length, 55½ miles; area, 171½ sq. miles; pop. (1870) 12,000. The surface is generally mountainous; in the middle Zia rises to 3290 feet, and near it Koroni to 3247. The plains and valleys yield abundant corn, wine, oil, cotton, figs, pomegranates, and lemons. N. exports salt and emery (in 1871, 2030 tons at £10). N. was in ancient times famed for its wine and marble, and here Dionysus was said to have found Ariadne, deserted by Theseus. It was early colonised by Athenian emigrants, was conquered in 540 B.C. by Pisistratus, by the Persians in 490, recovered its independence in 480, but did not again play an important part in history.—In **N.**, the chief town, on the N.W. coast, are a citadel built by the Venetian Duke Marco Sanudo, and a square tower of the old palace of the Dukes, destroyed by Babirussa. It is the seat of a Greek bishop and a Catholic archbishop, and has 16 Greek and 4 Catholic churches, and 3 monasteries.—Another **N.**, founded B.C. 735 on the E. coast of Sicily, S. of Mt. Taurus, by the Chalcidians of Eubœa, was the first Greek colony in that island. Six years after it sent colonies to Catana and Leontini. During the Sicilian Expedition N. aided the Athenians. In 403 it was destroyed by Dionysius of Syracuse. The survivors of the Naxians founded (358) the city of Tauromenium.

Naz'arene, a name universally applied in the New Testament to Jesus for his connection with Nazareth (Mt. xxvi. 71, Mk. x. 47, Lu. xviii. 37, Jo. i. 45, &c.), always with more or less of reproach (Jo. i. 46, *cf.* vii. 41), was afterwards applied to the first Christians as a term of contumely and scorn (*cf.* Acts xxiv. 5).

Naz'areth (Arab. *En-Názirah*), a town in the Turkish vilayet of Syria, lies in a valley girt by hills 400 to 500 feet high, 67 miles N. of Jerusalem and 11 W. of the Sea of Galilee. It contains a mosque, a huge Franciscan convent, attached to which is the Church of the Annunciation (rebuilt in 1620 on the site of the older building of St. Helena), a Maronite and a Greek church. The Mount of Precipitation and the site of the Casa Santa (see LORETO) are pointed out. Estimated pop. (1871) 7000.

Naz'arite, properly **Nazirite** (Heb. perhaps 'one separated'), among the Jews was a person of either sex under a particular vow, the regulations for which are given in Num. vi. 1–21, which, however, appear to imply a previously existing practice. The vow of the N. was:—1. To abstain from wine and all kinds of intoxicating drinks; 2. To refrain from cutting the hair of the head, because his whole person was consecrated to God, and could not be altered; and 3. To avoid all contact with the dead, even his nearest relations. The duration of the vow was fixed by the later Jewish canons as at least thirty days, but might be as much longer as was desired. See Ginsburg in Kitto's *Cycl. of Bib. Lit.* (new ed. Edin. 1866); and Ewald's *Alterthümer des Volkes Israel* (Eng. transl. 1876).

Neagh, Lough, in the province of Ulster, Ireland, is the largest lake in the British islands, having a length of 18 miles, a breadth of 11, and an area of 153 sq. miles. It is 120 feet deep, receives from the S. the Upper Bann, Blackwater, &c., and is drained on the N. by the Lower Bann into the Atlantic. N. abounds in fish, and is haunted by waterfowl (the swan, heron, bittern, teal, &c.). Its waters at various parts are noted for their petrifying qualities.

Neal, Daniel, an English historian and Nonconformist minister, was born in London, December 14, 1678. After leaving Merchant Taylors' School he spent three years at the universities of Utrecht and Leyden. From 1706 till 1742 he was pastor of a Congregational Chapel in Aldersgate Street. He published a *History of New England* in 1720, and his best-known work, the *History of the Puritans* (4 vols. 1732–38; edited by Toulmin, with a Life, 1793; new ed. 1837; American ed. New York, 2 vols. 1844) was designed to extol the virtues of the Nonconformists. Mr. Green in his *History of the English People* (1875) says that 'besides its inaccuracies, it contains little which is not taken from the more colourless Strype.' N. died at Bath, April 4, 1743.

Neal, John, an American author, was born at Portland (then called Falmouth), Maine, August 25, 1793. He led a rough sort of life up till 1816, when, after failure in the dry goods trade, he threw himself determinedly into the study of law. He read through a seven years' legal course in twelve months, supporting himself by magazine contributions, and was finally called to the Maryland bar in 1819. Besides much miscellaneous literary work, he published *Keep Cool*, a novel, in 1817; a volume of poems in 1819, and no less than four novels in 1823. In 1824 he made a visit to England, where he remained three years, part of which time he was the guest of Jeremy Bentham. He published *Brother Jonathan* in 1825, and contributed largely to *Blackwood*. Afterwards he practised law, wrote books—*Authorship*, *Down-Easters*, &c.—and taught fencing and sparring in his native town till 1850, when he retired. Since then he has written *One Word More, True Womanhood, a Tale* (both semi-religious works), *Wandering Recollections of a Somewhat Busy Life* (1870), *Portland Illustrated* (1874), &c. M.'s writings are destitute of culture and taste, but display a slashing vigour, and are brightened with bursts of genius.

Neale, John Mason, born in London, 24th January 1818, graduated M.A. of Cambridge (1840), was ordained (1842), and became rector of Crawley, in Sussex, and Warden of Sackville College, East Grinstead (1846). At the latter place he founded the well-known Sisterhood of St. Margaret (1856), and there he died, 6th August 1866. N., while leaning to the Eastern Church, was a warm supporter of the 'Anglo-Catholic' party in the Church of England, as may be seen from his *History of the Holy Eastern Church* (4 vols. 1847–51), *History of the Jansenist Church of Holland* (1858), *Essays on Church History* (1863), &c. He was an able hymnologist, and his *Mediæval Latin Hymns* and *Hymns of the Eastern Church* (collected 1871) are widely popular.

Nean'der, Johann August Wilhelm, the greatest of Church historians, was born of poor Jewish parents at Göttingen, 16th January 1789. When about seventeen years of age (1806) he made a public profession of Christianity, renouncing his Jewish name David Mendel, and called himself N. (Gr. 'new'

man'). Devoting himself to sacred literature, he studied first at Halle, where he heard the lectures of Schleiermacher, and afterwards at Göttingen, where Gesenius was Professor of Hebrew, Stäudlin of Systematic Divinity, and Planck of Church History. In 1811 he settled at Heidelberg as a private tutor in the University, and began his remarkable career of instruction in Church History. The following year he was appointed extraordinary Professor of Theology; but his work *Über den Kaiser Julianus und Sein Zeitalter* (Leips. 1812), attracted so much attention that in 1813, at the age of twenty-three, he was called to a chair of Theology in the University of Berlin, where he remained till his death (14th July 1850). In this place for thirty-eight years he continued to exercise an ever-increasing influence, 'such as has rarely been wielded in modern times.' Students flocked from all quarters, even from foreign countries, to hear his lectures. While he showed himself an erudite scholar, a profound and original thinker, and an eloquent expounder in every branch of the wide domain of theology, his *forte* undoubtedly was the historical department, in which it was evident from an early period of his career that he had a real genius. The personal character of N. deserved all the praise that has been bestowed upon it. 'Untiring industry, a sagacity—within certain limits almost prophetic—a humble, ardent, life-pervading, rejoicing spirit of godliness, childlike simplicity, self-denying benevolence, a heart glowing and capacious enough for all the requirements of Christian friendship, but delighting especially to pour out its rich treasures of instruction and of sympathy upon the receptive soils of the young,' have been enumerated as its principal features. As has been said, it would be difficult to say whether the influence of his lectures and writings, or of his example on his students, who loved him as a father, has been the greater. His great work, which is unrivalled in its field, because it is drawn as carefully from original sources as if N. had had no predecessor, is his *Allgemeine Geschichte der Christlichen Religion und Kirche* (6 vols., Hamb. 1825–52). The most important of his other writings are *Geschichte der Pflanzung und Leitung der Christl. Kirche* (2 vols. Hamb. 1832); *Das Leben Jesu Christi* (Hamb. 1837), written in reply to Strauss; *Der Heilige Bernhard und sein Zeitalter* (Berl. 1813); *Der Heilige Chrysostomus* (Berl. 1822); *Denkwürdigkeiten aus der Geschichte des Christenthumes* (Berl. 1822); *Antignostikus* (Berl. 1825); *Geschichte der Christlichen Dogmen*, published by Jacobi in 1856. English translations of most of these may be found in Bohn's 'Standard Library.' A complete edition of N.'s writings appeared at Gotha in 13 vols. 1862–66.

Neap Tides. See TIDES.

Near'chus, a distinguished friend and officer of Alexander the Great, was born in Crete, but settled at Amphipolis in Macedonia, Strymon. Of his family and parentage nothing is known. In 329 B.C. he became attached to Alexander, and accompanied him throughout his campaigns. During the Indian expedition he received command of the fleet constructed on the Hydaspes. In spite of numerous natural obstacles, lack of knowledge of the country, adverse weather and threatened mutiny, N. eventually, by prudence, judgment, courage, and patience brought his expedition to a successful issue. He left the Indus 21st September 325, reached Susa in Persia February 324, immediately after Alexander's arrival, and there took part in the honours offered to the conqueror, being himself rewarded with a golden crown for distinguished services, and with the hand of the daughter of the Rhodian Mentor and Barsine, Alexander's former wife. To the last N. remained the stedfast friend and adviser of Alexander. Of his famous voyage he left a record, a transcript of which has been preserved by Arrian, and which indeed has furnished the latter with materials for part of his 'Indica.' See Schmieder's edition of Arrian's *Indica* (8vo, Hal. 1798), Dr. Vincent's *Commerce of the Ancients in the Indian Seas* (Lond. 1807), and Geier's *Alexandri Magni Historiarum Scriptores* (pp. 108–150).

Neath, a town in Glamorganshire, S. Wales, on the river N., near its mouth, and 8 miles E.N.E of Swansea by rail. It is an important railway centre, and exports the copper, spelter, iron, tin, coal, coke, culm, and fine bricks produced extensively in the vicinity. A new tidal and floating dock was constructed at Briton Ferry, 2 miles from this town, in 1861. Historically N. is interesting as occupying the site of *Nidum*, a Roman station, also for its ancient castle, destroyed in 1231, and, above all, for the beautiful ruins of N. Abbey, according to Leland, 'the fairest abbey in all Wales.' Pop. (1870) 10,060. N. with the other Merthyr-Tydvil boroughs sends one member to Parliament.

Neaves, Charles, Lord, was born in Edinburgh, 14th October 1800, educated at the High School, of which he became dux in 1814, studied with distinction at Edinburgh University, and was called to the bar in 1822. From 1841 to 1845 he was Advocate-Depute, from 1845 to 1852 Sheriff of Orkney and Shetland, and from 1852 to 1853 Solicitor-General. On the death of Lord Cockburn in 1853 he was appointed a Judge in the Court of Session, and in 1858 a Lord of Justiciary. He died 23d December 1876. N. was unquestionably a great lawyer. No man, it is said, knew so much about the criminal law of Scotland as he did; but what will most surely keep his memory green was the brilliant and sportive genius of the man, which found expression alike in finely critical prose and exquisitely witty verse. N. was a contributor to *Blackwood* from 1830 almost to his death. Steeped in classical scholarship, he was the reverse of pedantic. His Latin and Greek only gave point and flavour to the native vivacity of his spirit. The brightest effluence of his muse is seen in the volume entitled *Songs and Verses* (Edinb. 1868; last ed. 1875). Many of the songs, *e.g.*, 'The Origin of Species,' 'Stuart Mill on Mind and Matter,' 'The Permissive Bill,' 'Saturday at E'en,' 'Let us all be unhappy on Sunday,' are not only infinitely amusing, but are instinct either with the soundest sense or the healthiest social sentiment.

Neb-neb or **Nib-nib,** the pods of *Acacia vera*, used in Egypt and also imported into Britain for tanning.

Nebraska, one of the central states of the American Union, is bounded N. by Dakota, S. by Kansas and Colorado, E. by the Missouri River, which separates it from Iowa and Missouri, and W. by Colorado and Wyoming. Area, 75,905 sq. miles; pop. (1874) 230,007, exclusive of some 6000 Indians. The country, in great part rolling prairie, has a length from E. to W. of 412 miles and a breadth of 208, rises gradually in the W. towards the Rocky Mountains, and in the E. is amply watered by the Niobrara and the Platte or N., and by many smaller streams, of which the chief are the Great Nemaha, Little Nemaha, Weeping Water, the Republican, and the Big Blue—the last two affluents of the Kansas. The Niobrara forms the N. boundary, and the N., a majestic but unnavigable river, traverses the state from E. to W.; both are tributaries of the Missouri. The river-beds or bottoms are confined by high bluffs, and the soil is a rich, black vegetable mould from two to ten feet deep. Wild grasses grow luxuriantly in the bottoms and on the prairies, but the supply of timber, even along the rivers, is not abundant, and large quantities of trees have been planted throughout N. in recent years. N. is entered in the S.E. by a continuation of the great coal-basin of Iowa and Missouri, but the coal is too thin for profitable mining on a large scale. Proceeding westwards, the rocks are first Permian, then Cretaceous, and finally Tertiary, including large deposits of excellent lignite. Besides coal, the minerals are lime, sandstone, marble, gypsum, and especially salt. In the W. are many large salt-basins, one of which, in a district 12 by 25 miles in extent, is said to produce the purest salt in the world. The springs contain 29 per cent. of salt, and the mineral manufactured by solar evaporation is 98½ per cent. pure chloride of sodium. N. has a fine climate, the mean temperature at four stations in different sections of the state ranging between 101° and 130°, and the mean annual rainfall during the period 1863–69 being 30·36 inches. In 1874 nearly one-fourth of the land was under cultivation, and the yield of Indian corn was 3,500,000 bushels (value $2,550,000); of wheat, 3,619,000 bushels ($2,171,400); of rye, 32,000 bushels; of oats, 1,944,000; of barley, 355,000; of potatoes, 275,000; and of hay, 180,500 tons. The total value alone of the crops enumerated was $7,166,200; but during the years 1873 and 1874 agriculture suffered greatly from droughts and the visitation of grasshoppers or locusts. In 1874 N. had 87,449 horses, 7615 mules, 229,469 cattle (return incomplete), 30,329 sheep, and 233,652 swine—total value, $7,708,044. Lincoln (pop. 1870, 2441) is the capital; the largest cities are Omaha and N. city. In 1876

there were throughout the state 1150 miles of railway. N., a part of Louisiana territory ceded to the United States by France in 1803, was admitted to the Union in 1867, and placed under a new constitution in 1876.

Nebuchadnez'zar (in the cuneiform inscriptions, *Nabukuduri-utsur*, 'Nebo is the protector against misfortune'), the greatest of the Babylonian monarchs, was born about 644 B.C., and succeeded his father, Nabopolassar, in 604. Having already defeated Pharaoh-Necho, king of Egypt, at Circerium (606), he now turned his arms against Palestine and Syria. He sacked Jerusalem and destroyed the Temple of Solomon (586), sending the greater part of the Jewish nation into captivity at Babylon, and captured Tyre (585), after besieging it for thirteen years. Strabo tells us that he even extended his conquests as far as Spain, by way of Libya. From the cuneiform inscriptions we learn how he beautified his capital and founded the cities of Cutha, Chilmad, and Teredon, and the book of Daniel relates his four years' fit of lycanthropy, and his erection of an image of Merodach in the plain of Dura. M. died in 561, and was succeeded by his son, Evil-Merodach. See Rawlinson's *Five Great Monarchies* (4 vols. Lond. 1862-67).

Neb'ulæ (Lat. 'thin cloudy mists') are celestial bodies which are distinguished from planets and stars by their generally hazy cloud-like appearance. Of the comparatively few visible to the naked eye, the most important are the great nebula in Orion and the Magellanic clouds of the southern hemisphere. The milky way is not a true nebula, but is merely a cluster of stars, easily resolvable by a telescope of moderate power. When Sir W. Herschell applied his forty-foot reflector to the task of sweeping the heavens, many nebula-like bodies were resolved into star-clusters, but many were still irresolvable. Some of these the giant telescope of Lord Rosse has since resolved; but the discovery of many more of these objects proved the inability of the telescope to decide whether all N. were star-clusters, or whether there existed in the universe diffused masses of gaseous material, the possible basis of a future system like our own. The regular forms which many of the N. assumed, however, argued in favour of the latter hypothesis, that there were bodies which could not be classified with stars, planets, comets, or meteors. Many form distinct spirals, others circular or elliptic rings arranged concentrically; and intermediate forms are recognisable. The most interesting of all are perhaps the so-called planetary N., which, from their sharply-defined disks and frequently nucleated appearance, have been regarded as a stage in the development of a planetary system—such a stage as our solar system is believed to have passed through in some remote epoch. The spectroscope (see SPECTRUM ANALYSIS) has fully borne out this hypothesis, and in the hands of Huggins, Frankland, Lockyer, Secchi, and others, has revealed that there are bodies distinct from star-clusters, to which therefore the name N. is now restricted. Stars give a continuous spectrum crossed more or less by dark absorption lines or bands. N. give no continuous spectrum, or at most a faint one; but they give one or more bright lines, some of which have been identified with the bright lines of known substances. In all one of the lines of nitrogen seems a constant feature; and another line of frequent occurrence has been identified with the violet line of hydrogen. A third line, not identified with any known substance, is also often present, and sometimes a fourth makes its appearance. The reason why *all* the lines of nitrogen and hydrogen do not appear is probably because of the peculiar conditions of temperature and pressure. Experiments upon Geissler tubes filled with various gases show that pressure and temperature are important elements in determining what lines should appear in the spectrum of the glowing gas. Frankland and Lockyer have given it as their opinion that the temperature of N. is generally lower than that of our sun; Secchi and Wullner, however, incline to the contrary opinion. See Schellen's *Spectral Analysis* (1870).

Necessity is a term used to denote the fixed relations of cause and effect which exist between physical and mental phenomena, including (according to the tendency of modern speculation) the human volitions. The primitive conception, however, was that of an ill-understood but tremendous Power [illegible]ich it was in vain for man to struggle. Th[illegible]ngeful Fate or the impersonal Abstraction, of which the Greek tragedians and philosophers have made such ample use. On the one hand the idea of causation is as universal as that of Existence, as nothing can be conceived without express or tacit reference to its effects: on the other hand, the particular causes which are to combine in controlling every moment of the individual life can never be foretold, and therefore to some extent remain mysterious and inevitable. N. was therefore a Faith, involving religious emotions of the most powerful kind: it included Predestinarianism and the other forms of Fatalism. As a metaphysical conception, N. correctly indicated the connection of verbal identity which existed between Cause, defined as the ideal sum of similar effects, and Effect, defined as part of the contents of the idea cause. This is the N. which occurs in syllogistic reasoning on the principle *dictum de omni et nullo*, and in the mathematical sciences, so far as the results flow from the definition and axioms. After Hume's analysis, however, it was seen that whatever may be the case as regards the general ideas, formerly called innate and necessary, mere mental connection does not explain the supposed necessity of invariable sequence in the case of a newly observed effect. Hume denied that there was any *nexus* except the inference, more or less probable, which the mind drew from experience. The Intuitionalist School fell back on the ideas of Cause and Power, and pointed out that these possessed qualities of universality and necessity which admittedly could not be generated by the experience, necessarily limited, even of the whole human race. To this it was replied that the existence of such ideas was easily accounted for by the history of the human mind, which is emotional as well as intellectual, and which, even so far as purely intellectual, does not tend, except under the conscious guidance of science, faithfully to mirror the uniformities of nature. An ethical and theological interest was imparted to the discussion by its extension to the human will, from which the Intuitionalists professed to derive their intelligible idea of power adequate to an effect, but which the Positive or Experience School maintained to be subject to the ordinary laws of causation. See CAUSE, FATALISM, FREE-WILL.

Neck'ar (Lat. *Nicer*), a river in Germany, and one of the chief affluents of the Rhine, rises in the Schwarzwald, on the frontier of Baden and Würtemburg, flows in a northerly direction through a beautiful vine-clad valley, receives from the left the Enz and from the right the Fils, Rems, Kocher, and Jaxt, passes Tubingen, Heilbronn and Heidelberg, and joins the main stream at Mannheim after a sinuous course of 240 miles, only half of which is navigable.

Neck'er, Jacques, a great French statesman, was born at Geneva, 30th September 1732. His family is said to have been an English Protestant one driven from Ireland by the Marian persecution. N. had a long commercial career in the Parisian banking houses of Vernet and Thellusson. He enjoyed the confidence of the Minister De Choiseul, to whom his firm rendered important financial services, and defended the privileges of the *Compagnie des Indes* against the criticisms of the Abbé Morellet. Retiring from business, N. began to bid for the post of Comptroller-General, to which, however, Turgot was appointed. By an ill-written *Éloge* upon Colbert he obtained a prize from the French Academy; and in *Essai sur la Législation et le Commerce de Grains* (1775) he opposed the abolition of all restrictions which Turgot had laid down as his programme. The State, he said, was bound to regulate the trade, and to protect poor consumers against the landed proprietors. Turgot was dismissed after the bread riots, and N., though an alien and a Protestant, succeeded the imbecile Clugny as Director-General of Finances. With war expenses and an annual deficit of more than 30 million livres, he began by borrowing nearly 500 millions, and addressed himself honestly to the task of reforming a corrupt administration and an inequitable basis of taxation. He suppressed many ridiculous offices, urged strongly the formation of provincial assemblies to deal with the feudal imposts, obtained an advance of 15 millions of rent from the tax-farmers, and in 1780 published his *Compte Rendu*, which showed a surplus of 10 millions by omitting all extraordinary expenses. This publication offended the Court very much, and N., on being refused by Maurepas a seat in the Council of State, resigned and retired to St. Ouen, where he wrote his *Essai sur l'Administration des Finances*, a work of great popularity and much historical value. The blunders of Calonne and Brienne

recalled him in 1788 to the Director-Generalship, with a seat in the Council. He found the Exchequer empty, the Government without credit, and a famine in the land. His appearance sent up the Funds 30 per cent. in a single day, and he lent France two million livres of his own money. N., however, had no wide political views, although he had studied the British Constitution. He opposed the demand of the States General for a double representation of the *tiers état*, and convoked the notables. When the struggle began between the throne and the people he was unceremoniously dismissed, but was recalled by acclamation after the taking of the Bastille. His political indecision now gave the lead entirely to Mirabeau, and he unwillingly saw the property of the clergy confiscated, and the issue of assignats. N. withdrew to Coppet, near Geneva, in September 1790. Here he wrote on his own administration and on the Constitutions adopted in '91 and '95, he also published a work *De l'Importance des Opinions Religieuses*. He died 9th April 1804. N. was skilful in monetary matters, and a man of high principle and good heart, but no statesman. His life was written by his daughter, Mme. de Stael (q. v.), and his *Œuvres Complètes* were published in 17 vols. (Par. 1822).

Neck'lace, a jointed or flexible ornament encircling the neck. It was worn by both sexes among the nations of antiquity, but its use is now confined exclusively to females of all races. It was regarded peculiarly as a bridal ornament by Grecian and Roman females. Very diverse materials have been, and still are, employed for making necklaces. Degraded tribes string together seeds, fruits, or shells, while coral, pearls, and beads of ivory, glass, porcelain, amber, and jet furnish materials for necklaces among civilised nations. Valuable neck ornaments are likewise made of precious metals and gems. For beauty and variety of form the granulated gold necklaces of the Etruscans have never been surpassed. See DIAMOND NECKLACE.

Neck-Mould or **Moulding**, in Architecture, a small convex moulding at the junction of the shaft and capital of a column.

Nec'romancy (from Gr. *nekros*, 'dead,' and *manteia*, 'prophecy') is a method of divination by conjuring up the dead. Its origin belongs to the most remote times. The story of the Witch of Endor (see 1 Sam. xxviii. 7–25), the *Necromanteia* of Homer's *Odyssey* (bk. x.); and bk. vi. of the *Æneid* of Virgil may be consulted on the subject of N. N. is one of the fast-disappearing superstitions of the past. In ancient Greece, especially in Thessaly, Phocis, &c., it was a profession. In Roman times it was interdicted by Constantine, and subsequently placed under the ban of the Church. See DIVINATION, SPIRITUALISM, and the special articles on cognate subjects.

Necrop'olis (Gr. *nekros*, 'dead,' and *polis*, 'city'), a name originally applied to the western suburb of Alexandria, in which the Catacombs (q. v.) were situated, and hence extended to the burial-places of the ancients generally, as the N. of Thebes, of Memphis, and Abydos. In modern usage the term is synonymous with Cemetery (q. v.), *e.g.*, the N. of Glasgow and of Woking.

Necro'sis (from Gr. *nekros*, 'dead') is the term applied to the total death of a portion of bone. N. is generally caused by inflammation, or by loss of blood supply. The dead bone, if not exposed to the air and bathed in the products of putrefaction, becomes white; if cut into, it does not bleed; it is denuded of its periosteum; and its surface is smooth, hard, and ringing when struck. The inflammation, which extends to the neighbouring bone, leads to condensation and periosteal deposits, both on the surface of the living bone, and especially over the dead bone, so that the latter is covered over or *invaginated* by a sheath of periosteal bone. N. is distinguished from *Caries* (q. v.), or the ulceration of bone, and its disintegration in molecules, the latter being the stage which succeeds the softening stage of ostitis when the inflammatory process proceeds towards disintegration instead of being arrested and repaired. N. is similar to the process of *gangrene* in the soft parts, and *caries* to that of *ulceration*. The treatment of N. is, as a general rule, to wait until the bone is loose, and then to remove it. The mode of removal depends upon the nature of the part affected and the extent of the disease.

Nec'tar (prob. from *ne* 'not,' and *kteinō*, 'I kill') was among the Greeks held to be the drink of the gods, as ambrosia was their food. Homer describes it as red in colour, and says it was poured out like wine, and mixed with water for use. N. was withheld from men, being an elixir of immortal life. Later it acquired the notion of fragrance, and the adjective *nectareos* ('nectarous') is frequently used for 'sweet-smelling.'

Nec'tarine, a smooth-skinned variety of the Peach (q. v.).

Nec'tary, in Botany, is a term applied to any part of a flower, which is specially formed for the secretion of honey or saccharine fluid. Instances of nectaries are afforded by the shallow pits at the base of the perianth-leaves of the crown-imperial, the hollows concealed at the base of the petals of ranunculus, the glands between the stamens of the grape-vine, the spur of the columbine and of many species of orchis, the appendages to the two stamens of viola, &c. The N. is of great importance in the economy of nature, as the secreted honey naturally attracts insects, and they, visiting flower after flower, convey the pollen of one to the stigma of another, thus effecting fertilisation. In structural design necessary to accomplish this cross fertilisation, the special flower and its special insect visitor are adapted to each other. By Linnæus the word N. was used to imply almost any abnormal structure in a flower, irrespective of its being a honey-gland.

Needle-Gun. See BREECH-LOADING ARMS.

Needles are instruments used for sewing together textile fabrics, leather, skins, furs, and other materials, the nature of which permits of separate pieces being sewed together with thread. The needle, in one form or another, is of the highest antiquity, as is obvious from the fact that remains of sewed garments and a rude kind of bodkin or needle of bone are found among the pre-historic remains of various countries. To the present day the Esquimaux use N. of bone for sewing together the skins which form the garments they use. Although N. generally consist of straight pieces of steel wire, having a hole or 'eye' through one extremity, and brought to a fine sharp point at the other, yet for various purposes the form of the needle is much modified. Thus the essential feature of the needle of any sewing machine consists in the eye being brought as near as practicable to the point, and therein indeed lies the peculiarity on which the invention of the sewing machine depended. The N. of many sewing machines are curved, and for surgical purposes, packing, and upholstery use, curved N. are also employed. In some 'overhead' sewing machines now in use spiral N. are employed.

The needle manufacture, combined with the allied industry of fish-hook making is, in Great Britain, almost exclusively confined to the town of Redditch, and, as conducted at the present day, it is a pursuit in which remarkable manual dexterity is combined with very perfect instruments and appliances. As will be obvious from the following brief outline of processes, the simplest needle passes through many hands and stages before the piece of drawn steel wire of which it is fabricated is turned out ready for use. Steel of the finest quality, drawn into wire of suitable gauge for the various sizes of N. is the raw material, and it is first cut into lengths suitable for two N. To straighten these lengths several thousands are packed within two iron rings, which run in grooves on a flat iron table. By running the bundle back and forward several times under friction applied between the rings, the whole of the wires quickly adjust themselves in a perfectly parallel position. Both extremities are next ground to a point on small grindstones, the workmen dexterously holding a number parallel at one operation against the stone, moving them round so as to have the points uniform by a motion of the thumb. With these lengths of wire so sharpened at both ends, the next operation consists in piercing the eyes. By means of the stroke of a falling die a bulge is produced in the centre of the wire, at each side of which there is at the same time formed a small groove. The bulge is the dividing line of the two needles, and the grooves are the depressions in which the eyes are next formed. The piercing of the eyes is done by means of a hand screw-press, in the descending arm of which there are two steel points or cutters of the exact size of the eye to be made. The prepared wire being placed in position, the arm is brought down, and steel points penetrate the wire at the upper extremity of each groove. Through these pierced eyes a fine wire is next run, and a considerable number of the double needles are thus spitted or strung together. With a file the burr or bulge at the centre is next smoothed off, and the wires being now weakened at the centre, they are at this stage broken

across, thus leaving two rows of rough needles strung on wire. The points of one row are now firmly grasped in a hand-vice, and the heads are rounded and smoothed by filing, after which the wire is withdrawn. They are now ready for hardening and tempering by the ordinary processes, and then they are scoured or cleaned by making up bundles of 50,000 or more, on which a mixture of emery, soft-soap, and oil is sprinkled, the whole being lightly tied up in a canvas cover. The bundles are submitted to long-continued friction by rolling back and forward under heavy rollers in a scouring machine. This process is repeated several times, and on its completion the N. are washed with soap and water, and dried by working in a revolving box among bran. At this point the N. are gone over and arranged so that their points lie in one direction, the broken and defective specimens are picked out, and they are next 'handed' or sorted into lengths. The eyes are next 'blued' or softened for drilling, and drilled or worked on a small drill into a smooth rounded form, and finally they are polished on emery wheels—the polishing being done on three successive wheels fed with emery powder of increasing degrees of fineness. The N. are now practically complete, and only the papering and mounting of them remains to be done. In the grinding process the same unhealthy conditions prevail which are found in cutlery grinding; but by the adoption of the suction fan over the grindstones the evil can to a large extent be obviated.

Neem Tree. See MELIACEÆ.

Neemuch (*Nímach*), an important British military station in Central India, within the territory of Scindiah, the Mahratta Rajah of Gwalior, 1476 feet above the sea, 155 miles N.W. of Mhow and 371 S.W. of Delhi. It was acquired from Scindiah in accordance with the treaty of 1817. The cantonments are large and healthy.

Neer'winden, a village in Belgium, province of Liége, where the French under Marshal Luxembourg defeated an English, Dutch, and Austrian army, 29th July 1693, and Dumouriez was worsted by the Austrians and Prussians, 18th March 1793. Pop. (1873) 423.

Negapatam', a town in the district of Tanjore, Madras, British India, on a mouth of the river Cauvery, 160 miles S. of Madras. Pop. (1871) 48,525. Many of the inhabitants are descended from the early Dutch and Portuguese settlers. The town is well laid out and airy. It is now the terminus of a branch of the S. Indian Railway. There are manufactures of cotton, silk, and oil, and some ship-building. There is also a large traffic in rice, &c., chiefly with Ceylon. In 1874–75, the value of the exports was £485,371; of the imports, £320,138.

Neg'ative, in Photography, signifies a picture that exhibits, by transmitted light, the lights and shadows of the model reversed, the natural *whites* appearing as *blacks* and *vice versa*. The method of taking a collodion N. on glass is as follows: The plate, perfectly clean, is coated with iodised collodion, and then immersed in the sensitising nitrate of silver bath. After exposure in the camera, the plate is treated with the developing protosulphate of iron solution, which renders the lights and shadows in reverse arrangement to nature. The picture is washed with water, and if it be feeble it is submitted to the intensifying action of the citropyrogallic acid solution with a few drops of nitrate of silver added. On rewashing, the picture is fixed by removing the unaltered iodide of silver by means of a solution of hyposulphite of soda or cyanide of potassium. All traces of the fixing agent are removed with water, and the picture is then dried and varnished. For the manner of obtaining from this N. positive proofs on paper, with the lights and shadows as in nature, see POSITIVE PRINTING.

Negative Quantities, in Algebra, may be defined as quantities which when added to equal and *positive* quantities give zero as result. Thus $-a$ is a negative quantity, and is such that

$$-a + a = 0$$

A negative quantity is therefore zero diminished by an equal positive quantity; and hence N. Q. are of necessity less than zero. If we consider a as a *directed* quantity or vector, then the expression $-a$ represents a line equal to $+a$ in length, but directly opposite in direction. Hence if the transit from O to A is represented by $+a$, the transit from A to O will be represented by $-a$; and since O A + A O evidently result in no displacement, the equation $+a - a = 0$ holds good with this extension of signification. This was the step partly taken by Descartes in his analytical geometry, and completed by Hamilton in his Quaternions (q. v.). In algebra we have $-a \times -a = +a^2$, so that $\sqrt{a^2} = +a$ or $-a$. What then is the signification of $\sqrt{-a^2}$ or $a\sqrt{-1}$? This question has been fully answered by Hamilton, who discovered in $\sqrt{-1}$ a unit-vector or directed line in space whose length is the arbitrary unit. See VECTOR.

Neg'ligence, in Law. Every man is legally bound to take care that he does not injure his neighbour. Therefore when a man receives an injury to his person or property by the fault of another—whether the fault be of omission or of commission, whether wilful or by N.—the law will give damage for the injury sustained.

Negotia'tion is the procedure which the holder of a Bill of Exchange (q. v. under BILL) must follow to procure acceptance of it and payment when it falls due. See also ACCEPTANCE, DISHONOUR.

Negrais, a small island which gives its name to a headland in British Burmah, bounding the most W. mouth of the Irrawaddy, in the district of Bassein. A British settlement was established here as early as 1687. After having been more than once abandoned and reoccupied, it was attacked by the Burmese in 1759, when all the Europeans were killed. It is said to afford a very safe harbour, and there is a fine lighthouse on the adjacent reef of Alguada.

Ne'groes (Span. *negro*, 'black;' Lat. *niger*), the ideal type of the negroid division of mankind (see ETHNOLOGY), occupy the Sudan, Upper and Lower Guinea, Senegambia, and the eastern portion of tropical Africa. Spread over so vast a district, and broken up into countless tribes, they exhibit many varieties of colour and physique, while sharing the characteristics of dark eyes and complexion, black woolly hair, a broad flat nose, coarse lips, and a dolichocephalic, prognathous skull. According to American ethnologists, the standard negro skeleton is heavier, and the skull 5 oz. lighter, than that of the white. With the Australioid races, the negro stands on the lowest step of natural development. Their powers of keen observation bear fruit in ape-like imitation, their sociability vents itself in excessive talkativeness, a quick susceptibility to sorrow, followed by as speedy forgetfulness; their religious instincts are purely emotional, and their dexterity and good-humour are counterbalanced by greediness, vanity, and vindictiveness. The chief negro races are the Mandingoes (q. v.), Fellata (q. v.), and the natives of Ashanti (q. v.), Congo (q. v.), Dahomey (q. v.), Angola (q. v.), and Sierra Leone (q. v.). See SLAVERY; and Waitz, *Die Negervölker und ihre Verwandten* (Leips. 1860); Oberländer, *West Africa* (Leips. 1874); De Compiegne, *L'Afrique Équatoriale* (Par. 1875); R. Hartmann, *Die Nigritier* (1 vol. Berl. 1876); and the works of Livingstone, Barth, Rohlf, Schweinfürth, &c.

Ne'gro Min'strelsy, a kind of music—simple words set to simple airs—which originated with the slaves of the Southern States of America. The troupe of 'Christy's Minstrels,' formed by E. P. Christy at Buffalo in 1842 to popularise N. M., has produced a host of bones and banjo imitators both in America and in England; the most famous in this country being the 'Moore & Burgess Minstrels' of St. James' Hall, London. Such minstrels are seldom coloured men, although the farce of blackening the face is kept up, and their performances are for the most part only amusing and broad caricatures. The 'Jubilee Singers,' a troupe of male and female freedmen, who have sung their crude but joyful hymns in this country several times since the abolition of slavery, are much truer exponents of a form of N. M.

Ne'gropont. See EUBŒA.

Negun'do, a Japanese and N. American genus of *Acerates*, differing from the Maples (q. v.) by having pinnate leaves. *N. fraxinifolium*—the so-called ash-leaved maple—a native of the United States, attains a height of about 50 feet, and is rich in saccharine sap. In California it is used extensively as a shade tree.

Ne'gus, a drink named after its originator, Colonel Negus, and made by diluting port or sherry wine with twice its bulk of

hot water, sweetening with lump sugar, and flavouring with lemon and grated nutmeg.

Nehemi'ah (Heb. 'comforted of Jehovah'), the Jewish patriot, was the son of Hachaliah (N. i. 1), and during the Babylonian exile was raised to the post of cup-bearer (i. 2) to Artaxerxes (Longimanus, B.C. 465–424). Owing to intelligence he received regarding the distressed condition of his brethren at Jerusalem he proceeded thither with authority from the king (B.C. 445; N. ii. 1), and in spite of the opposition of the Persian officials and those around them, succeeded in getting the walls completed; and then ruled as Persian governor in Judah for twelve years, till the thirty-second year of Artaxerxes (ii. 1–vii. 3, *cf.* v. 14). At this time he paid a visit to Babylon (xiii. 6), but soon returned to Jerusalem, and set himself to reform certain abuses among the people, as withholding the dues of the Levites, profaning the Sabbath, and marrying foreign wives. The Book of N. is so intimately connected with that of Ezra that the Jews comprehended both under the name of the Book of Ezra, or the First and Second Book of Ezra (LXX). The two comprise the history of the Jews from the first year of Cyrus (B.C. 536) to the thirty-second of Artaxerxes, a period of 100 years. The Book of N. is divided into three sections: i.–vii., viii.–x., and xi.–xiii. In the first and last, which are similar in style, N. speaks in the first person, as the author; in the middle section, which besides is different from the other two in its whole style, he is spoken of in the third person. Accordingly it has been thought that the third section originally followed the first, and that the middle one was inserted by a later hand. Chapter vii., too, as he says himself (*cf.* v. 5), was not written by N., and one or two passages in the third section, *e.g.*, xii. 1–26, 47, are thought also to have been altered or inserted, probably by the writer of the middle section.

Neil'gherry Hills (*Nilgiri* = 'blue mountain'), a range, or rather mass of hills in a triangular form, in S. India. They form a sort of junction between the E. and W. Ghauts, their greatest length (40 miles) being from S.W. to N.E. The highest peak is Doddabetta, near Ootacamund, 8760 feet above sea level. Their rocks are of primary formation, granite, quartz, gneiss, &c., broken through by dykes of basalt. There is little forest, the most conspicuous tree being the rhododendron. The temperature is very equable; the thermometer rarely rising above 76° in the hottest months (April and May), and rarely sinking to the freezing point in December and January. The tract of the N. H. was acquired by the British in 1803. The first European built his house at Ootacamund in 1820. There is now a branch of the Madras Railway to Metapollium, close to that town. The hills are sought not only for their salubrious climate, but also for the valuable products which British enterprise has introduced. Coffee is annually exported from the neighbourhood to the amount of £600,000, and there is a little tea cultivation. Cinchona was introduced in 1862 at the instigation of Mr. C. Markham. Apart from private gardens, there are now 1000 acres planted with more than 2,000,000 cinchona trees, the property of Government. The experiment has proved a success, and Indian fevers are now cured with cheap Indian quinine. In all there were, in 1874–75, 13,000 acres under coffee, 3000 under cinchona, and 2000 under tea. Potatoes, garlic, and onions are also grown for export. There is a botanical garden at Ootacamund, and the Forest Department yields a revenue of £7000.—The *district* of the Neilgherries, which is co-extensive with the hills, has an area of 749 sq. miles; pop. (1871) 49,501, of whom 1339 are Europeans and 796 Eurasians. Among the aboriginal tribes are the Todas (q. v.). The chief town is Ootacamund (q. v.), and there is a military depôt at Wellington for the accommodation of 1300 men. See *Primitive Tribes of the Nilagiris*, by J. W. Breeks (Lond. India Museum, 1873, abundantly illustrated by photographs).

Neilgherry Nettle is a name given to one or more species of *Girardinia*, natives of India. The genus differs from the nettles proper by having alternate instead of opposite leaves. The long, white, sharp, stinging hairs cover the whole plant, and their sting is very painful. From the fibre of the stem of *G. heterophylla* a sort of cordage and cloth is manufactured in Sikkim, and from *G. Leschenaultiana* a fine silk-like fibre that can be spun into a beautiful soft thread is procured. The process of separation is by boiling or by maceration.

Neill, James George, General, one of the heroes of the Indian Mutiny, was the son of a Scottish gentleman of good family, and was born in 1810 in the neighbourhood of Ayr. Before he was seventeen he joined the 1st Madras European regiment, now H.M. 102d Fusileers, with which regiment his name is ever associated, and of which he wrote an *Historical Record*. He served through the second Burmese War of 1853, and in 1855–56 was appointed second in command of the Anglo-Turkish Contingent. In April 1857 he returned to Madras as Colonel of his old regiment, and next month was summoned to Calcutta by the news of the Mutiny. His were the first troops to proceed up country, and his resolute treatment of the railway officials at Howrah has become a household story. He arrived in time to save Benares and Allahabad, and followed Havelock into Cawnpore, where it became his duty to inflict condign punishment for the massacre. He was killed while leading his brigade in the street-fighting of the first relief of Lucknow on 25th September 1857. A statue has been erected to his memory in the town of Ayr. See *Lives of Indian Officers*, vol. ii. by Sir J. W. Kaye (Lond. 1867).

Neiss'e, a fortified town of Prussia, province of Silesia, situated in a marshy district, at the confluence of the Glatzer, N., and Biela, 30 miles S.W. of Oppeln by rail. It has large military establishments, barracks, magazines, &c., important manufactures of arms, chemicals, tobacco, linens, and woollens, and extensive breweries and distilleries. Pop. (1875) 19,811, including 4075 soldiers.

Nej'ed, or **Nejd,** the central tableland of Arabia, is surrounded on three sides by the great sand-desert of Dhana, and is mainly occupied by the Jebel Tuweik range, which, nowhere exceeding 5000 feet of elevation, is intersected by a perfect network of fertile valleys and watercourses, dry, except in the rainy season. The heights are covered for a great part of the year with rich grass. The Wahabis (q. v.) form the bulk of the population. Their capital, Riad, is estimated by Palgrave to have 40,000 inhabitants, who live by agriculture and horse-rearing. See Palgrave's *Narrative of a Journey through Central Arabia* (Lond. 1865); and Pelly, *A Visit to the Wahabee Capital*, in the *Journal of the Geographical Society* (1866).

Nejin or **Njeahin,** a town in the government of Tchernigov, Russia, on the Oster, a branch of the Dnieper, 80 miles N.E. of Kief by rail. It has a cathedral, nineteen other churches, a lyceum, several large factories, and an important trade in tobacco of a fine quality. Pop. (1870) 21,590, of whom many are Greeks.

Nellore', the chief town of the district of the same name in the Madras Presidency, British India, on the right bank of the Pennair river, 8 miles from the sea, and 107 miles N. of Madras. Pop. (1871) 29,922. The site is high, and the streets are irregularly built; the walls, once formidable, are now in ruins. Interesting remains have been discovered, and Roman gold coins of Trajan, &c., were dug up in 1787. The Pennair is here crossed by an *anicut* or weir for irrigation.—The *district* of N., which lies between the E. Ghauts and the Bay of Bengal, has an area of 8462 sq. miles, and a pop. (1871) of 1,376,811. The crops are rice, millets, ragee, gram, and indigo. The breed of cattle is good, having been much improved by an annual exhibition held at Addanki, in the N. of the district. The manufactures are indigo, cotton cloth, and fine muslin. The Government monopoly of salt annually produces about £120,000. There is a small coasting trade, and a navigable canal southwards to Madras.

Nel'son. 1. A district and formerly a province of New Zealand. It occupies the N.W. portion of the Middle Island, and has an area of 10,270 sq. miles. It is for the most part rugged and mountainous, and derives its chief importance from its mineral wealth, which exceeds that of any other district of the colony, though at present it is very imperfectly developed. The first discovery of gold in New Zealand was made in N. in 1856, since which date large quantities of that metal have been obtained, principally in the basin of the Buller (q. v.) river. Good coal is found in great abundance, and valuable deposits of hæmatite are beginning to be worked. Silver, copper, manganese, and chrome are also obtained. The principal towns are N., Greymouth, Westport, and Collingwood. The population of the district at the census of 1874 was 22,566, and at the end of 1877 was probably 28,000.—2. An episcopal city, the capital of the above

district, charmingly situated on the eastern shore of the great inlet known as Blind Bay. It enjoys a delightful climate, but has a limited trade, though there are manufactures of cloth and leather. Pop. (1874) of the municipality, 5660; with the suburbs, 10,000.

Nel'son, Hora'tio, a kinsman on the mother's side of Horatio Walpole, was born at Burnham-Thorpe, a Norfolk village, of which his father was rector, September 29, 1758. After some years' schooling at Norwich and North Walsham, he went to sea with his maternal uncle, Captain Suckling (1771), acquired a passing dislike to the navy on board a West Indiaman (1772), and was the only boy who served in the Polar expedition of Commodore Phipps (1773). He was next rated midshipman in the *Seahorse* on the East Indian station, was invalided home (1776), and having passed his lieutenant's examination (1777), rose to be first lieutenant of the *Bristol*, commander of the *Badger* (1778), and post-captain of the *Hitchinbrook* (1779). In 1780 he distinguished himself in an expedition up the San Juan, and, one of 380 survivors out of 1800 men, returned home crippled by dysentery. From 1781 to 1783 he commanded the *Albemarle*, and from her was appointed to the *Boreas*, on the Leeward Islands station, where by his enforcement of the Navigation Act and seizure of four American traders he nearly exposed himself to an action for £40,000 damages, and where he married a Mrs. Nisbet, March 11, 1787. Paid off in the autumn, N. lived at his father's parsonage till, on the eve of the Revolutionary War, he was commissioned to the *Agamemnon* (1793), and sailed under Lord Hood for the Mediterranean. Here at Naples he first met Sir William and Lady Hamilton, captured Bastia with 1200 against 4000 men (1795), lost an eye at the siege of Calvi, and in Hotham's action with the Toulon fleet (1795) took the *Ça Ira*. He hoisted the commodore's pennant in 1796, and at the battle of Cape St. Vincent (February 14, 1797), in defiance of Jervis' orders, brought his ship the *Captain* into action with seven Spanish first-rates, boarding the *San Nicolas* of 80 and the *San Josef* of 112 guns to the cry of 'Westminster Abbey or victory!' Already promoted rear-admiral, N. received the Order of the Bath and the freedom of the city of Norwich; and now shifting his flag to the *Theseus*, commanded the inner squadron at the blockade of Cadiz, where, to use his own naïve words, his 'personal courage was more conspicuous than at any other part of his life.' His next achievement—a gallant though unsuccessful attack on Santa Cruz (July 24)—cost him his right arm, but won for him a pension of £1000 and the freedom of the cities of London and Bristol. Up to this date N. had been in engagement with the enemy upwards of 120 times. On April 30, 1798, he was despatched to watch the Toulon expedition, which he came up with in Aboukir Bay. The Battle of the Nile (August 12), in which thirteen English vessels of 1012 guns engaged seventeen French of 1190, resulted in the annihilation of the latter—the French loss being 5225 killed and 3105 prisoners against an English loss of 895 killed and wounded. For this 'conquest' N., who was himself severely wounded in the head, was created Baron N. of the Nile and of Burnham-Thorpe, and received a pension of £2000, a grant of £10,000 from the East India Company, and numerous foreign decorations. At Naples, where he now remained stationed for nearly two years, he was welcomed as the saviour of Italy and raised to the dukedom of Bronte; and here it was that in 1799, under the influence of his unhappy attachment for Lady Hamilton, he committed the one act that sullies his public reputation—the judicial murder of Prince Francesco Caracciolli, an old man of seventy, whose offences, if any, were solely against the Neapolitan government. N. returned with the Hamiltons through Germany to England (1800), and on January 13, 1801, he separated from Lady N., his 'adopted' daughter Horatia being born in February. As second in command to Sir Hyde Parker, he sailed for the Baltic (March 12), and in the Battle of Copenhagen (April 2), turning his blind eye to Sir Hyde's signal of recall, and with his own flag of battle nailed to the mast, destroyed the Danish fleet of seventeen vessels, mounting 632 guns, and flanked by two batteries. The English loss was 953 killed; that of the Danes, in killed and wounded, 6000. Created a viscount, N. failed in an attack on the Boulogne flotilla (August 4), after the Peace of Amiens spent a year with the Hamiltons at Merton in Surrey, and was present at the death of Sir William, April 6, 1803. On the renewal of the war he was appointed to the command of the Mediterranean fleet, and only quitted his ship the *Victory* for three hours from May 1803 to August 1805—a period spent in the blockade of the French fleet in Toulon and in chasing it to the West Indies and back. On October 21, 1805, he at last fell in with the united fleets of France and Spain off Cape Trafalgar. The enemy's force was forty vessels of 2964 guns, the English thirty-one of 2322 guns. At 11.40 A.M. N. hoisted the signal, 'England expects every man to do his duty;' at 1.15 he was struck by a bullet from the mizen-top of the *Redoubtable;* and at 4.30—when the victory was already decided, twenty of the enemy's vessels having struck—he died, with his last breath commending Lady Hamilton and his child to the nation. He was buried January 9, 1806, in the crypt of St. Paul's, where Northesk and Collingwood, his Trafalgar captains, and the Duke of Wellington were afterwards laid. His brother was made an earl, with a pension of £6000; £10,000 was voted to each of his sisters; and £100,000 for the purchase of an estate. Lady Emma Hamilton, who, born in Cheshire in 1761, had been successively a servant, a courtesan, a model to the painter Romney, and since 1791 the wife of Sir William Hamilton (q. v.), died in extreme poverty at Calais, January 15, 1815. Puny and sickly in body, suffering from sea-sickness to the last, and troubled by a settled melancholy, N. had yet throughout been animated by the conviction that he would some day have a gazette of his own. He 'hated a Frenchman,' but he was ever merciful to the conquered, and his grandest monument is the concurrent admiration expressed for him by the historians of the nations he subdued. His own men, the very mutineers of the Nore, worshipped him for his chivalry and kindness; enemies he had none, at least of his own making; and jealousy he could only feel for another, never towards him. He was 'a sinner, but not a great one,' and could honestly thank God that he had done his duty. See the Lives of N. by Clarke (1809), Churchill (1813), Southey (1814), Tucker (1847), Pettigrew (1849), and Allen (1853); in French by De Forgues (1860), and Lamartine (1863). Sir Harris Nicolas edited N.'s *Despatches and Letters* (7 vols. Lond. 1844).

Nelum'bo, or **Nelum'bium**, a genus of aquatics, forming a sub-order of *Nymphæaceæ*. From a fleshy root-stock stems arise, bearing large pellate leaves that float upon or rise above the surface of the water, and flower-stalks of equal height ascend, bearing solitary flowers remarkable for their size and beauty. The receptacle ('fruit') is shaped like a funnel, in the upper surface of which the numerous ovaries ('seeds') are placed each in a socket. *N. speciosum*—the Pythagorean bean—has a wide distribution in Asia, occurring also in Egypt and in Australia. The starchy root-stock and the seed are both used as articles of food. The latter is in size and shape like an acorn, with a delicate almond-like flavour. The plant is held sacred by the Hindus, who prepare a wick from the spiral vessels of the leaf-stalks to burn in their pagodas. In China, Japan, and Thibet it is also used in religious ceremonies, and it was worshipped by the ancient Egyptians. The large rosy or white flowers are very fragrant, and the leaves being covered with a felt of microscopic hairs, have the property of repelling water, which runs off them like quicksilver. *N. luteum*, a native of Jamaica and N. America, is a handsome plant with leaves one or two feet in diameter, and yellow flowers that measure about a foot across. The capsular fruit contains from 20 to 40 seeds, having a pleasant taste. The fleshy root-stock tastes like the sweet potato.

Nematel'mia (from the Gr. *nēma*, a 'thread,' and *helmis*, a 'worm'), a group of animals including many parasitic forms, but also some beings which are of non-parasitic habits. It is included in the class *Scolecida* (q. v.), to which the tape-worms, flukes, and other true parasites belong. The body is rounded—the term N. being used in contradistinction to the word *Platyhelmia*, which designates the tape-worms, and other flat-bodied organisms. In many N. the skin shows traces of segmentation, such as is seen in the true worms, but their internal structure is wholly different. Most N. are *diœcious*, that is, have the sexes in different individuals. The nervous system appears to consist of an anterior nerve-mass or masses, from which nerves are distributed to the posterior and lateral portions of the body. The N. have the system of vessels known as the *water-vascular* system. Three orders of N. are reckoned:—(1) The *Acanthocephala* or 'thorn-headed worms,' which live as parasites in the digestive systems of birds and fishes; (2) the *Nematoidea*,

which include the most typical N.; (3) the *Gordiacea* or 'hair-worms' (*Gordius*, &c.) which are found as parasites within the bodies of insects.

Nemat'ocyst, a term frequently applied to the *Cnidæ* or thread-cells found in the tissues chiefly of *Cœlenterate* (q. v.) animals. Each N. consists of a sac filled with fluid, and having coiled up in its interior a thread or spiral filament. On being irritated in any way, the sac ruptures, the 'thread' is everted, and the fluid at the same time escapes. If the thread and fluid be brought into contact with the tissues of some animals, a sharp, stinging sensation is produced. By means of the N., Cœlenterate animals kill or paralyse their prey, while some (*e.g.*, Jelly-fishes, &c.) are able to inflict severe injury even on man himself.

Nemat'oda, a division of *Nematelmia* (q. v.) including the round and thread-worms (*Ascaris* and *Oxyuris*), which infest the human alimentary canal, the vinegar eels (*Anguilla*), the *Trichina* (q. v.), the Guinea Worm (q. v.), and other parasitic forms. The N. have long cylindrical bodies, and a distinct mouth and digestive system, while the *anus* or vent is found at the posterior extremity of the body. The system of water-vessels (*water-vascular* system) is in many instances contractile, and opens on the exterior of the body by lateral or ventral pores. The sexes are in distinct and separate individuals; and it is a remarkable fact that male N. are, as a rule, but rarely met with, the females, on the contrary, being plentiful. For example, the male Guinea worm has not been discovered—a result probably due to its presumably minute size, or to its existing in some unsuspected form. The N. have no lateral appendages, although sometimes spines or papillæ are found. The skin is provided with a dense, horny layer; and there is a total absence of *cilia* at every period of life. Layers of muscles are seen on investigation of the body-substance, and the nervous system consists of a ring of nerve fibres and cells surrounding the gullet, and distributing filaments throughout the body. The generative aperture in the male N. occurs at the hinder extremity; in the female, at the centre of the body. N. have been divided into (1) *Polymyaria*, or those in which the muscles of the body are divisible into many series of muscle-cells; (2) *Meromyaria*, or those in which eight longitudinal series of muscle-cells exist; and (3) *Holomyaria*, in which the muscles are not divisible into such series.

Nemea, a deep and fertile vale of Argolis, between Cleonæ and Phlius. Here was a splendid temple of Zeus, situated in a sacred grove; and here too, twice in every Olympiad, or generally speaking once in every two years, the Nemean games were celebrated. These games were instituted, according to some, by the Seven against Thebes, to commemorate the death of Opheltes, afterwards called Archemorus. This form of the legend is well known to readers of Greek poetry (see Pindar, Nem. iii. 114, &c., and Strabo, viii. 377). Other legends ascribe the institution of the Nemean games to the Greek Hercules after he had slain the Nemean lion. The games and competitions were such as generally belonged to the Gymnasium (q. v.). The judges in the Nemean games were dressed in black robes. The period of their celebration is uncertain. In addition to the above cited authorities, see Livy xxvii. 30, &c., xxxiv. 41, Polybius x. 26, and Villoison's *Histoire de l'Acad. des Inscrpt. et bell. Lett.* vol. xxxviii. p. 29, *et seq.*

Nemer'tes and **Nemer'tida**, names given in Zoology, the former to a genus of *Scolecida* (q. v.), or forms allied to the Tapeworms, Nematoda (q. v.), &c., the latter to the division in which N. and its companion genera are contained. The Nemertida form a group included with the tapeworms, flukes, and allied organisms in the division *Platyelmia*, or that of the '*flat-bodied*' Scolecida. They are distinguished by having long worm-like bodies, a distinct *anus* or vent, and a perivisceral or body-cavity, by the *water-vascular* system being closed in the adult, and by the sexes, with few exceptions, being distinct. These animals have a system corresponding to the blood system of other animals, in addition to the water-vascular system. The genus *Nemertes* is represented by marine organisms, which exist as worm-like bodies, occasionally attaining a length of from 30 to 40 feet. Their bodies, which are found among the seaweed, &c., on the sea-shore, are susceptible of sudden contraction to a mere fragment of the size above mentioned. The N. and its neighbours pass through peculiar phases of development. The young N. comes from the egg as a helmet-shaped body, which Johannes Müller captured in the towing-net, and to which he gave the name of *Pilidium*. After living an independent existence for a longer or shorter period, this *Pilidium-larva* exhibits a growth of new matter on one side of its alimentary canal. This new growth eventually appears as a worm-like body, and is, in fact, the future N., which ultimately detaches itself from the larval body.

Nem'esis, daughter of *Nox*, *Erebus*, or *Oceanus*, is a personification of the moral reverence of law, or the natural fear (*metus*) of committing a guilty action as against the bodily fear (*timor*) and the everlasting dread that weighs upon the mind of the sinner (*formido*). In later writers N. is the power of destiny; in Hesiod and Pindar she is a fatal divinity as well. She is, moreover, constantly allied with *Atē* and the *Eumenides*. In a word, N. is a power checking the extravagance of fortune—the avenging Fate—the *Dikē* that sooner or later overtakes the reckless.

Nen'agh (Ir. Gael. *n'Ænach*, 'the place of assembly'), a town in Tipperary county, Ireland, on the Roscrea and Limerick Railway, 28 miles N.E. of Limerick. It has an ancient keep called N. Round, a fine parish church, erected in 1861, a court-house, barracks, &c., and carries on some trade in woollens, tobacco, and candles. Three newspapers are published here. Pop. (1871) 5531.

Nenn'ius, the alleged author of a *Historia Britonum* which possesses some historical value. In its first form this work probably belongs to the close of the 7th or the beginning of the 8th c. The author is unknown, but his compilation soon became very popular, and various additions were made to it from time to time. The first of these additions was the *Genealogia*, a pedigree of the kings of the different English states reaching to the year 738, and thus perhaps indicating the date of its composition. The lives of St. Germanus and St. Patrick are still later insertions. The name N. is first attached to an 'edition' of the work coming down to 858. The three oldest MSS. belong to the 10th c. The Vatican MS. bears the name of Mark the Anchorite, and contains the date 946. The Paris MS. corresponds with it in all essentials, but the British Museum MS. has additions not found in any other, and which could not have been made earlier than 977. The later MSS. are twenty-five in number. Skene reckons six different forms of the work prior to the 12th c. The *Historia* was first published by Ale (1691), whose text was reprinted by Bertram at Copenhagen in 1757. More recently it has been edited by the Rev. Mr. Gunn (1819), and J. Stevenson (1838). See Skene's *Four Ancient Books of Wales* (vol. i. pp. 37–41).

Ne'ophyte (Gr. *lit.* 'one new-planted,' 1. Tim. iii. 6, A.V. 'a novice'), in the early Christian Church, meant one newly converted or one newly baptized, when baptism followed immediately on conversion. Afterwards, when converts were put through a long course of instruction and probation before baptism, N. or novice, like Catechumen (q. v.), was a name given to those thus preparing for baptism.

Neoplat'onism is the name given to a school of philosophy at Alexandria which attempted to reconcile a positive religious faith with the sceptical conclusions of the New Academy. It was founded on Philo's doctrine of the *logos endiathetos* or Divine idea and the *logos prophorikos* or Divine idea realised, which again was really an attempt on Platonic principles to escape from the admitted inconceivability of the Unconditioned or God. The leading names of the first period of N. are Ammonius Saccas, a street porter, and the mystic Plotinus, who lectured at Rome. Origen and Longinus were also disciples. The second period is directed by Porphyry and Iamblichus, who gave logical system to the metaphysical constructions of Plotinus. They come into intellectual conflict with Christianity, especially when the Christian Emperor Constantine was succeeded by the Neoplatonist Julian the Apostate. The third period is identified with the name of Proclus, the most genuinely scientific spirit of them all. It did not survive the reign of Justinian. The Neoplatonists considered the Platonic Dialectic of Universals to give insufficient ground of belief, and therefore introduced the Ecstasy (q. v.) or identification of subject and object in the art of knowledge. By this was elaborated the famous Alexandrian Trinity, in which Unity proceeds to its second and third Hypostases

(q. v.) of Mind (*nous*) and Universal Soul (*psyche*). This Unity (τὸ ἓν ἁπλοῦν) is not numerical, nor is it the Unconditioned *per se;* it is the Ideal Beauty, the Supreme Good, or in Hegelian language, the Immanent Negative, the Absolute Nothing. The system also resembles the *substantia* of Spinoza, with its two attributes of thought and extension. By the doctrine of Emanation (q. v.) the Neoplatonists further preserved their Pantheism and escaped from the various forms of Dualism previously accepted, as in Jupiter organising Chaos; the Demiurgos of Plato, who directs matter and motion; the Immovable Thought of Aristotle, and the personal Creator of the Christian world. The great feature of N. is the combination of an extremely subtle and powerful metaphysic with a mysticism which in some cases became almost ascetic. It was this oriental religious spirit which opposed it to Christianity. Besides the ordinary handbooks of History of Philosophy, see Matter, *Essai Historique sur l'École d'Alexandrie* (2 vols. Par. 1820), Simon, *Histoire de l'Ecole d'Alexandrie* (2 vols. Par. 1843), and St. Hilaire, *De l'École d'Alexandrie* (Par. 1845).

Neozo'ic (Gr. 'new life' formation), in Geology, is a term invented by Edward Forbes to include all the Mesozoic or Secondary and Kainozoic or Tertiary formations. It thus stands in contradistinction to Palæozoic, but though geological evidence renders its adoption plausible, it is rarely used in standard text-books.

Ne'pa. See WATER SCORPION.

Nepaul' (*Naipál*, from its legendary founder Naimuni), an independent state, among the Himalaya mountains in the N. of India, closely connected by treaty with the British power. The inhabited part consists of the valleys of the Gogra, Gunduk, Kosi, and other tributaries of the Ganges, together with the *terai* or marshy strip that everywhere intervenes between the Himalaya and the plain of Hindustan: in the higher tracts the snow often lies for ten months out of the twelve. For fertility, the valley of Khatmandu has been compared with Cashmere. The entire length, from S.E. to N.W., is about 500 miles; the breadth varies from 70 to 100 miles; the area is estimated at about 54,000 sq. miles; the pop. at 2,000,000; the total revenue may amount to £1,000,000; the army consists of 13,932 foot, 117 horse, 420 guns and 2282 artillerymen. The guns, which are borne by men, are mostly smooth-bores; like the muzzle-loading rifles of the infantry, they are made in Nepaul, but some difficulty is found in the manufacture of cartridges. The most formidable weapon is the kookrie or Gurkha knife. The currency consists of silver *mohurs* and various kinds of copper *pice*, which are in common use within British territory. During the four years ending 1876 the state mints are ascertained to have struck coin valued at £200,000; but British rupees are in great demand. The dominant race is the Gurkhali, of a mixed Hindustani origin, who are to be distinguished from the Gurkhas or hill men proper: both of these are Hindus in religion, but there are also many subject tribes who are Buddhists. The name of the present ruler is Surender Bekrum, and his title is Maharaj Dheraj; but for the last thirty years all power has been in the hands of the celebrated Prime Minister, Sir Jung Behaudur (see JUNG) who died in February 1877, and of his brother, who has succeeded him in office. The staple produce is rice, other cereals, and oilseeds; the surplus is exported into the plains, in exchange for Manchester piece-goods and salt. The manufactures are a coarse cotton cloth, and metal wares of all sorts. The chief trade route is through the Behar district of Chumparun. The Bengal registration returns for 1876–77 show a total export from N. valued at £632,000, including cattle (£143,000), food grains (£120,000), oil-seeds (£100,000); the imports were valued at £482,000, chiefly European piece-goods (£141,000), native cotton goods (£38,000), salt (£39,000), brass and copper ware (£21,000). These figures only refer to a portion of the trade. The N. government levies an elaborate system of duties along the frontier, but these are not primarily intended to have a protective effect. The principal towns are Khatmandu, Bhatgaon, Lalita Patun, Jumla, and Gurkha. The history of N. is referred back to a remote and legendary past. The present dynasty, which claims a Rajput descent, first established itself in 1769. For 200 years previous they had ruled in the town of Gurkha, but they then conquered the whole of N. In 1792, they came into collision with the Chinese, but were compelled to submit to an ignominious peace. The first [illegible]he British date from the same period. Aggressions in the direction of Gurhwal led to the Gurkha wars of 1814-15, in which the Nepalese fought bravely and were with difficulty defeated by Sir D. Ochterlony. The peace of Segowlie, ratified in 1816, still governs our relations with N. The Nepalese allowed a British Resident at Khatmandu, acknowledged the British as paramount, and agreed not to employ any Europeans. The Resident, with an escort of 95 natives, is still the only Englishman in the State; but since the accession to power of Sir Jung Behaudur, our relations with N. have been of a most friendly character, and a salute is annually fired on the Queen's birthday. N. also maintains its ancient connection with China, and receives, or did till recently receive, a tribute from Thibet. In 1857 Sir Jung Behaudur led in person 16,000 men to assist the British in stamping out the Mutiny. His services were especially valuable in the final capture of Lucknow and the pacification of Oude. In recompense, a large strip of the Oude *terai* was ceded to N., and the Gurkha soldiers received the Mutiny medal. See Brian Hodson's *Essays* (1874), Burnouf's *Introduction à l'Histoire du Boudhisme* (Par. 1847), and Wright's *History of Nepal* (Camb. 1877).

Nepen'thes is the sole genus of the natural order *Nepenthaceæ*, consisting of about twenty species, mostly natives of the islands of the Indian Archipelago, and all plants of much interest from the curious pitcher-like appendages that terminate their leaves. The one best known in cultivation is *N. distilloria*, commonly called the Pitcher-plant. It belongs to Ceylon. But the finest species yet described is from Borneo, and named after Rajah Brooke *N. Rajah*. In it the excurrent midrib or tendril from the apex of the leaf is twenty inches long, as thick as the finger, and terminates in a pitcher that will contain nearly a quart of water. The fluid secreted by the plant is attractive to insects, the destruction of which it effects by drowning, and it is supposed that the products of their decomposition are beneficial to the plant by absorbing the nitrogenous substances, and digesting the same within its tissues.

Neph'rite (Greek *nephros*, 'kidney,' so called on account of a supposed influence this mineral, in common with other green stones, possessed on diseases of the kidneys), is a species of Jade (q. v.). Chemically, it consists of an anhydrous silicate of lime and magnesia, and it forms a very tough, hard, translucent mineral, with a colour varying from a dark green to an almost milky white. It is very highly esteemed by the Chinese and Japanese for ornamental purposes, by whom it is carved in the most elaborate manner. The supplies of N. in oriental countries are chiefly obtained from Eastern Turkestan, where famous quarries have long been known; but recently it has also been found extensively in Eastern Siberia. The mineral is also found in New Zealand, where it was formerly much used by the Maoris for making charms or household gods, and for war clubs, whence it is known as axestone.

Nephri'tis (Gr. *nephros*, 'kidney'), is the term used to indicate inflammation of the kidneys. Active congestion of the kidneys terminating in N. may be the result of exposure to cold; of the irritation of such medicines as cantharides or turpentine; or of the various febrile and inflammatory diseases. Passive congestion may be caused by interference with the general venous circulation from cardiac or pulmonary diseases, the gravid uterus, or tumours pressing on the renal veins or inferior vena cava alone. N. may be also caused by the direct irritation of a renal calculus or embolus, or by inflammation of the bladder passing along the ureter causing *pyelitis*, or inflammation of the lining membrane of the kidney, which may implicate the substance of the kidney and terminate in *suppurative* N. The pus formed may escape by the ureter, or an abscess may form, enlarging and burrowing in all directions towards the diaphragm, the loins, the peritoneum, or descending along the psoas muscle and pointing under Poupart's ligament. The symptoms of N. are general febrile symptoms; pain and tenderness in the loins, increased by pressure; irritability of the bladder, and the presence of blood, mucus, or albumen in the urine. In suppurative N. these symptoms are aggravated, with rigors and hectic fever, suppression of urine, and death from exhaustion. Treatment—In active congestion of independent origin, it is advisable to leech or cup the loins, and apply hot fomentations. The treatment of pyelitis and of suppurative N. depends very much on ascertaining the cause, and employing agents to remove irritation and support the strength. See KIDNEYS, DISEASES OF.

Nepomuk. See JOHN OF NEPOMUK.

Ne'pos, Corne'lius, a Roman historian, lived between 660 and 730 A.U.C. (94 B.C. and 24 B.C. Teuffel; 80 B.C. and 28 B.C. Koch). Though the precise period is unascertained, we yet know that N.'s lifetime lies between the extreme dates given above, inasmuch as he was the friend of Cicero, Atticus, and Catullus. He was certainly a native of Verona, or of some place in its vicinity. To N., Catullus—the young gentleman of Verona—dedicated his *Lepidum Novum Libellum*, in which dedication the *Chronica*, a universal history in three books, is referred to in terms of unqualified praise. The other works of N. are *Exemplorum Libri*—a collection of remarkable sayings and doings; *De Viris Illustribus*, perhaps the same work as the preceding under a new title; *Vita Ciceronis; Epistolæ ad Ciceronem; De Historicis*; and if we are to credit the younger Pliny, *Poemata* (*vide* Pl. Ep. v. iii.). None of these survive except the *De Viris Illustribus*, which till the middle of the 16th c. was published with the bastard title, *Æmilii Probi de Vita Excellentium*. In 1569, however, Dionysius Lambertus showed that the so-called work of Probus was in all probability the long-forgotten work of N. (many critics, however, regard it as merely an abbreviation of N.'s work). Among later editions of N. are those of Schott (fol. Frankf. 1608); Van Staveren (8vo, Leyd. 1734, 1755, 1773 revised by Bardilli, 1820); Paufler (Leips. 1804); Tzochucke (8vo, Gott. 1804); Bremi (8vo, Zurich, 1820); and that by Lemaire (8vo, Par. 1820). The most recent editions are those by Nipperdey (5th ed. Berl. 1868); Koch (Leips. 1855); C. W. Nauck (Königb. 1856); Siebelis (6th ed. 1868) Halm (Leips. 1871).

Nep'tune (probably from Gr. *naiō*, Lat. *nato*, 'to swim,' and a contraction for *Navitunus*), the chief marine deity of the Romans, was a brother of Jupiter and Pluto. He was identified both as to powers and attributes with the Greek Poseidon (q. v.).

Neptune is the most distant of all known planets from the sun, round which it revolves at a mean distance of 2750 millions of miles, in an ellipse of eccentricity ·00872. Its orbit is inclined 1° 47′ to the ecliptic. The diameter of N. is estimated at 37,000 miles, but the immense distance of the planet forbids us placing any confident reliance upon such determination, and prevents us altogether from assigning a period of axial rotation. Its volume is 108 times, but its density is only 16 times that of the earth. One satellite has been observed and its elements determined, giving an inclination to the ecliptic of no less than 29°. Its motion is believed to be retrograde, but this is not satisfactorily established. The year of N. is equal to 60126·72 of our days, or nearly 165 of our years. To the naked eye N. is quite invisible, though it ranks next in point of absolute size to Jupiter and Saturn. The peculiar interest attached to this planet is the history of its discovery. In 1820, Bouvard began elaborate calculations of the elements of the motion of Uranus; but his results, which took account in theory only of the actions of the sun, Jupiter, and Saturn, deviated widely from observation. Ultimately he was led to express his belief that there must be an external planet disturbing the motions of Uranus. In 1841, J. C. Adams of Cambridge began, from the known elements and observed perturbations of Uranus, to calculate the position of the hypothetical planet, and in July 1846, sent to the Cambridge observatory his results, which lay for some time, however, unheeded. Leverrier, the French astronomer, had been engaged in the same investigation; and though somewhat later in beginning his calculations, and less full in final details than his English contemporary, he published his results on August 31, assigning a position to the unseen planet closely concordant with that assigned by Adams. From his results, the Berlin astronomers detected the planet on September 23, 1846. Both calculators, in deducing their results, gave to N. a mean distance, as indicated by Bode's Law (q. v.)—a supposition which is now known to be far from true. It was therefore a wonderful chance that at the time of discovery their hypothetical planet of 242 years' period should have coincided with the true planet of 165 years' period—a coincidence which happens only once every 500 years. Still the result is a remarkable link in the chain of evidence which warrants us in accepting Newton's law of gravitation as a law of nature.

Neptune's Cup (*Thalassema Neptuni*), a species of sponges found in tropical seas, and forming one of the largest examples of this group of animals. Occasionally specimens may be met with from 4 to 5 feet in height. The fibrous substance is very tough when dried, and preserved in museums the exterior looks like the bark of a tree.

Nerbudd'a (*Narmada*), a large river of India, which flows nearly due E. and W. across the centre of the peninsula, and is sometimes regarded as separating Hindustan proper from the Deccan. It rises in the native state of Rewa, and after a total course of 801 miles, chiefly through the Central Provinces, falls into the Bay of Cambay by a fine estuary, 30 miles below the town of Broach. Its drainage basin is 36,400 sq. miles. Its tributaries, which are neither important nor numerous, come chiefly from the N. The greater part of its valley is shut in between the Vindhya and Satpura mountains, and it preserves throughout the characteristic of a hill stream. Being much broken by gorges, rapids, and waterfalls, it is of little use for navigation or for artificial irrigation. Large ships, however, can ascend the estuary to Broach. The N. valley is famous for its fertility and mineral wealth. It is composed of the black soil which yields inexhaustible crops of wheat and cotton; and these, together with its beds of coal and iron, are now utilised by means of the railway, which runs up the valley from Khunda to Jubbulpore, nearly 300 miles. In traditional sanctity the N. is second only to the Ganges, and its banks are crowded with historical sites and temples. The regular pilgrimage on foot from its source to its mouth and back again is estimated to occupy two years.

Ne'reids, the fifty daughters of Nereus and Doris, chief of whom was Thetis, mother of Achilles. They dwelt in the Ægean Sea, in shell-decked and vine-shaded caves on the seaboard, or in the sea-depths along with their sea-born parents. The N. were the attendants of the great sea-gods, especially of Poseidon (q. v.), whose power over the sea was supreme. Sailors paid honour to them. Milk, oil, honey, and goats' flesh were the gifts invariably offered. In works of art Nereus and his daughters appear crowned with sea-weed over eye, chin, and breast. See Hirst, *Mythol. Bilderb.* (p. 150, tabb. 18, 19).

Nereis, a well-known genus of *Annelida* or worms belonging to the order *Errantia*, the species of which inhabit the sea coasts. From the large number and prominent nature of the bristles or *setæ* which fringe the sides of N. and its companion-genera, the order has sometimes received the name of *Polychæta*. The animals are *diœcious*, and each joint of the body has four processes named *parapodia*, which bear the bristles or setæ. The head is distinctly marked, and bears eyes, tentacles, and a protrusible proboscis provided with jaws. The eyes and sense organs are borne on a segment above the mouth and named the *præstomium*. The nervous system is distinct, and consists of large *cephalic* or head-ganglia or nerve masses, and of a ventral chain of ganglia. The breathing organs are plumate gills borne on the dorsal or back portions of the body-segments. The embryos are ciliated and free-swimming. The species of N. are often named 'sea-centipedes,' from the prominent character of the side-bristles, which, however, are not in any sense legs.

Ne'reites, the name given to certain markings found in some of the oldest fossiliferous rocks (*e.g.*, Cambrian formations), and which are supposed to represent the petrified tracks of worms, such as are well seen in a fresh condition on modern sea-beaches. Many of these tracks are, however, of doubtful nature. Some were described in former years as the actual fossilised bodies of the worms themselves.

Ner'eus, in the Greek myth, was the son of Pontus and Gæa, and the husband of Doris, by whom he became the father of the fifty Nereids. Under Poseidon he ruled the Mediterranean. His daughters, whose names are variously given by Homer (*Il.* xviii. 39), Hesiod (*Theog.* 240), and Pindar (*Isthm.* vi. 8), were distinguished, on the one hand, from the Oceanides, the dwellers in ocean, and on the other from the Naiades, the nymphs of streams and lakes. See NEREIDS.

Neri, St. Filippo di, founder of the Congregation of the Oratory (q. v.), was born at Florence, 23d July 1515, of a noble family. In 1533 he went to Rome, where, after completing his studies and becoming a priest (1551), he devoted himself to works of charity, and gained a high reputation for piety and zeal. N. stimulated greatly the revival of religious earnestness within the Catholic Church after the Reformation. His good-humour and

ready wit made him a universal favourite, and in Rome to this day the 'Good Filippo' is peculiarly the 'layman's saint.' He died May 26, 1595, and was canonised by Gregory XV. in 1622. See Faber's *Spirit and Genius of St. Philip Neri* (1850).

Ne'rium. See OLEANDER.

Ne'ro, Roman Emperor A.D. 54-68, was the son of Cn. Domitius Ahenobarbus and of Agrippina, daughter of Germanicus and sister of Caligula. The term N. was a cognomen of the Claudian gens, and signified in the Sabine tongue 'brave and vigorous.' N.'s original name was L. Domitius Ahenobarbus; but after his mother's marriage with the Emperor Claudius, her uncle, he was adopted by Claudius (50 A.D.), and his name was exchanged for that of N. Claudius Cæsar Drusus Germanicus. N. was born at Antium, 15th December 37 A.D. Shortly after his adoption by Claudius, N. at the age of 16 married Octavia, daughter of Claudius and Messalina. Seneca had been one of his early instructors, and under his tuition N. had given evidence of a taste for the arts; but he was naturally weak and wayward. On the death of Claudius (54 A.D.), at the announcement of Burrhus he was declared Emperor instead of Claudius' own son, Britannicus, the rightful heir. His elevation, instigated by the prætorian guards, was at once sanctioned by the Senate and by the provinces. N. began his reign with promise, but the baneful influence of his mother led him rapidly into a life of folly and crime. He caused Britannicus to be basely poisoned because he feared him as a rival; secured his mother's assassination to please his mistress Poppæa Sabina (wife of Otho, afterwards emperor), to marry whom he divorced his own wife Octavia on the ground of barrenness, and shortly thereafter had her murdered. The Nemesis that pursues the villain did not fail to overtake N. His murdered mother's ghost haunted him to the hour of his death. Stung with remorse he strove to drown memory in fresh riot, and condescended to the undignified callings of charioteer, musician, and actor. Meanwhile dangers gathered both in the East and West. In 60 A.D. a comet appeared portending, it was believed, some great disaster. In 61 A.D. occurred the insurrection in Britain under Queen Boadicea, soon quelled, however, by the vigorous action of Suetonius Paulinus. The year A.D. 62 witnessed the death of Burrhus, the retirement of Seneca, and the Parthian war in Armenia. In the following year the city of Pompeii was almost wholly destroyed by an earthquake; while at Antium, to N.'s unbounded joy, Poppæa gave birth to a daughter, who however survived only a few months. In 64 A.D. occurred the great conflagration at Rome—a disaster due, according to Dion and Suetonius, to N. himself. N., on the other hand, threw the blame on the Christians, whom he persecuted with relentless fury. His next step was to rebuild the city in more than its former magnificence, and to rear for himself a gorgeous palace, called from its golden ornaments *Aurea Domus*. To gratify the people he gave splendid shows and made princely distributions of corn. In 65 A.D. a plot was formed against him, but it was discovered and divulged by Milichus, a freedman of one of the conspirators. Among the many whose death followed in consequence may be mentioned Seneca and Lucan. Poppæa's death, caused by a kick from her brutal husband during her pregnancy, came next. N. then proposed to Antonia, the daughter of Claudius, but she declined his suit, and on that account suffered death. He now married Statilia Messalina, whose husband he caused to be slain. In 67 A.D. he attended the Olympic games. In 68 A.D. the Gallic and Spanish legions rose against him. This was followed by the defection of the prætorian guards, whereupon N. fled from Rome to the house of a freedman Phaon, about four miles off, and there committed suicide, 11th June 68 A.D. N.'s brief life is a long catalogue of hypocrisies and crimes; and one loathes to think that such a monster of vice should have been the votary and patron of poetry, music, and sculpture.

Nertchinsk', a town of E. Siberia, in the province of Transbaikalia, on the left bank of the Nertcha, near its confluence with the Shilka, 466 miles E.N.E. of Kiachta. Founded in 1652 by the Cossack chief Belekof, N. has an observatory and school of mines, and is the centre of an extensive mining district inhabited by Russian exiles, and producing silver, lead, tin, iron, copper, gold, and coal. Pop. 4000.

Ner'va, M. Coccius, Roman Emperor 96-98 A.D., was either a native of Narnia, in Umbria, or born of Narnian parents. The date of his birth was 32 A.D. He was consul with Vespasian 71 A.D., and with Domitian 90 A.D. On the assassination of the latter he was declared emperor. His mildness, justice, and prudence were beyond question; but he had not the vigour and firmness to control the turbulence of an insolent soldiery. His nobleness of purpose, and his good sense were, however, evinced by his choice of Trajan—then at the head of the forces in Germany—as his successor. N. conferred on him the titles of Cæsar and Germanicus, and tranquillity was again restored. In 98 A.D. N. and Trajan were joint-consuls. N. died 27th January 98 A.D. He was carried to the funeral pyre shoulder-high by the senators, and his remains were deposited in the tomb of Augustus. After his death divine honours were decreed to him.

Ner'vous Sys'tem is the system of organs in living beings, in virtue of which they maintain relations with their surroundings. Hence the N. S. is said to exercise the function of *Relation*, otherwise known as that of *Innervation* or *Irritability*. The function of *Nutrition* (q. v.) in living beings may be said to bring the organism into relation with itself, and to maintain its bodily or physical equilibrium. The function of *Reproduction* (q. v.) brings the individual being into relation with its species or race, while the function of *Relation* or that of the N. S. unites the other functions by governing and controlling them, and brings the organism into appreciative contact with its environments and with the world in which it lives. In a general survey of the structure and functions of the N. S. we shall firstly indicate what are its essential characters; secondly, what are its various forms in animals; thirdly, what are the details of innervation in the lowest animals and plants; and, fourthly, what is the structure and physiology of the various parts of the N. S. of man.

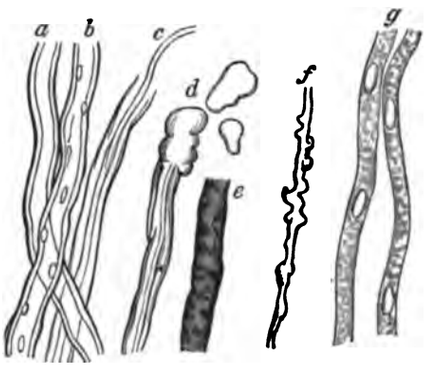
The *essential characters* of a N. S. in any animal may be said to comprehend three parts or sets of organs working together in harmonious adjustment. These parts are (1) a *nerve-centre* or organ for the origination or reception of nervous impressions; (2) a *nervous cord* or *nerve* for the transmission of these impressions; and (3) an *organ or part* in which the nerve ends, or from which impressions are conveyed, and which is connected by the nerve with the nerve-centre. In the simplest nervous acts of man—illustrating the phenomenon known collectively under the name of *reflex action*—the relationship of these three parts is well shown. Reflex action, or the simplest nervous acts may take place without *consciousness*. As an illustration of reflex action, let us try to determine the *rationale* of the simple action of the closure of the eyelids with the object of protecting the eye. On a blow being aimed at the face the eyelids close instantaneously, and the action may be said to be essentially automatic. But it is evident that notwithstanding the apparent simplicity of the act there are involved in its performance a set of complex conditions. There has been firstly transferred to the brain or nerve-centre, and to that part of the brain regulating the movements of the eyelids, an impression of danger from without, which, because it proceeds *to* the nerve-centre, may be termed *centripetal*. This impression in the next place was rapidly transformed in the brain into another impression of an exactly opposite kind, and which proceeded outwards or *centrifugally* through the nerves, to the eyelids, causing their contraction. Thus the first impression received from without has been *reflected*, as it were, to the organ concerned whence the phenomenon is known as *reflex action*. Similarly when any substance is taken into the mouth, a flow of *Saliva* (q.v.) is caused by reflex action. The contact of the substance with the nerves of the mouth produces an impression which travels to a nerve-centre, whence the impulse is 'reflected' along the nerves of the salivary glands with the result of stimulating these organs, that of causing a flow of saliva. Nervous impulses, however, do not always originate from outward impressions. When an idea, or, as we term it, a 'thought,' is conceived or generated in the brain, as the beginning of any simple act, such as that of touching any substance, the impression first proceeds from the brain along the nerves disturbed to the muscles of the fingers. The muscles are thereby stimulated to action and the fingers are brought in contact with the object desired. But this forms only one half of the action. How, it may be asked, do we know that we have touched the object in question? If we suppose that the sense of touch is the only sense concerned in the process, as in the case of a blind person who could not 'see' that he had touched the object, we

find that on the fingers being brought in contact with the object, the impression is reflected to the brain or nerve-centre, and we thus become conscious through the sensations evoked that the original behest of the brain has been obeyed. Thus the common acts of life involve a highly complicated nervous procedure; and there is thus illustrated the essential manner in which the N. S. acts—namely, in that of producing impulses which travel outwards and inwards, or *vice versâ* (*centrifugally* and *centripetally*), these impulses not only stimulating organs and parts to perform functions, but enabling us also to become aware of the discharge by these organs of their varied functions. It may be remarked, however, that impressions are not invariably reflected to the centres from which they originated, but may proceed to other centres and be diffused to distant parts. In this way originally simple actions become exceedingly complicated, and may occasionally defy analysis altogether. The essential attributes of a N. S. may be summed up in the statement that it originates, conveys, and distributes nervous impressions or impulses which affect the body in fashions as varied as are the directions of the impulses themselves.

Passing now to consider as a second topic the *Comparative Anatomy of the N. S.*, we find the lowest animals or *Protozoa* (q. v.), represented by sponges and many microscopic animalcules, to exhibit no traces whatever of nerves or nerve-centres. This absence of nerves in these lowest organisms is on a par with their rudimentary or negative characters in other respects. Their bodies, consisting for the most part of minute masses of *Protoplasm* (q. v.), exhibit no traces of digestive or circulatory organs. The simplicity and uniformity of their structure, in short, forbid us to expect in them the highest elements of organisation. Among *Cœlenterate* animals (of which the hydræ, sea-anemones, zoophytes, jelly-fish, and corals are examples), a N. S. appears for the first time in the animal world, as we trace the structures of its members from lower to higher grades. In the lower Cœlenterates, such as hydra, the zoophytes, &c., no traces of nerves can be found, and in the sea-anemones, corals, &c., their existence has yet to be proved. But in some jelly-fishes, which are of lower rank than the last-mentioned animals, recent research has revealed the presence of elementary nerve-tracts; and in the *Ctenophora* (q. v.), or highest Cœlenterates, represented by *Beröe*, &c., distinct nerve-elements have long been known to exist. In *Echinozoa* or *Annuloid* animals, represented by sea-urchins (*Echini*), starfishes, holothurians, crinoids, and by many parasitic organisms (*e.g.*, the Tapeworm (q. v.), *Rotifera*, the Fluke (q. v.), &c.), a distinct N. S. is always found. In the sea-urchins and other Echinodermata (q. v.) the N. S. exists as a ring of nervous matter, bearing nerve-masses or *ganglia*, from which nerve-filaments are distributed to other parts of the body. In such animals as the Tapeworm, &c., there are two nerve-masses in the anterior region of the body which send filaments backwards; while in the *Rotifera* (q. v.), or 'wheel animalcules,' there is a very large nerve-mass. Among *annulose* or *Articulate* animals, the N. S. is not only invariably present, but is highly developed. These animals are represented by worms, centipedes, insects, spiders, scorpions, mites, crabs, lobsters, barnacles, and other crustaceæ. Their N. S. consists typically of a double chain of ganglia, situated in the floor or ventral region of the body, two ganglia being in each *somite* or segment. This disposition of the nerve-centres occurs in the lower Annulosa, but in insects and higher Annulosa, the double nerve-chain may and usually does become fused to form an apparently single chain with *one* ganglion in each somite or segment of the body. In *Mollusca* (q. v.), the nervous axis shows two forms or dispositions. In the sea-squirts and other lower molluscs only one nerve-mass or ganglion appears, this being homologous apparently with the supra-œsophageal ganglion of Annulosa; but in higher mollusca there are well-marked ganglia. In *Vertebrate* animals, which include the series of 'backboned' forms, ranging from the fishes to quadrupeds, and including man, the great peculiarity of the nervous system consists in its being separated from the other regions of the body, and in its higher specialisation. The brain and spinal cord, together forming the *cerebro-spinal axis* of man, are thus enclosed in a tube formed by the skull and spinal column, and are completely partitioned off from the general cavity of the body. In Invertebrate animals no such separation takes place. A second nerve-system, known as the *sympathetic nervous system*, lies along the front of the vertebrate spine, and is not enclosed within any special tube, but exists in the abdominal and thoracic or general body-cavity of these animals. Regarding the appearance of sense-organs in animals, we find *ocelli* or *pigment-spots*, representing rudimentary eyes, in the jelly-fishes, in Cœlenterates, and Echinozoa. In the former, *auditory vesicles* or rudimentary organs of hearing are also found. In Annulosa both simple and compound eyes are found, as well as auditory organs, and *antennæ* or feelers exercising the sense of touch, and presumably that of taste as well. Molluscs have usually eyes and auditory sacs, and in Vertebrate animals the five senses are represented in a more or less perfect degree.

The consideration of the *general anatomy and physiology* of the human N. S. forms a fourth department of our present inquiry. In the N. S. of man, as well as in the simplest N. S. which can be examined, there would appear to be two distinct elements discernible by the microscope. These elements are: 1, *nerve-fibres*; and, 2, *cellular* or *vesicular* nerve-elements. The first form the nerves themselves; the last occur in the nerve-centres either solely or mingled with the fibrous structures. The function of the fibres appears to be that of transmitting and conducting the nervous impulses, while that of the nerve-cells and vesicular elements is probably concerned with the production of the nervous force itself. In man two great systems of nerves are found. The *cerebro-spinal* N. S. already mentioned is contained within the skull and vertebral column, and consists of the brain and spinal cord. The second system, known as the *sympathetic system*, is situated within the visceral tube or region, and consists of a series of *ganglia* or nerve masses lying along the front of the spine, and having connection with the cerebro-spinal axis. From each of these systems or centres nerves originate.

The *nerve-fibres* of which nerves are composed are in reality minute *tubules*, forming disconnected or frequently interlacing bundles. The bundles are connected by tissue in which the



NERVE-FIBRES.—*a*, Medullated fibre in the fresh state; *b*, similar fibre showing the nuclei of the limiting membrane; *c*, axis-cylinder projecting beyond the torn limiting membrane of a fibre, from which the medullary sheath has been partially removed; *d*, substance of medullary sheath escaping in irregular drops; *e*, fibre treated with acetic acid; *f*, fine medullated fibre from brain, the medullary sheath running into drops, being unsupported by any limiting membrane; *g*, grey fibres.

blood-vessels of the nerves are contained. The nerve itself is covered by a delicate sheath of fibrous tissue named the *neurilemma*. Nerve-fibres are of two kinds—the *white, medullated*, or *dark bordered* fibres found in the nerves belonging to the cerebro-spinal system; and the *pale, non-medullated*, or *gelatinous* nerve-fibres found in connection with the *sympathetic* system. When microscopically examined, a cerebro-spinal nerve is seen to possess an outer covering of the connective-tissue already mentioned, and named the *perineurium*. Each nerve may be split up into *fasciculi* or bundles of fibres; and each fasciculus may in turn be resolved into its component fibres. Each fibre consists of a tubule, bounded by a clear, pellucid membrane within which the true *nerve-substance*—a transparent homogeneous matter—is contained. A nerve-fibre in fact resembles a clear glass tube filled with transparent fluid. After death, or when water, acetic acid, or other re-agents have been added to its substance, the nerve-fibre exhibits a division into three layers. Externally there is the *neurilemma*, or nerve-sheath; next comes the *medullary*

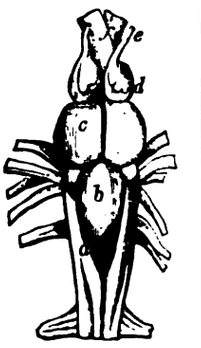
sheath, or *white substance* of Schwann; and internally lies the *axial* or *axis cylinder* of the nerve or *central band* of Remak. There also appears in the dead nerve-fibre a double outline that is wanting in the fresh state. That differences of a very material kind exist between the various parts of a nerve, there can be no doubt. Thus the axis *cylinder* can be readily stained with carmine, whilst the medullary sheath is impervious to it. The axis-cylinder is unaffected by chromic acid, while the medullary sheath is browned and rendered opaque by it. The medullated fibres vary in size. The very large ones measure about the $\frac{1}{1\,1\,0\,0}$th of an inch in diameter, those making up the brain fibres as seen in the nerves near the spinal cord are much smaller, and may not exceed the $\frac{1}{2\,5\,0}$th or $\frac{1}{2\,5\,0\,0}$th of an inch in diameter.

The second variety of fibres, named *non-medullated*, is seen in the *olfactory* and *sympathetic nerves*. These fibres also occur, however, in the cerebro-spinal system. These non-medullated nerve-fibres consist of pale greyish, translucent, and flattened fibres, each measuring from the $\frac{1}{4\,0\,0\,0}$th to the $\frac{1}{1\,5\,0\,0}$th of an inch in diameter. They do not possess a double contour, and their contents are uniform in appearance, while they have no 'medullary sheath' or 'white substance.' Nuclei are found in these fibres. Physiologists are agreed that the differences in structure and composition clearly point to a difference in the functions of the two kinds of nerve-fibres. Nerve-fibres usually run in an uninterrupted manner from the nerve-centre to their termination in the *periphery* or outer portion of the body, or in some other part. *Anastomosis*, or the union of nerves to form *plexuses*, is well seen in many parts of the body, and it has been supposed that the presence of a plexus gives to a nerve a wider and more efficient connection with the spinal cord. Nerves end in various ways, both at the periphery of the body and in nerve-centres. Nerves supplying muscles and membranes end in fine plexuses; some end in *touch-corpuscles*, *Pacinian bodies*, and *end bulbs*—organs associated with the sense of touch. Those in the eye and ear terminate in special cells; and in muscles special endings in *motorial end-plates* have been described.

The second elements in the N. S. have been already alluded to under the names of *cellular* and *vesicular* elements. Sometimes they are called *nerve-corpuscles*. The nerve-centres are made up of these, along with a proportion of fibres. *Nerve-corpuscles*, which form the essential parts of ganglia, the brain, and spinal cord, are in reality nucleated cells of a special type. Some are of simple form and rounded shape. Others give up a process at either end (*bipolar cells*), or numerous processes (*multipolar cells*). These cells are filled with fine granular matter, and are nucleated. There seems little doubt that the processes or branches given off from nerve-cells are means of communication with neighbouring cells.

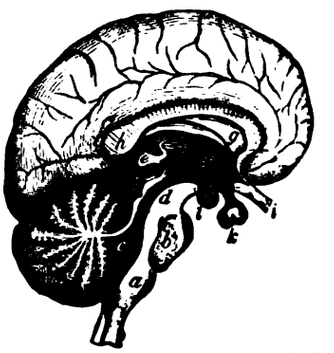
In each ordinary nerve two sets of fibres indistinguishable from each other are found. One is named *centripetal* or *afferent*, and serves to convey impressions *to* the nerve-centres. The other, called *centrifugal* or *efferent*, serves to convey impressions *from* the nerve-centres to the periphery and other parts and organs of the body. The centrifugal fibres have been named *motor fibres* when the impulse they convey excites *motion* in muscles; *trophic*, when they influence nutrition through stimulating organs (*e.g.*, salivary glands) devoted to this function; and *secretory*, when they affect the organs or membranes devoted to secretion. Centrifugal fibres are *sensitive* when they are connected with the production of sensation; or *inhibitory*, when they produce a restraining effect in the nerve-fibres. Nerve-fibres are mere conductors of nerve-force. They have no power of generating this force, and certain nerve-fibres will only respond in their own part to stimuli of certain kind. Thus the optic nerve is affected by light alone, and the auditory nerve only responds to or is excited by sound-waves. Nerve force has been estimated to travel along nerve-fibres in man at the rate of about 111 feet per second; other observers state the rate at 140 feet per second, while in cold-blooded animals the rate is of necessity slower. When a nerve is divided, its power of conducting impressions is destroyed, and it would appear, according to Waller, that the portion of the nerve lying between the point of division and the outward or peripheral end of the nerve undergoes changes of degenerative nature. The cut ends of a nerve, however, soon unite, and its conductivity and functions are restored with the perfection of its physical continuity. The chief *nerve-centres* are the brain and spinal cord, and the various *ganglia* or nerve-masses formed in connection with the sympathetic and cerebro-spinal systems. The function of nerve-centres is that of producing or generating the *nerve-force* which is conveyed and transmitted by the nerves.

The *cerebro-spinal* and *sympathetic nervous systems* may be briefly described by way of conclusion. The former, as already remarked, consists of the brain (*Encephalon*) and spinal cord, with the nerves (*cranial* and *spinal*) which issue from these centres respectively. This system is enclosed within the bony case formed by the skull and spinal column. The brain of man, complicated as it may appear, is in reality constructed on a similar plan to that of all other vertebrata. The typical vertebrate brain may be divided into three chief regions—a *fore*, *mid*, and *hind brain*—corresponding to the three divisions which the organ exhibits in the course of its development; but for the sake of greater simplicity we may regard any brain as consisting of some six or seven ganglia, or nerve-masses, disposed in a linear series. In many fishes this elementary condition of the brain is well seen. The first ganglia are the *olfactory lobes*, or those exercising the sense of smell. The second brain segment is formed by the *cerebrum* or true brain; the third by the *corpus striatum*; the fourth by the *optic lobes*, or those concerned in the sense of sight; the fifth by the *cerebellum*, or lesser brain; the sixth by the *pons Varolii*; and the seventh by the *medulla oblongata*, or upper part of the spinal cord.



BRAIN OF A COD, viewed from above.—*a*, Medulla oblongata; *b*, cerebellum; *c*, optic lobe; *d*, hemisphere-vesicle; *e*, olfactory bulb; *f*, optic nerves.

In some *Amphibia* (*e.g.* frogs) the cerebral hemispheres attain a better development, and appear in excess of the other ganglia. Reptiles and birds have these ganglia still further increased in size, and in Mammalia, but most distinctively in man, the cerebrum, or true brain, overgrows and overlaps all the other portions, so that in the human subject the two chief regions of the brain are the *cerebrum* and *cerebellum*. The weight of an adult human brain is about 3 lbs.—varying from 48 to 50 oz. In man it makes up from $\frac{1}{2\,5}$ to $\frac{1}{3\,0}$ of the weight of the body, and its weight relative to that of the body is only exceeded by the brain of some birds and some of the smaller monkeys. In *absolute* weight man's brain exceeds that of all animals except that of the whale and elephant. The female brain weighs on the average less than that of the male. Cuvier's brain weighed 64 oz., Goodsir the anatomist's weighed 57½ oz., Dr. Abercrombie's 63 oz., and that of Sir J. Y. Simpson 54 oz. The cerebrum is the seat of intelligence and will. Although the systems of mind-localisation hitherto formed are more or less deficient, yet the physiology of the brain is beginning to be well understood, so that in a few years we may hope to possess very definite information regarding the functions of different parts of the brain. The *cerebellum* discharges the function of *co-ordinating the movements of the body*. When this segment of the brain is removed from an animal, it remains perfectly intelligent; eats, and otherwise exhibits normal actions; but its

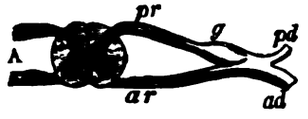


MESIAL SECTION OF HUMAN BRAIN.—*a*, Medulla oblongata; *b*, pons Varolii; *c*, fourth ventricle and, behind it, valve of Vieussens; *d*, iter, and behind it, corpora quadrigemina; *e*, pineal body; *f*, optic thalamus looking into the third ventricle, and, in front of it, an open passage from the third to the lateral ventricle, called *foramen of Monro*; *g*, left layer of septum lucidum bounding the fifth ventricle, and, beneath it, the fornix; *h*, posterior extremity of corpus callosum above the transverse fissure; *i*, optic nerve; *k*, pituitary body; *l*, one of the corpora albicantia.

movements are erratic and indeterminate, and it appears to have lost all power of harmonising or co-ordinating the actions of its muscles. From the brain 12 pairs of cranial nerves—9 pairs according to English anatomy—are given off. These nerves, with their names and distribution, may be thus tabulated :—

ORDER.		NAME.	FUNCTION.
I. Pair.		OLFACTORY.	Exercises special sense—that of smell.
II. „		OPTIC.	Exercises special sense—that of sight.
III. „		MOTOR-OCULI.	Motor for all the muscles of eyeball save two.
IV. „		TROCHLEAR or PATHETIC.	Motor for *superior obliquus* muscle of eyeball.
V. „		TRIGEMINAL or TRIFACIAL (5th Nerve.	Sensori-motor; supplies *Sensory* branches to face, mouth, and part of tongue; and *motor* branches to masticatory or jaw-muscles.
VI. „		ABDUCENS (6th Nerve).	Motor to *ext. rectus muscle* of eyeball.
VII. „	7th and 8th of Continental Anatomists.	(1) FACIAL (in part).—*Motor* nerve of face.	
		(2) AUDITORY.	*Special sense*—that of *hearing*.
VIII. „	9th, 10th, and 11th of Continental Anatomists.	(1) GLOSSO-PHARYNGEAL NERVES	Special sense—*taste*.
		(2) PNEUMOGASTRIC or VAGUS.	Chest and abdomen. Sensory and motor of pharynx, gullet, heart, lungs, and stomach, &c.
		(3) SPINAL ACCESSORY NERVES.	*Motor* to trapezius muscles of back, and muscles of neck, &c.
IX. „	12th of Continental Anatomists.	HYPOGLOSSAL NERVES.	*Motor* to muscles of tongue.

The *spinal* cord extends in man from the *foramen magnum*, or hinder aperture of the skull, to a point opposite the body of the 1st lumbar vertebra. It attains a length of from 15 to 18 inches, and is cylindrical in shape, but flattened on its front and hinder surfaces. It is enlarged (*brachial or cervical enlargement*) between the 3rd cervical and 1st dorsal vertebra; and again (*lumbar enlargement*) opposite the last dorsal vertebra. From the former point the nerves of the upper limbs, and from the latter those of the lower limbs, are given off. The spinal cord is divided through its length almost completely into two symmetrical halves, which are united in the middle line by a *commissure*. The *anterior fissure* separating these is shallower than the *posterior*. Each half of the cord is further marked by two longitudinal furrows. The cord ends below in a slender filament named the *filum terminale*, which is surrounded on each side by nerves forming the *cauda equina*. A minute canal, formed as already described in the development of the nervous system, runs through the centre of the cord; this canal being lined by a layer of *ciliated epithelial* cells (see EPITHELIUM). The cord consists of *grey* and of *white* nervous matter. The latter lies to the outside, and forms the *columns*. The grey matter is internal and is surrounded by the white. It exhibits a crescentic shape in each half of the cord. The proportions of grey to white matter vary in different parts of the cord, the latter increasing in extent from below upwards, and being most plentiful in the neck-region. The spinal cord contains both nerve fibres and nerve-cells. The white matter is fibrous in its nature; the grey matter contains connective tissue, blood-vessels, nerve-fibres, and nerve-cells. It is noteworthy that the position of the grey and white matter in the brain is reversed from that which obtains in the cord; the grey matter being external in the brain, and the white being internal. The grey and white substances of the nervous centres appear to have widely different functions. The grey matter appears to be that through which sensation is alone manifested, whilst motor impressions are also conveyed by the grey substance. The white matter, on the contrary, appears to convey motor impressions only. The *spinal nerves*, originating from the spinal cord, number 31 pairs. They pass outwards to supply the various parts of the body through the *intervertebral foramina*, or special apertures existing between the vertebræ. The first 8 pairs are named *cervical*; then follow 12 *dorsal*, 5 *lumbar*, and 5 *sacral* pairs, and 1 *coccygeal* pair. Each spinal nerve arises by two roots, named respectively *anterior* and *posterior*—the latter being the larger of the two. The posterior root bears a ganglion, and just behind the ganglion the fibres of the two roots fuse together, so as to form a single spinal nerve. Sir Charles Bell's great discovery of the functions of the two roots revolutionised our knowledge of the physiology of the N. S. He discovered by experiment that if the posterior roots of one of the spinal nerves supplying the limbs be divided in a living animal, the animal will lose all *sensation* in the parts supplied by the nerves, while the power of motion will remain unimpaired. But if the anterior root be cut and the posterior left intact, the animal will lose all power of motion in the part, but will retain its sensation or feeling. This discovery clearly showed that the *anterior fibres of the spinal nerves supply power of motion to the parts to which they are distributed, while the posterior roots supply sensation*. Hence these roots are named *motor* and *sensory* roots respectively. In every spinal nerve we therefore find fibres, the function of which is to convey impressions *from* the nerve-centres (cord or brain, or both) to outward parts, these being *motor* fibres; and others which transmit impressions *to* the nerve-centres; these latter being *sensory* fibres. The correspondence of these names with the terms *centripetal* and *centrifugal*, already defined, is apparent.



SECTION OF SPINAL CORD AND ITS NERVES.—*pr*, Posterior, and *ar*, anterior roots of spinal nerve; *g*, ganglion on posterior root.

The *Sympathetic N. S.* consists of two nervous cords bearing ganglia, and which lie one on each side of the spine. Each cord extends from the base of the skull to the end of the spine. In the dorsal, lumbar, and sacral regions of the spine, one ganglion exists almost for each pair of spinal nerves, and each of the latter nerves is connected with the sympathetic system by connecting twigs. Below the two sympathetic cords unite in a ganglion named the *ganglion impar*, lying in front of the coccyx. There are three ganglia in the neck. From this system of nerves branches are supplied to the heart, lungs, stomach, and other viscera, and especially to the blood-vessels; the nerves supplying the latter constituting the *vaso-motor nerves*. Summed up in the briefest possible manner, the functions of the sympathetic system may be said to include the regulation of these processes which are involuntary, or not under the command of the will. Thus the vaso-motor nerves regulate the movements of the blood-vessels; certain branches of the sympathetic regulate the movements of the heart; and the movements of the viscera in digestion appear to be controlled chiefly by fibres derived from the sympathetic system.

Diseases of the N. S.—In a strictly scientific classification of disease it would probably be found that the greater number of diseases with which the human frame is afflicted are diseases of the N. S., either depending on primary lesions or secondary affections; but many of these diseases are necessarily obscure during life, and this obscurity is often not removed by post-mortem examinations, so that a strictly scientific classification is impossible with our present means of diagnosis. The following are the principal diseases of the brain :—*Cerebral anæmia* may be due to sudden hæmorrhage, to diseases of debility, or to insufficient diet, the symptoms being giddiness, ringing and buzzing in the ears, paleness, faintness, and sometimes convulsions and coma. *Cerebral congestion* may be active or passive, as in diseases which obstruct the circulation. In the active form the capillaries and large blood-vessels are enlarged, and in the passive form the veins are generally distended. In both conditions there is pain, giddiness, and confusion of intellect, but in the former there is in addition irritability and sleeplessness, and in the latter mental torpor and drowsiness. *Embolism* and *Thrombosis*, occluding the vessels at a point beyond the circle of Willis, lead to red softening and subsequent degeneration of the tissue of the brain. In embolism, which is usually associated with valvular disease of the heart, the onset is sudden, but in thrombosis, depending on advanced age, and feebleness of the heart's action, the symptoms are slowly developed. *Degeneration* of the brain substance, or of the coats of the vessels; miliary or larger aneurisms, and diseased states of the blood, as in purpura, may cause rupture of the vessels and extravasation of blood. Inflammation of the membranes of the brain, or Meningitis (q. v.), affects secondarily the brain substance, and the brain substance itself may be

inflamed, causing *Cerebritis* or *Encephalitis* (q. v.). These diseased conditions frequently terminate in dropsy of the brain and membranes, as in Hydrocephalus (q. v.). Tumours of the brain may be vascular, parasitic, cancerous, tubercular, or syphilitic, and in addition to their own specific action, they grow at the expense of the brain, which in health nearly fills the cranial cavity. The brain and spinal cord are subject to grey degeneration of the nerve tissue, with increase of the interstitial tissue in areas here and there. In cerebral softening, variously designated *white*, *yellow*, or non-inflammatory softening, the nerve cells undergo fatty degeneration; but in *red* or *inflammatory softening* the nerve substance is disintegrated and mixed up with the products of inflammation. See also SCLEROSIS. Diseases of the N. S., having their seat in the spinal cord, are *spinal meningitis*, and *myelitis*; *hæmorrhages* into the spinal cord; *congestion*, and *softening*. *Cerebro-spinal fever*, sometimes called *epidemic cerebro-spinal meningitis*, consists in an inflammation of the membranes, and sometimes also of the substance of the brain and spinal cord.

NEURALGIA is the term used to denote those diseases of the N. S. which, in so far as can be ascertained, are not due to diseases of the brain or spinal cord, but which have their seat in the nerves themselves. Different names are given to these diseases, according to the nerves affected, or to their site. Thus we have tic-doloureux, sciatica, lumbago, and pleurodynia. There are many diseases of the N. S. of an obscure nature, which are referable to Hysteria (q. v.). Spinal irritation, or spinal tenderness, is an affection of this class, and as it may arise from a variety of distinct conditions, such as disease of some part of the spinal cord, uterine disease, chronic disease of the intestinal viscera, &c., its diagnosis is not very definite.

The principal diseases of the N. S. are described under their respective names, as Apoplexy, Epilepsy, Chorea, Sunstroke, Paralysis, Tetanus, Hydrophobia, Hysteria, &c. See Romberg on *Diseases of the N. S.*, translated by Dr. Sieveking, and *Diseases of the N. S.*, by Dr. Althaus (Lond. 1877).

Ness (Scand. *næs*, 'a nose or cape'), a frequent suffix of the Norse names bestowed by the old sea-rovers on the spits and headlands of the English and Scottish coasts, as Sheerness, Fife Ness, and Caithness, Grinez in France, and the Naze in Essex. Norway presents us with variants of the same word.

Ness, Loch (Gael. 'lake of the waterfall'—probably of Foyers), in Inverness-shire, Scotland, extends in the valley of Glenmore for a distance of 24 miles from N.E. to S.W., and nowhere exceeds 2 miles in breadth. It is 130 fathoms deep, on account of which it never freezes. The Morriston, Oich, and Foyers (q. v.) are its chief feeders, and it is drained into the Moray Firth by the river Ness. The scenery of the loch, though wild and impressive, lacks in variety.

Nesselro'de, Karl Robert, Count, a celebrated Russian diplomatist of German descent, was born 14th December 1780, at Lisbon, where his father was Russian ambassador. He became an *attaché* of the Russian Embassy at Berlin (1802), passed to Stuttgart, thence to the Hague (1804), and after the Peace of Tilsit became (1807) counsellor to the Russian Embassy at Paris. After the rupture in 1812 he was made a secretary of state. He actively promoted the treaties between the allied Powers of 1813 and 1814, signing the Peace of Paris (30th May 1814), and played a prominent part at the congresses of Vienna, Aachen, Troppau, Laibach, and Verona. In 1821 N. became Foreign Minister, and, amid the political complications of the next thirty years, he contributed greatly to increase the influence of Russia. In accordance with the instincts of his race he favoured the 'German party' in the Russian empire. In 1829 he was made Vice-Chancellor, and in 1844 Chancellor of the Empire. Before the outbreak of war in 1853 N. counselled a pacific policy. He resigned office 20th March 1856, and died at St. Petersburg, 23d March 1862. His *Autobiography*, written in French, was published soon after his death. A German version appeared in 1866.

Nest (Old Eng. *nest*; Comp. Welsh *nyth*, Gael. *nead*, Lat. *nidus*, and Sans. *nida*), the 'name given to the structures which various animals prepare, either as a habitation, or for the production and upbringing of their young, or for both of these purposes. It is of course in the case of birds that the art of N.-building is best seen. The variety of form, materials employed, and situations selected for the N., would require a large volume for their full treatment. Every gradation may be traced in the perfection of this art in birds, from the simple cavity scooped out in the ground by many sea-birds, to the wonderful product of the dexterity of the tailor birds. Among *Mammalia* (q. v.) some species of mice and other Rodents (such as squirrels, &c.) make nests, and under this designation may perhaps be also included the structures of certain monkeys (*e.g.*, orangs) in trees. Some reptiles (*e.g.*, particular species of snakes and lizards) are known to collect materials and to arrange these in a rough fashion around their eggs; and among the fishes the familiar sticklebacks are true N.-building forms. The gobies, goramy, and other fishes also construct nests of rude character. Among *Invertebrata*, various insects (*e.g.*, wasps, bees, hornets, ants, termites, &c.) are well known as N.-builders. Some spiders (*e.g.*, the mason-spiders) build habitations of very definite kind, and the well-known trap-door spiders (*Mygale*) construct a true N., the aperture of which is provided with a movable lid. The *Argyroneta*, a water spider, builds a N. in the form of a diving-bell, and ascends periodically to the surface for a supply of air.

Nes'tor, son of Neleus and Chloris, and husband of Eurydice according to one legend; according to another, of Anaxibia, the daughter of Cratieus. Heracles invaded the dominion of Neleus and slew all his sons except N., who had taken refuge among the Geronians. N.'s prowess was conspicuous in the wars with the Arcadians, Eleians, and Centaurs. According to Ovid, he was engaged in the chase of the Calydonian boar and in the Argonautic expedition. His fame, however, is derived chiefly from the Homeric poems, in which he is celebrated as the wisest of all the heroes who went against Troy. He is said to have gone thither with a fleet of sixty ships, and to have been the most excellent and eloquent adviser among the chiefs, Ulysses not excepted. After the fall of Troy N. was privileged to return to his own land, to rule over a peaceful people, and to enjoy a ripe old age, surrounded by his brave and intelligent sons. Pylos in Messenia claimed to be the city of his birth, and the house in which he was believed to have lived was shown there in the time of Pausanias.

Nesto'rians, a heretical sect of the early Church, derived their name from Nestorius (q. v.), who was condemned by the Council of Ephesus (431), under the presidency of Cyril of Alexandria, before the arrival of the Eastern bishops. When they arrived they elected John, bishop of Antioch, their president, and deposed Cyril and his principal abettor, Memnon of Ephesus, who, however, were reinstated by the Emperor. The consequence was a separation of the Church in the East from the rest, especially Egypt. There was a want of unanimity, however, among the Orientals, which proved a source of weakness in the contest. Thus Rabulas, bishop of Edessa, interdicted the writings of Diodorus of Tarsus and Theodore of Mopsuestia, which were the source of Nestorius' opinions. Great opposition to this was offered by the theological school in Edessa, and when some of the teachers betook themselves to Persia they were confirmed in their attachment to Nestorianism by Barsumas, bishop of Nisibis (435–489). The school of Edessa was finally destroyed in 489, and those connected with it fled to Persia; and Pheroses, king of that country (461–488), favoured the separation of the Persian Church from that of the Roman Empire for political reasons. They called themselves Chaldean Christians, receiving the name of N. from their opponents; but they also spread into India, where they took the name of Thomas Christians, and even into China and Tartary. They still exist in the East, but now agree in the main with the Romish Church on the Incarnation, although they express the doctrine in different terms. See Gieseler's *Lehrbuch der Kirchengeschichte* (Eng. trans. 1853).

Nesto'rius, a Syrian by birth, and a disciple of Theodore of Mopsuestia, who, with Diodorus of Tarsus, had maintained the complete human nature of Jesus in opposition to the Monophysitism (q. v.) of Appolinarius (q. v.), was bishop or patriarch of Constantinople from A.D. 428. He sympathised with those who wished distinctly to separate the two natures of Jesus from fear of annihilating the divine nature by lowering it, or of annihilating the human nature by taking from it any of its distinctive elements. Anastasius, a presbyter of Constantinople, in 428 preached against the use of the phrase Theotokos ('Mother of God') as applied to the Virgin Mary, because God could not be said to be born of a human creature. N. afterwards maintained the view of the presbyter. He held that the divine and the human natures of Christ ought to be distinctly separated, and

admitted only a junction of the two and an indwelling of the Deity. Cyril, patriarch of Alexandria, at once came forward as the champion of orthodoxy, and maintained the perfect union of the two natures. N., in reply to the letter of Cyril, accused the latter of confounding the two natures of Jesus. Cyril, however, succeeded in enlisting Celestinus, bishop of Rome, and in inciting the prejudices of the Western Church generally, against N., by misrepresenting his doctrine as a form of Pelagianism (q. v.); and both at Alexandria and at Rome he was accused of heresy. To settle the dispute the Emperor (Theodosius II.) convoked an Œcumenical Council at Ephesus (431), which condemned N. (who afterwards died in exile, 440), and decreed that Christ was at the same time God and man, and that in the unity of his person the two substances, divine and human, were not simply annexed but united.

Nests, Edible Birds', are the gelatinous nests of probably more than one species of *Collocalia* birds, closely allied to the swallow, and known as the salanganes. The birds are found wide-spread over Eastern Asia, the Indian Archipelago, and many of the South Sea Islands, and they attach their nests to rocks and caves. The nests are small, of a dirty white colour, and are composed of gelose, a gummy substance similar to what is obtained from a species of seaweed. They are taken thrice yearly, and two months are said to be occupied by the swallow in constructing a new abode. The Chinese esteem E. B. N. a very great luxury in soups, paying from 30s. to £7 per lb. for them. An extensive and profitable trade in the nests is carried on between several of the E. Indian Islands, Siam, and Chinese ports. The annual value of the E. B. N. introduced into China is estimated at £200,000.

Net (Old Eng. *net*, *nyt*, from *cnytan*, 'to knit;' Ger. *nets*), a meshed fabric, made with twine or thread, used for catching fish or birds, for protecting garden beds, and for other purposes. Fishing-nets were made in remote ages, as is proved by frequent allusions to them in the oldest known writing and their representation on the wall-paintings of ancient Egypt. Six varieties of nets are mentioned by classical authors, and among these two answering to the casting-net and sea-net of modern times, frequently occur. The same process of making nets by hand, namely, *netting*, was no doubt pursued in ancient as in modern times. Netting consists in forming a line of string into a series of regular meshes in rows and knotting the twine at every intersection. The instruments used for this purpose are the *pin*, a piece of wood like a flat ruler, and the *needle*, a wooden tool resembling at each end a two-pronged fork, round which the twine is wound lengthwise. Loops are formed by the aid of the former implement, and by passing the latter through these, the interlacing and knotting are effected. Knotting prevents any alteration in size of the individual meshes, and affords security against injury to one or more of them affecting the usefulness of the adjoining meshes in retaining objects caught in them. Hand-netting formed at one time an important branch of industry in many coast towns, but except in a few isolated fishing-villages it is now seldom practised. Notwithstanding their cheapness, hand-made nets were unable to compete with machine-made nets, which now are principally manufactured by beautifully-contrived machinery, at Musselburgh, Kirkcaldy, and other towns in Scotland, and at Bridport in England. Within a few years cotton has been introduced as a substitute for hemp and flax for net-making. Nets of cotton possess advantages in lightness, invisibility, and ease of working in water over the stout and heavy hemp-nets. Hempen twine is, however, more durable than cotton, and the best quality from Manilla is still retained for trawl nets. Hempen nets are preserved and strengthened by exposure to the action of oak-bark or catechu liquor, while those of cotton are, when new, treated with linseed-oil, and afterwards 'barked' or dressed with tar. The different kinds of fishing-nets and their special uses are detailed under the head FISHERIES.

Neth'erlands, Kingdom of the (Dutch *Nederlanden*, 'low lands;' Ger. *Niederlände*; Fr. *Pays Bas*), or **Holland**, is bounded on the N. and W. by the North Sea, S. by Belgium, and E. by Rhenish Prussia and Hannover, in lat. 50° 46′—53° 36′ N., and in long. 3° 22′—7° 16′ E. Its extreme length from N. to S. is 195 miles, and its breadth from E. to W. 110, while the coast line, including the Zuider Zee and lesser indentations, has a length of some 500 miles. Luxemburg (q. v.) has a separate constitution and legislature. The areas and populations were as follows, according to an official return at 1st January 1876:—

Provinces.	Areas in Sq. Miles.	Pop. 1876.	Chief Towns.
Brabant, North	1960	451,095	Bois-le-Duc.
Gelderland	1964	448,820	Arnhem.
Holland, North	955	748,162	The Hague.
Holland, South	1162	629,345	Haarlem.
Zeeland	681	185,628	Middleburg.
Utrecht	532	184,084	Utrecht.
Friesland	1253	313,804	Leeuwarden.
Overyssel	1283	265,144	Zwolle.
Groningen	915	238,662	Groningen.
Drenthe	1017	112,221	Assen.
Limburg	840	232,562	Maastricht.
	12,562	3,809,527	

Physical Aspect.—The southern and greater portion of the N., which may be regarded as the Delta of the Rhine, is irregularly shaped, and in surface is both level and low. Dutch landscape is tame, but has a certain quiet pastoral beauty. The wide expanses of meadow, clad with luxuriant verdure, and richly stocked with herds of well-fleshed kine, are intersected by canals, and relieved by quaint windmills and clusters of trees. In the vicinity of the towns the canals are fringed with willows and poplars, and the characteristic villas are girt with gardens and parks. The N. are traversed from E. to W. by the main branches into which the Rhine separates soon after leaving Rhenish Prussia, namely the Waal and the Lek, which enclose the long fertile tract of Betuwe ('good meadow land;' Lat. *Batavia*). The Maas, after a northerly course through Limburg and Brabant, flows W. and joins the Waal opposite Groningen and a little above Biesbosch; while the Lek, some 6 miles below the point of its departure from the Waal, sends off the Ijssel in a northerly direction towards the Zuider Zee. From Belgium in the S.W., Holland receives the estuary of the Scheldt, which at once separates into the Ooster Scheldt and De Hond or Wester Scheldt (more correctly N. and S. Scheldt). The estuaries of these large rivers, split into a maze of streams, encircle a cluster of in-shore islands, of which the chief are Voorne, Goeree, Schouwn, N. and S. Beveland and Walcheren. The principal channels by which the Waal finds its way to the North Sea are the Holland Diep, dividing into the Haringvliet and Kammer, and the Oude Maäs, which joins the streams into which the Lek divides. The islands of the N. are simply parts of the low-lying coast, cut off by the rivers when their courses have been changed by floods. The Biesbosch ('rush-bed'), a waste of morass and waters, through which the Waal sends part of its waters to the Holland Diep, was formed by the breaking of a sea-wall in 1421, when 72 villages were laid under water. The Zuider Zee (q. v.), which occupies almost the heart of Holland, and is a shallow bay, 80 miles long, and 40 broad, and 1365 sq. miles in extent, was formed out of an inland lake by successive invasions of the sea, which culminated in a great flood in 1247. The islands at its mouth—Texel, Vlieland, Terschelling, and Ameland—stretching N.E. in a chain from the peninsula of N. Holland, are merely the unsubmerged rising grounds of the original plain. In the extreme N., and partly separating Holland from Hannover, is the Dollart Zee, an inlet formed in 1277 by a flood which destroyed 33 villages and 100,000 lives. In many parts of the N. the surface is below the level of the adjacent canal or river, and even of the sea; and this is the chief cause of frequent inundations. A great part of the coast is defended by sand-hills about 50 feet high, and these the natives protect by sowing them with binding grasses. In other places enormous dykes have been built at the public expense, some of granite blocks from Norway. Every precaution is taken to preserve these barriers; *e.g.*, the stork is protected by law, because it is the enemy of the frogs and worms which injure the sand-hills. Dykes are also built along the banks of the great rivers, with sluices at intervals, by means of which the country can be laid under water at the approach of an enemy. Much of the area formerly covered by lakes has been drained and rendered arable, and such tracts are called 'polders.' The only large portions of the country still unused for agricul-

ture or grazing are the Bourtanger morass in the N., and the sandy heath of Peel in the S.E. Only in Gelderland are there any hills, and these are of but slight elevation.

Hydrography.—Without any considerable river entirely within her own borders, Holland possesses in the branches of the Rhine and Maas, supplemented as these are by extensive canals, a more complete system of water communication than any other country. Of the canals, the principal are the North Holland Canal, 52 miles long, 120 feet broad, and 20 feet deep, connecting Amsterdam with the North Sea at Helder; the Voorne Canal, from Voorne to Helvoetsluis, shortening the outlet from Rotterdam; and, by far the most important of all, the North Sea Canal, or Amsterdam Canal, giving Amsterdam a direct waterway of only 15 miles to the North Sea through the Y, the Wijkermeer, and the narrow Neck of Holland. This great work, now (1877) nearing completion, is 14 miles long, 90 feet broad, and 25 feet deep, and terminates in a large artificial harbour formed by piers of concrete. The draining of the Y and Wijkermeer into the canal will set free extensive polders. In this, and similar works, the drainage is now assisted by powerful Appold centrifugal and force pumps. Another triumph of hydraulic engineering in Holland was the draining of the Haarlem Lake (q. v.), completed in 1852. Recently it has even been proposed to drain the southern part of the Zuider Zee (q. v.), and the task is likely to be taken up by Government before long. The construction and maintenance of canals and dykes are intrusted to the officers of the Waterstaat, who expend about half a million sterling.

Climate, Botany, and Agriculture.—The climate is humid and variable, and to foreigners disagreeable if not dangerous. Cold foggy weather is sometimes quickly followed by great heat, bringing with it agues and fevers. The winds blow almost incessantly, and occasionally with great violence, overwhelming the land with fogs. The sky is generally overcast, there being rarely more than forty bright days in the year. Winter is usually severe, and though little snow falls, the frosts are intense. The mean annual temperature at Amsterdam is 49° 8′, while in winter it is 36° 6′, and in summer 64° 4′; the yearly rainfall is 26 inches, and number of rainy days 170. Although there are no natural forests, plantations of oak, elm, beech, &c., are by no means rare. Aquatic plants, as might be expected, are unusually numerous. Holland has been called the China of Europe, on account of the great skill and industry required to render the natural resources adequate for the support of the inhabitants. The soil near the coast is chiefly sand mixed with turf, in other parts a deep loam, and is everywhere cultivated, generally in small farms, with the utmost care. The principal grain crops are rye, buckwheat, barley, and oats, together with some wheat in the S. provinces. Other important crops are potatoes, flax, hemp, rapeseed, clover-seed, madder, chicory, mustard, beetroot, hops, and tobacco. Horticulture has been carried to great perfection, especially at Haarlem, and there is a large export of the bulbs of hyacinths, tulips, &c. But Holland is chiefly a grazing country. The cheese of Gouda, Leyden, and Edam is famous. Game is largely exported to London, especially hares, wild ducks, partridges, pheasants, plovers, and snipes. Holland is the paradise of the swan and the stork.

Geology and Mineralogy.—The geological formations in the N. are almost exclusively the Tertiary or Post-Tertiary, and consist of banks of sand and marine shells, and beds of peat and clay, supporting an alluvial soil, deep, rich, and clayey. Coal is wrought only in Limburg; and in the same province is found a soft sandstone, used in building. Stones of any considerable size are seldom seen in the soil, and building stones are imported from Norway for the erection of dykes, piers, and other important structures. For want of stone, brick is used for paving as well as building. The timber used in building is floated down the Rhine from the German forests in immense rafts, sometimes 1000 feet long, and directed by some hundreds of labourers. The N. are comparatively poor in minerals; the chief are potter's clay, brick-clay, fuller's earth, a little bog-iron, and immense deposits of turf.

Industries, Commerce, &c.—Holland has no large manufacturing centre; yet the seats of industry, though small, are numerous. Among the chief manufactures are the linens known as 'Hollands,' the gin which goes by the same name, the pottery of Delft, the cheese of Gouda, the Turkey-red yarns and dyed silks of Roermund, and the carpets of Utrecht, Arnhem, and Breda. Notable also among the industrial products are woollens, damasks, calicoes, shirtings, striped dimities, paper, leather, glass, firearms, tobacco, snuff, tobacco-pipes, saltpetre, and cordage. There are also large shipbuilding yards, sugar-refineries, breweries, and type-foundries. The diamond-cutting trade of Amsterdam is the largest in the world. Along the coasts there are valuable cod, turbot, sole, oysters, and other fisheries; the rivers yield abundance of salmon, eels, perch, &c.; a productive herring-fishery is carried on in various parts of the North Sea, and on the N. coast of Scotland; while several whalers annually visit the Greenland seas. The position of Holland at the mouth of the Rhine, and her possessions in various parts of the world, have long given her the command of a great foreign trade. In 1875, in addition to the purely transit trade, the exports amounted in value to £44,914,242, and the imports to £59,903,854. In 1876 the exports to Great Britain alone were valued at £16,602,154, and the imports therefrom at £18,707,800. The trade is chiefly with Great Britain, Germany, Belgium, Java, and France. Chief among the articles of export from the N. to Great Britain (1875) were butter to the value of £1,917,910, live animals, principally cows and sheep, to the value of £2,124,935, and cheese to the value of £1,078,594. From Great Britain the chief imports were cotton goods (including yarn) of value £3,656,916, woollen goods of value £2,750,068; and wrought and unwrought iron, of value £1,563,831. Other leading exports, besides those already given are coffee, sugar, raw cotton, tobacco, spices, and dried fruits (mainly the produce of the Dutch colonies), which are exchanged for the grain, wool, manufactured goods, timber, wine, and brandy of other European countries. At the end of 1875 the mercantile navy of Holland consisted of 1835 vessels, of 526,527 tons, including 86 steamers of 76,827 tons. In 1876 the kingdom was traversed by 1036 miles of railway, and 2150 miles of telegraph lines.

Colonies.—The colonial possessions have a total area of some 666,700 sq. miles, and a pop. (census of 1874–75) of 24,386,991. On its separation from Belgium in 1830, Holland retained all the colonies. The island of Java, by far the most important, is the only colony yielding a profit after defraying the cost of its own government and defence. The chief colonies are Java, parts of Sumatra, Borneo, the Celebes, the Moluccas, Timor, Bali, Lombok, Billiton, Rian, Banca, the western part of New Guinea, Surinam or Dutch Guiana, Curaçao, Aruba, the S. half of St. Martin, Buen-Ayre, Eustatius, and Saba.

Government, Army, Navy, &c.—The government of the N. is a constitutional and hereditary monarchy, and the legislative power is vested in the king and the States-General, comprising an Upper House of thirty-nine members elected by the provincial states, and a Lower House of eighty members elected by the ballot of all natives who pay £1, 13s. in taxes. The Lower House alone has the initiation of new laws. In 1877 the revenue, derived chiefly from indirect taxation, amounted to £8,666,037, and the expenditure to £10,017,849, while the public debt was £76,016,012. In 1877 the regular army comprised 60,867 rank and file, and 2063 officers; the colonial army had a total of 33,996, of whom 1416 were officers. There is besides a militia (*Schuttery*) numbering 100,323 more. In the latter 14,461 were Europeans, 19,170 natives of the colonies, and 365 Africans. The sum voted to the war department in 1875 was £1,541,926. The royal navy comprised (1876) 22 ironclads with 533 guns, 7 frigates, 9 corvettes, 19 avisos and gunboats, and 10 paddle steamers. The only large ironclad, a double-turret ship, 245 feet by 48, and armed with four 35-ton Armstrong guns, was built at Amsterdam, and launched in August 1876.

Religion and Education.—Both Protestants and Roman Catholics are salaried by the State. The latest return gives 2,074,734 Calvinists, 68,067 Lutherans, 1,313,052 Roman Catholics, 68,003 Jews, and 55,725 of various other Christians. The government of the Calvinistic or Reformed Church is Presbyterian; the Roman Catholics are under an Archbishop of Utrecht and four bishops. Several British Presbyterian ministers whose churches here are incorporated with the Dutch Reformed Church are paid out of the public funds. An unsectarian 'Primary Instruction Law' was passed in 1857, and under it there were, in 1871, 2608 public schools and 1119 private schools. There are also 81 middle-class schools, 55 Latin schools, a polytechnic institute at Delft, 5 Roman Catholic and 3 Protestant seminaries, and the three universities of Leyden, Groningen, and Utrecht, with a total of 1339 students.

Ethnography.—The Dutch, a people of purely Teutonic race, are distinguished by a cleanliness that has become proverbial, by an industry at once ingenious and persevering, and by great practical sagacity, no less than by an exceptionally phlegmatic temperament. They are strongly animated by a love of home and country, rising into a keen sense of national independence. Remarkable for their nautical skill, they meet danger with singular courage and composure. Their cleanliness is rendered necessary by the exceeding humidity of the climate, which would otherwise consume their iron with rust and their wood with mould. During the three months when all the canals and several of the rivers are frozen over, the whole nation may be said to move about on skates. Even children skate to school, and women to market with baskets of eggs on their heads.

Language.—The Dutch language is a dialect of Low German. Its oldest form is found in the so-called 'Karolingian Psalms' (800 A.D.), first published by Von der Hagen at Breslau in 1816, the idiom of which is closely allied to the Old Saxon of the *Heliand*. 'Middle Dutch' dates from the poem *Reinaert de Vos*, written probably in the last half of the 12th c., and extends to the 16th c. It was called by the French 'Thyois,' or 'Tiesche,' and by those who spoke it 'Dietsch' (whence the English name 'Dutch'); while 'Vlæmsch' was as yet the common designation of the provincial *patois*. In the third, or modern period, French influence in the S. provinces, and in the N. the impulse of national freedom, further widened the breach between Dutch and Flemish.

Literature.—The literature of the N. prior to the 16th c. being already noticed in the article on FLEMISH LITERATURE (q. v.), our account of Dutch literature begins at that period. Though the exercises of the 'Rederijker' had small æsthetic results, their influence on politics and religion was considerable, and in the 16th c. they were therefore suppressed by the Spanish government. Again restored, they declined in the 17th c., and in the 18th altogether ceased. Amsterdam was their chief seat, after the great emigration from the South had made it the national capital. Amidst the crowd of rhetoricians and psalm-writers of the 16th c., Anna Bijns (born 1494) stands out as the one real poet of genius, and with her modern Dutch literature really begins. Her *Refereinen*, or 'Refrains' (new ed. by Bogaers and Helten, Rotterd. 1876), are modified *chants-royals*, breathing a high-souled passion, yet full of graceful imagery, and moving with a new and joyous freedom in elaborate harmonies. Dirk Coornhert (1522–90) and his friends Roemer Vischer and H. L. Spiegel wrote in prose and poetry, and counteracted the Gallicising tendency of the South. The University of Louvain (founded in 1425) was a centre for Catholicism and humanistic studies, Leyden (founded in 1575) for the Protestant spirit. Scaliger, called to the latter in 1592, gave a freer course to classical study. The rich fruit Holland gained from the *Renaissance* is seen in the great names of the 17th c. History and learning were represented by Hooft (q. v.), Grotius (q. v.), Brandt (1626–85), Pontanus (1571–1640), Ditzema, Gronovius, Heinsius, and Vossius; poetry by Camphuysen, Hooft, Van den Vondel (q. v.), Huyghens (1596–1686), and Jakob (called 'Father') Cats (1577–1660); and the drama by Bredero (1585–1618), Brandt, Jaachim Ondaan (d. 1692), Reimer Anslo (d. 1669), and J. A. van der Goes (d. 1684). The inspiration of the war of liberation was succeeded by a disposition to enjoy the welfare it brought about. The Revocation of the Edict of Nantes (1685) brought to Holland many French exiles, whose influence contributed to form a school devoted to the unities and the criticism of Boileau. In the *Kunstgenootschaapen* ('poetic clubs') of the period, Pels, Rohaans (d. 1710), Hoogvliet (d. 1763), and Feitama (d. 1758), were of this section, while Poot (d. 1733), Broekhuisen (d. 1707), were the exponents of a more national feeling. Van Winter (d. 1795) and his wife L. V. van Merken wrote dramas and descriptive poetry; Willem Z. van Haren (d. 1768), a romantic epic; his brother Onno the lyric tale *De Geusen*. Langendijk (d. 1756) was distinguished in comedy; Focquenbroch (d. 1796) in burlesque; and Van Essen's *Hollandsche Spectator* (1731–35) formed modern Dutch prose after an English model. To the great advance in German literature during the last third of the 18th c. is due a movement towards stricter truth to nature, led by the lyrists Van Alphen, Rhynvis Feith, and Bellamy, whose ballad of *Rosje* (about 1770) is perhaps the most beautiful in the language. History had already reached a higher stage in the 18th c. in the hands of Wagenaar, Stijl, Te Water, Meermann, Engelbert, and Scheltema; and in the 19th was written by Kluit, Van Kampen, and Bilderdijk (also famous as a poet); more recently by De Jonge, Van den Bergh, and Van den Brink (d. 1865). The history of literature has been treated by Van Vries, Willems, Van Kampen, Siegenbeek, Geysbeek, and Van der Aa. The chief poets of the 19th c. are Helmers, Kinker, Hendrick Tollens, Loosje, Loots, Ten Kate, Polgieter, and De Bull. Van Lennep, Bogærs, Meyer, Ter Haar, and Beets represent the Romantic school in romance. The chief novelists are Oltman ('Van der Hage'), Tonssaint, Cremer, Schimneel, Brouwer, Linde ('Vater Smits'), and Douwes Dekker, author of *Max Havelaar*. In spite, however, of the vigour and originality of the national literature, no Dutch authors can be said to have gained a European reputation except those who wrote in Latin, the most illustrious of whom are Erasmus, the father of the Renaissance, Grotius the famous jurist, Spinoza the philosopher, Arminius the theologian, and Bœrhaave, the first physician in the world at the beginning of the 18th c. See Jonckbloet's *Geschichte der Niederländischen Literatur* (2d ed. Leips. 1873).

For an account of the Dutch school of painting, see the articles BELGIUM and PAINTING.

History.—The earliest known inhabitants of the N. were the Batavi (q. v.) and the Frisians (q. v.), who were subdued by the Romans and subsequently by the Franks under the Karolings (q. v.). On the growth of the feudal system the country became broken up into many small principalities, of which the chief were the duchies and countships of Brabant, Flanders, Gelderland, Holland, Zeeland, and Hennegau, and the archbishopric of Utrecht. The remote position of the country made the feudal lords more than usually independent of the royal or imperial authority, which was met in particular with a keen resistance by the counts of Holland and the archbishops of Utrecht. By the marriage of Philippe the Hardy (1369) Flanders passed to Burgundy, and later the Burgundian dukes, either by force or inheritance, acquired the whole country. 'With the advent of the Burgundian family the power of the commons has reached so high a point that it is able to measure itself, undaunted, with the spirit of arbitrary rule of which that engrossing and tyrannical house is the embodiment.' And the struggle for freedom, for civic life, was continued till in the 16th c. it developed into the greater struggle for religious liberty. On the death of Charles the Rash the N. fell (1477) to the Archduke Maximilian of Austria, who had married the duke's daughter Marie. During the reign of Karl V., son of Philipp the Handsome of Austria and Juana, a daughter of Ferdinand and Isabella of Spain, the industry and commerce of the N. developed rapidly in spite of oppression. The Reformation doctrine early found a home in the country, and Philip II., who succeeded his father Karl V. in 1555, made a determined effort to root it out. But the schemes of the Inquisition and the unparalleled tyranny of Philip stirred the people to a struggle which, inaugurated by the terrible atrocities of Alba, and lasting over eighty years (from 1566), ended in the humiliation of Spain and the firm establishment of the Republic of the United Provinces, or rather of a league of seven federal provinces, joined very loosely together, and governed by Stadtholders and 'Estates.' The southern provinces, nearly corresponding to modern Belgium, were secured to Spain and the Roman Catholic Church by the consummate abilities of Parma. Philip III. was obliged to conclude a thirteen years' truce, the Peace of Antwerp, in 1609, and the independence of the United Provinces was recognised by all the European powers long before Spain gave its tardy concurrence, at the close of the Thirty Years' War, by the Peace of Münster, 1648. William the Silent, Prince of Orange, was the 'father' of the Republic, and the story of its rise is at the same time his biography; with his death may be said to close the heroic period in Dutch history. Head and ruler of the state in a sense that is true of but few kings, and invited to assume the crown by all the municipalities save that of Amsterdam, William was never actually invested with sovereignty. Olden-Barneveld subsequently pressed the claims of Maurice to the crown, but as he rose in power, the Advocate himself became the rival of his prince. Meantime the little commonwealth had become the greatest existing naval and commercial power, girdling the world with its innumerable dependencies. It had nearly one hundred thousand sailors and three thousand ships, and for a century longer it was absolutely master of the seas. From 1610 till 1619 a fierce struggle raged between

Arminians and Gomarists, distracting the country and leading eventually to the execution of Barneveld. The stadtholder, William II., married Mary, eldest daughter of Charles I. of England, and after the thrill of horror with which the news of that king's execution was received throughout Europe, Holland took the lead in acts of open hostility. The 'Dutch War' of 1652–53 was signalised by the first defeat which Holland, since the downfall of Spain, had sustained upon the sea. After a fierce encounter in the Channel, Blake forced De Ruyter to retire under cover of night; but the fleet was at once raised to seventy-three ships, and with this force, double that of the English, the veteran Van Tromp drove Blake into the Thames, and swept the Channel in triumph with a broom at his mast-head. This struggle, which the wisdom of Cromwell had closed, was renewed in 1664, ostensibly to settle the monopoly of trade on the Guinea coast, but really on account of the ambition of the Duke of York, and the resentment of Charles at the insults he had suffered from Holland in his exile. Monk twice defeated De Ruyter, and sailed along the coast of Holland, burning ships and towns. But the Dutch found a powerful and unexpected ally in the Plague which fell on London (1666), paralyzing the energies of the nation. The treasury was empty, and neither ships nor forts were manned when the Dutch appeared in the Nore, advanced unopposed up the Thames to Gravesend, burst the boom on the Medway, burned three men-of-war which lay anchored in the river, and for six weeks sailed defiantly along the southern coast, undisputed masters of the Channel. William III., who had been excluded from the stadtholdership by the jealousy of Oliver Cromwell and the action of the republican party in Holland, was, on the murder of the brothers De Witt (q. v.), restored in time to save his country from the rapacity of France. Louis XIV. (q. v.) in two campaigns attempted the conquest of Holland, and had secured the non-intervention of the Emperor. His first invasion of the Low Countries was checked by the Triple Alliance between England, Holland, and Sweden (1668), binding him to the terms he had offered as a blind, and forcing on him the Peace of Aix-la-Chapelle. In 1672 war was declared against Holland by France and England, Louis having detached Sweden and easily procured the aid of Charles. But after meeting with a desperate resistance Louis was forced to forego his designs by concluding the Peace of Nimwegen in 1678. William III., who had married Mary, eldest daughter of James II., and was now the head of a European league against Louis, became King of England in 1689, and as such continued the struggle with France. During the American Revolution the N. declared war against England, jealous of her growing maritime power, but in 1782 a final blow was given her naval supremacy. After several years of civil strife, the rights of the House of Orange were confirmed and enlarged in 1789. Two parties had long been conspicuous in the state, the one anxious to raise the stadtholders to the dignity of kings and make the office hereditary in the family of Orange-Nassau, the other, the 'patriots,' striving to establish a pure republic. When in 1794 a French army entered the N. after conquering the Spanish N., it was hailed by the patriots; the stadtholder, William V., fled to England, and the Batavian Republic was proclaimed 16th May 1795. It was made a kingdom by Napoleon I. for his brother Louis in 1806, and a department of France in 1810. Holland was united to Belgium from 1813 till 1830, when the latter became an independent monarchy. After the treaty of London (1839), which settled the differences between Holland and Belgium, and adjudged an equitable partition of Luxemburg (q. v.), the chief events in the external history of the N. are the abolition of slavery in the Dutch W. Indies (1863), the cession of the Gold Coast settlements to Great Britain in 1871, and the tedious and costly war in Atchin (q. v.) begun in 1873 and not yet (1878) ended. Meantime a great political struggle has been going on in the country, chiefly to decide whether unsectarian education shall continue. The 'liberal' party in the state are generally regarded as having secured a final triumph by the elections of December 1877. See the article BELGIUM, and Bilderdijk, *Geschiedenis des Vaderlands* (12 vols. Leyden, 1832–39); Motley's *Rise of the Dutch Republic* (3 vols. Lond. 1856–59); and *History of the United Netherlands* (4 vols. 1860–67).

Netley, Royal Victoria Hospital, at, is a palatial building on the shore of Southampton Water, which was commenced in 1855, and erected at a cost of about £350,000. The hospital, which was designed for the reception of invalids from the army and navy on foreign service, and from among the troops in the adjoining military districts, was constructed on the most approved principles, so as not only to be efficient for the purposes intended, but a model hospital for the State. The hospital is also utilised as a medical school for candidates for the army and navy medical departments; and in it special facilities are afforded for practical instruction in those departments of medicine, surgery, and hygiene peculiar to military service. There is accommodation in the hospital for over 1000 patients. See MEDICAL DEPARTMENT OF THE NAVY.

Nettle (*Urtica*), a genus of about forty species of herbaceous or rarely shrubby plants, widespread in the tropical and temperate regions of the world, and giving name to the natural order *Urticaceæ*. They have opposite leaves, monœcious or dioecious flowers in axillary clusters or spikes, and an achene as fruit. Many are covered with stinging hairs, the name *Urtica* (from Lat. *uro*, 'I burn') being chosen for the genus in allusion to the *burning* pain of the sting. These hair-stings are formed of a single conical cell dilated at its base, and closed at the apex by a globular button placed obliquely. The button breaks off on the slightest touch, when the sharp extremity of the hair enters the skin and pours into the wound the irritating fluid which has been pressed out from the elastic epidermal reservoir at the base. When the plant is grasped with violence the sting is crushed, and no injury is effected. Two species of N. are natives of Britain—the one, an annual, common in waste and uncultivated ground about dwellings, is the small N. (*U. urens*), and the other, or common N. (*U. dioica*), is the universally known plant of our roadsides and hedgebanks. Another species, called Roman N. (*U. pilulifera*), is occasionally found, but is in all likelihood an introduction. The young shoots of the common N. are commonly used as a pot-herb on the Continent of Europe, and occasionally also in this country; they are wholesome but have a disagreeable grittyness. A yellow colouring matter is obtainable by boiling the roots with alum, and from the stalks and leaves a green dye is procurable. Formerly, before the introduction of flax and hemp into the northern countries, a tough fibre obtained from the inner bark of this species was manufactured into cordage, a coarse cloth, &c., and the name N. indicates this fact. Westmacott in his *Scripture Herbal* (1694) says, 'Scotch cloth is only the housewifery of the N.' An infusion of the leaves is used in country places to purify the blood, and a mixture called N.-beer is made and sold in the large manufacturing towns of Lancashire and bordering counties. The stinging property of some of the Indian species is powerfully developed, especially in *U. stimulans* and *U. crenulata*. Both of these are, however, exceeded by *U. urentissima*, a plant of dreadful renown; its effects are so violent as to last for months or even a year. It is nearly equalled by two Australian species, viz., *U. morioides*, a bush, and *U. gigas* (or *Laportea gigas*), a large tree with heart-shaped leaves a foot or more in width, beset with hairs of an exceedingly virulent stinging power. Cattle coming in contact with it are made furious, and it is necessarily a great impediment to the traveller. Some of the nettles are used for medicinal purposes, as *U. baccifera* in the W. Indies and *U. membranea* in Egypt, and the tubers of *U. tuberosa* are reported to serve as a food in India. In the Sandwich Islands the fibre from *U. argentea* is employed for making ropes, as is that of *U. baccifera* in the W. Indies, and *U. Cannabina* also yields a useful fibre. (See BOEHMERIA.) The name dead-N. is applied to the genus *Lamium* belonging to *Labiatæ*. It has no connection with the above, but the leaves of some of the species are N.-like in outline.

Nettle-Rash, or **Urtica'ria,** is an eruption of little, solid, elastic eminences, closely resembling that produced by the application of a common nettle to the skin. The wheals or raised patches have a white centre and red margin of irregular form, and are accompanied by more or less tingling and itching. N.-R. when acute runs a rapid course, and is accompanied with a smart fever; but when chronic, it is slow, obstinate, persistent, and has a tendency to recur. The acute forms are generally connected with the ingestion of some kinds of food, constituting errors of diet, as shell-fish, cucumbers, almonds, oatmeal cakes, &c. The more chronic and intermittent forms are frequently associated with uterine derangements of various kinds. *Treatment*—In the

acute form, an emetic followed by a purgative should be administered, and afterwards faulty digestion should be corrected. The diet should be simple, without wine, beer, or stimulants, and tepid baths should be used. The cutaneous irritation may be allayed by a lotion containing *prussic acid* and *perchloride* of *mercury*.

Nettle-Tree (*Celtis*), a genus of handsome trees belonging to the elm family (*Ulmaceæ*), but widely different from the elms by bearing a fleshy drupe or fruit. The common N.-T. (*C. Australis*) grows to 50 feet high, is ornamental, and in Europe is frequently planted in squares, along public walks, &c. The wood is hard and dense, eligible for turners' and carvers' work, also for musical instruments, and the elastic shoots or branches are in request for whip-stocks, walking sticks, &c. The small black fruit, after it has been touched by the frost, is edible and wholesome; it has a very sweet flavour, hence supposed by some to be the Lotus (q. v.) of the ancients. The tree is a native of the S. of Europe and coast of N. Africa. The hackberry, hagberry, or Hoop-Ash (q. v.) is a fine forest tree of Ohio, &c., called *C. crassifolia*. It grows to the height of 80 feet, and yields an elastic wood which is used for charcoal. The sweet fruits are edible. Of *C. orientalis*, the inner bark consists of numerous reticulated fibres forming a kind of natural cloth, used by some of the tribes of India, where the tree is pretty common, for clothing purposes and as a rug or blanket. *C. caucasia*, another Indian species, is a fine large tree, but the wood is light, soft, and subject to attacks of insects.

Neu-Bran'denburg, a town of Germany, grand-duchy of Mecklenburg-Strelitz, on Lake Tollens, 17 miles N.N.E. of New-Strelitz by rail. It has large breweries and distilleries, and manufactures paper, cards, &c. Near it is the fine ducal palace of Belvedere. Pop. (1875) 7495.

Neu'burg, an old town of Bavaria, on the right bank of the Danube, 12 miles E. of Ingolstadt by rail. Its royal schloss, on a height, contains an interesting collection of portraits and armour. The ducal line of Pfalz-Neuburg expired in 1742. Pop. (1875) 7297.

Neuchwang, a port of China, in Manchuria, on the left bank of the river Liao, 25 miles from its mouth, and 110 miles S.W. of Mukden. Its trade is slowly developing in spite of the difficulty of transit and the prevalence of brigandage throughout Manchuria. In 1874 (a poor year comparatively) the total value of the imports and exports (less re-exports) was £1,256,003, and the number of vessels that entered and cleared the port was 512 of 181,084 tons, including 202 German vessels of 61,912 tons, 126 British of 49,934 tons, and 92 American of 31,574 tons. The imports are chiefly cotton and woollen goods, opium, sugar, and metals; the exports beans, bean-cake, bean-oil, barley, ginseng, other drugs, fungus, deer-horns, and melon-seeds. Pop. 30,000.

Neufchâtel', **Neuchâtel'**, or **Neu'enburg**, a western canton of Switzerland, lies between the lake of the same name and the French frontier. Area, 304 sq. miles; pop. (1870) 97,284. N. is traversed from N.E. to S.W. by four lateral ranges of the Jura, and watered by the small streams Reuse, Seyon, Serierre, &c. The natural products are wheat, wine, timber, and fruits. N. rears cattle, sheep, horses, goats, swine, and bees. The Val de Travers is famous for its asphalt stone; and other minerals found in N. are coal and iron ore. But the great specialty of the canton is watchmaking, an industry introduced by J. Richard at La Sagne in 1681, and now producing yearly some 300,000 watches (value 20 million francs), of which 30,000 are exported to the United States. At La Chaux-de-Fonds and Le Locle, the great centres of the trade, are made many of the best watches sold at Geneva. Lace-making, though still an important industry, is on the decline. Among the exports are cheese, printed cottons, scientific instruments, paper, *bijouterie*, and *extrait d'absinthe* (170,000 bottles yearly). The inhabitants, mostly French Protestants, are distinguished for ingenuity and orderliness. The principality of N. formed part of Burgundy till it was united to the empire in the 11th c. In 1288 the emperor Rudolf of Hapsburg gave it to Jean Comte de Chalons, whose great-grandson Jean III. became by marriage Prince of Orange. On the extinction of the house of Orleans-Longueville in 1707, N. was adjudged by the estates to Friedrich I. of Prussia, who was chosen over other fourteen claimants on account of his descent from the Prince of Orange. It remained with Prussia till 1806, when Napoleon conferred it on Marshal Berthier. It formally joined the Swiss Confederacy in 1815, and the bond with Prussia was finally dissolved by a treaty signed 26th May 1857.—*Lake Neuchatel* belongs to the river basin of the Rhine, is 27 miles long and 6 broad. It is drained by the Aar, abounds in fish, and its shores in some parts exhibit bright and picturesque scenery.

Neufchâtel, capital of the Swiss canton of the same name, situated on a steep slope of the Jura, overlooking Lake N., at the entrance of the Seyon, 25 miles W. of Bern. It has a castle, the seat of the cantonal government, a Temple du Haut of the 12th c., a new college, containing a natural history collection founded by Professor Agassiz, a picture-gallery, chiefly of modern Swiss works, and many celebrated charities. There is an important trade, especially in watches, wine, grain, and cattle. Pop. (1870) 13,321.

Neu'haus, an old town of Bohemia near the Moravian frontier, and on the river Nescharka, has a grand castle of the Czerny family, and manufactures paper, chemicals, &c. Pop. (1867) 8620.

Neuhaus'el (*Ersek-Ujvár*), a town of Hungary, formerly a strong fortress, on the Neutra, 75 miles N.W. of Pesth by rail. It was conspicuous in the Turkish wars, but is now a dull market town. Pop. (1869) 9483.

Neuilly, a town of France, department of Seine, 1½ miles N.W. of Paris, on the right bank of the Seine, which is here spanned by a magnificent five-arched bridge, 640 feet long, erected by Perronet (1768–73). The château of N., destroyed in the revolution of '48, was a favourite residence of Louis-Philippe, and the spot where his son Ferdinand was killed in a carriage-accident (July 13, 1842) is marked by a Byzantine chapel, designed by Ary Scheffer. Bleaching, distilling, and nursery-gardening are the principal industries. Pop. (1872) 15,466. Being wholly within the French lines, N. came little into notice during the Prussian siege of Paris, but it was the scene of several engagements between the Communists and the Versailles troops, April 20–May 21, 1871.

Neu'münster, a town of Prussia, province of Slesvig-Holstein, in a barren plain, on the Schwale, and near the Stör, 36 miles N. of Hamburg, at the junction of railway lines to Kiel, Neustadt, Hamburg, and Slesvig. N. manufactures cloth, carpets, linens, cottons, leather, and metal buttons. It derives its name from an Augustinian monastery, founded in 1130, and removed to Bordesholm in 1326. Pop. (1875) 8628.

Neural'gia. See NERVOUS SYSTEM, DISEASES OF.

Neurop'tera (Gr. 'nerve-winged'), an order of Insects (q. v.) having long bodies. The wings are large, broad, and have prominent veins or *nervures*. Many N. (*e.g.*, dragon-flies) are of predatory habits, and pursue and devour other insects. The mandibles, or longer jaws, are well developed. The abdominal appendages do not form a 'sting,' but subserve egg-deposition. The N. as a rule undergo an imperfect *Metamorphosis* (q. v.), the chrysalis or *pupa* being active. But in some few cases the metamorphosis is complete; and in such cases the pupa may be enclosed in a cocoon. The young of N. are frequently aquatic in habits, and pass their earlier stages in pools and rivers, as is the case with the dragon-flies, May-flies, &c.

Neu'satz (Ger. 'new settlement,' Magyar *Uj-Vjidék*), a town of S. Hungary, in the comitat of Bács, on the left bank of the Danube (here crossed to Peterwardein by a fortified bridge of boats 847 feet long), 70 miles N.W. of Belgrad. It is the seat of a Greek bishop, and has ten churches, and an important trade in corn. N., founded in 1740, has been rebuilt since the Hungarian Revolution, during which it was taken, June 11, 1849, by the Imperial troops under Jellachich, and nearly destroyed by the insurgents' fire from Peterwardein. Pop. (1869) 19,119.

Neuse River, in North Carolina, U.S., is formed by the confluence of the Flat and Eno. It flows S.E., and enters Pimlico Sound, after a course of 300 miles, great part of which is navigable by steamers.

Neusied'ler-See (Magyar *Fertö-tava*), a brackish lake in W. Hungary, 7½ miles W. of Oedenburg. In 1860 its area was 122½ sq. miles, and in 1862 its depth was still 2–3 feet, but in the beginning of the summer of 1865 it quite dried up, as it is said to have done also in 1693 and in 1738. The dry bottom was laid

out in farms, but in 1870 a great body of water returned from the Raab and Rabnitz through the Hanság ('floating turf') swamp (the draining of which had been commenced in 1865), covering 454½ sq. miles of arable and productive land.

Neu'sohl (Ger. 'new settlement,' Magyar *Besztercze-Bánya*), a town in Hungary, comitat of Sohl, at the confluence of the Gran and Bistritz, 23 miles N.N.E. of Schemnitz by rail. It is a Catholic bishop's see, and has the largest copper and iron mines in Hungary. Lead and coal are also worked, and beet-sugar, paper, and colours are manufactured. 4½ miles N. are the copper and silver mines of *Herrengrund*. Pop. (1869) 11,780.

Neuss (the *Novesium* of the Romans), a town of Rhenish Prussia, on the Erft, 1 mile from the left bank of the Rhine, and 5 miles W.S.W. of Düsseldorf by rail. It has a fine Catholic church of St. Quirinus (1209), the chief corn-market in Rhenish Prussia, and the largest oil and flour mills in Germany. Cottons, woollens, linens, machinery, hardware, soap, and brandy, are among the manufactures. Pop. (1875) 15,563.

Neu'stadt ('New Town'), a very common name of German towns. The following are the most important :—1. **N.** (Polish *Prudnitz*), a town of Prussia, province of Schlesien, at the confluence of the Braune and Prudnicka, and on the Frankenstein-Kosel railway, 160 miles S.S.E. of Breslau. It has an excellent *Real-schule*, and considerable manufactures of damasks, linens, cottons, and silk. In the bombardment by the Austrians (28th February 1779) the greater part of the town was destroyed. Pop. (1875) 10,941.—2. **N.**, a town of Prussia, in the province of W. Preussen, on the river Biala and the Berlin-Stettin railway, 28 miles N.N.W. of Danzig. It has a castle, a gymnasium, and twenty chapels on the wooded heights S. of the town, annually visited by numerous pilgrims. Pop. (1875) 4140.—3. **N.-Eberswalde**, a town of Prussia, province of Brandenburg, on the Finow Canal and the Berlin-Stettin railway, 28 miles N.E. of Berlin, has a school of forestry (founded 1824), and manufactures flour, nails, and deals. Pop. (1875) 8223. Near N.-E. are the villages Spechthausen, with a government paper manufactory; Heegermühle, with the largest brass-foundry in Prussia; Eisenspalterei, with a great iron-foundry; and Kupferhammer, with iron and aniline manufactures.—4. **N. an der Orla**, a town of Central Germany, in the grand-duchy of Sachsen-Weimar-Eisenach, on the river Orla and the Gera-Eichicht railway, 30 miles S. of Naumburg, with a fine castle (Arnshaugk) and manufactures of cloth and leather. Pop. (1875) 4816.—5. **N. an der Haardt**, a town of S. Germany, in Rhenish Bavaria, at the junction of the Pfalzgraf-Ludwig's and the N.-Monsheim railways, 18 miles S.W. of Mannheim. It has a fine Gothic church of 1346, a richly endowed hospital, manufactures of cloth, paper, furniture, starch, and straw-plait, and extensive trade in wine and fruit. Pop. (1875) 9320.

Neu-Stettin, a town of Prussia, province of Pommern, lies between two lakes near the source of the river Persante, 92 miles E.N.E. of Stettin. It was founded in 1313, is built after the pattern of Stettin, and has manufactures of leather. Pop. 1875) 6971.

Neu-Strelitz', the capital of Mecklenburg-Strelitz, lies between the lakes Zierker and Glambecker, 60 miles N.E. of Berlin by rail. It is laid out in the form of an eight-rayed star, and has a beautiful castle, the residence of the Grand Duke, containing a library of 80,000 vols., and surrounded by fine gardens. Alt-Strelitz (pop. 2997), a mile to the S., was formerly the capital, and has a great horse market. Pop. (1875) 8525.

Neus'tria (either *neueste rik*, 'the latest kingdom,' or *ne-oster rik*, 'the not-eastern,' *i.e.*, 'the western kingdom;' Lat. *Francia Occidentalis*), the name under the Merwing and Karoling dynasties of the western kingdom of the Franks, which, extending from the Scheldt to the Loire, and bounded on the E. by the Maas, Vosges, and forest of Ardennes, included the two Flanders and ten of the later provinces of France, and had a total area of upwards of 60,000 sq. miles. Soissons, Paris, Orleans, and Tours were the chief towns. From the 10th c. onward, after Charles the Simple's concession of Normandy to Rolf the Ganger, the name N. disappears from history.

Neutitsch'ein (Czech *Nový Jičín*), a town of Moravia, Austria, in the district called Kuhländchen (Czech *Kravarska krajina*) or 'Cow-country,' 25 miles S. of Troppau by rail. It has three churches, and manufactures woollens, leather, and a kind of Polish carriages, hence called *Neutitschainky*. Pop. (1869) 8645.

Neu'tra or **Neitra** (Magyar *Nyitra*), a town of Hungary, in the comitat and on the river of the same name, 75 miles N.W. of Pesth by rail. On Mount Zobor, E. of the town, is a strong castle. M. is a Catholic bishop's see, has three monasteries, two cathedrals, and a theological college. There is considerable trade in wine. Pop. (1869) 10,683.

Neu'tral Tint, a pigment, artificially prepared by mixing together blue, red, and yellow in varying proportions.

Neu'trals, the name given to nations who take no part in a war that is being carried on by other nations. Their duties have given rise to much controversy. See INTERNATIONAL LAW, BLOCKADE, CONTRABAND OF WAR, LETTERS OF MARQUE.

Neu'wied, a town of Rhenish Prussia, on the right bank of the Rhine, 12 miles N.E. of Koblenz by rail. Its chief building is the castle of the Wied family, which contains a museum of Roman remains. There are manufactures of woollen and cotton fabrics, hosiery, leather, iron wares, and tobacco. Pop. (1875) 9483, of whom 400 are Moravians.

Ne'va, an important river of Russia, flows from the S.W. corner of Lake Ladoga in a westerly direction to the Gulf of Finland, which it enters after passing in two main branches through the city of St. Petersburg. It is a broad, rapid stream, 40 miles long, but its entrance is shallow, and its immense trade is therefore mainly conducted by small steamers and lighters. By the Ladoga Canal it is connected with the water system of the Volga, and thus assists in uniting the Baltic and Caspian Seas.

Neva'da, one of the Pacific States of the American Union, is bounded N. by Oregon and Idaho, E. by Utah, and S. and W. by California. Area, 104,125 sq. miles; pop. (1875) 68,760, including 3152 Chinese, 1251 coloured people, and 16,220 Indians. Most of N., included in the 'Great American Basin,' is a table-land about 4000 feet above the sea, wedged in by the Sierra N. on the W. and by the Wahsatch Mountains on the E., and bounded N. and S. by cross ranges, thus having no outlet for its waters. Some 12,000 sq. miles of area, a romantic region of lofty *mesas* or table-lands and deep cañons, are outside this basin, and lie within the drainage of the Colorado River. Several of the peaks in the W. Humboldt and S. Toyabe ranges rise to a height of 12,000 feet, and the Sierra N. sends down many mountain streams, which disappear suddenly from the surface to reappear as lakes or pools. The lower valleys are frequently occupied by muddy pools, impassable on account of their depth in winter, and converted by summer heat into alkali flats crusted over with crude soda. Among the principal lakes are Pyramid Lake, 33 by 14 miles; Walker, nearly as large; Carson, 12 miles in diameter; Humboldt, slightly smaller; Winnemucca, 18 by 8 miles; and Tahoe, 6000 feet above the sea and 1500 feet deep. In 1874 the arable land amounted to 1,505,000 acres, the grazing land to 22,210,276, the timber land to 3,699,700, and the land on which minerals are wrought to 2,582,720. Everywhere throughout N. are visible evidences of volcanic action, the bleak mountain sides in many places being still covered with lava. Silver is the chief mineral, and is being produced in rapidly increasing quantity; the lodes which are found in every part of the state yield from $65 to $2500 per ton. Gold is found in considerable quantity in combination with silver. In 1874 there were 243 mines, and the yield of gold and silver amounted in value to $35,402,263, of which $22,000,000 came from the famous Comstock lodes at Gold Hill and Virginia. The Sutro Tunnel, already 3½ miles long, drains all the ramifications of the Comstock mines at a depth of 3000 feet, and is expected to be completed by January 1878. Besides gold and silver, N. also yields lead, copper, iron, antimony, arsenic, graphite, sulphur, lignite, &c. There are several geysers and many mineral springs. Although mining is the chief industry, many of the inhabitants are engaged in agriculture. The climate if somewhat rigorous is healthy. Summer brings the frequent thunderstorm, the violent whirlwind, and lofty dust columns. Among the wild animals are the grizzly bear, puma, lynx, antelope, deer, and sage-hare. The live stock in 1874 comprised 22,131 horses, 4732 mules and asses, 181,891 cattle, 185,486 sheep, 2439 Cashmere and Angora goats, and 5290 hogs. In 1876 N. contained 680 miles of rail-

way, the principal line being the Central Pacific. The capital is Carson city, and the largest town is Virginia (pop. 7048). N. is part of the territory ceded by Mexico in 1848, and was originally included in California. It was constituted a territory in 1861, and a state in 1866.

Nevers, a town of France, capital of the department of Nièvre, stands at the junction of the Nièvre and Loire, 112¾ miles S.E. of Orleans by rail. Its chief buildings are the cathedral of St. Cyr (13th c.), the Palais de Justice, formerly the château of the Dukes of N., and a triumphal arch, erected in 1746 at the entrance of a seventeen-arched bridge across the Loire to commemorate the victory of Fontenoy. There are also the Hôtel-dé-Ville, containing the Musée Nivernais, and a museum, public library, theatre, lyceum, &c. M. has six porcelain factories, employing 700 labourers; the largest ordnance foundry in France, turning out yearly 400 naval cannons; and manufactures of files, farm implements, chemicals, &c. Pop. (1872) 19,314. The *Noviodunum* of Cæsar, N., afterwards called *Nevirnum* and *Nivernum* (whence the modern name), was raised to a bishopric (506), and became the capital of the duchy of Nivernais (1538), which corresponded with the modern department of Nièvre. The duchy was purchased in 1659 by Cardinal Mazarin, whose last ducal descendant, Louis Jules Barton Mancini-Mazarini, died at Paris in 1798.

Nevianak', a town of Russia, government of Perm, on the eastern slope of the Urals, 45 miles N.N.W. of Ekaterinburg, has a mint, with a celebrated leaning-tower; and in the neighbourhood are extensive gold-washings, and iron-works which yield annually 4950 tons of iron. Estimated pop. 20,000.

Neville's Cross, Battle of, was fought near Durham, between the Scotch and English, October 17, 1346. In it the Scotch were totally defeated, their king, David Bruce (q. v.), made prisoner, and 15,000 of their nobles and commons slain. The English were commanded by the Archbishop of York, Henry Percy, and Ralph Neville, who raised the cross (destroyed in 1589), from which the battle takes its name. Froissart's statement that Queen Philippa was present in person is unsupported by any of the native chroniclers.

Nevis, one of the Leeward Islands, in the W. Indies, lies 2 miles S.E. of St. Christopher's, from which it is separated by the Narrows channel. Circular in form, it has a circumference of about 24 miles, and consists of a single conical mountain of volcanic origin 2500 feet in height. Area, 50 sq. miles; pop. 1871) 11,735. The revenue of N. in 1874 was £9786; expenditure, £11,150; public debt, £3000; value of total imports, £38,101; exports, £60,341, of which £54,079 was sugar. The total tonnage of British vessels that entered the port of Charlestown (the capital) was 15,198 tons, and of those that cleared, 11,148 tons. N. was first colonised by the English in 1628.

Nevis, Ben. See BEN NEVIS.

New Al'bany, a city of Indiana, U.S., on the Ohio River, 3 miles below Louisville, with which it is connected by rail. It has many fine buildings, 30 churches, 142 factories of various kinds, 3 newspapers, a large river trade, and splendid water-power from the falls of Ohio, 3 miles distant. Pop. (1870) 13,396.

New'ark, a city of Ohio, U.S., situated on the Licking River, the Ohio and Erie Canal, 33 miles N.E. of Columbus by rail, lies in a rich agricultural district, near large coal-fields. It possesses two banks, several churches, and two newspapers, and, besides important manufactures, has a thriving trade in coal, grain, and live stock. Pop. (1870) 6698.

Newark-upon-Trent (the 'new wark' or 'fortress'), a market-town of England, in Nottinghamshire, 16 miles S.W. of Lincoln by rail, on the Devon, which joins the Trent both above and below the town. The chief buildings are the parish church, one of the largest in the kingdom (218 feet long by 80 broad, with a spire 245 feet high), the commarket (1849), townhall, and county court-house. There are large breweries and malthouses, iron and brass foundries, manufactures of millers, farm implements, plaster of Paris, and a trade in malt, flour, corn, and cattle. N. returns two members to Parliament. At its castle, now in ruins, King John died (1216), and here Charles I. took refuge in the Scots' camp (May 5, 1646). Pop. (1871) 12,187.

New Bed'ford, a city of Massachusetts, U.S. on the Acushnet River, 55 miles S. of Boston. It was the chief port of the once flourishing whale fisheries of America, and now manufactures cottons, iron and copper wares, twist drills, Prussian blue, paraffin candles, glass, leather, &c. There are 2 daily and 2 weekly newspapers. Pop. (1870) 21,320.

New'berne, a city of N. Carolina, 90 miles from Hatteras Inlet, on the Atlantic and N. Carolina Railways. It has fifteen churches, two tobacco-factories, several lumber-mills and turpentine distilleries, and supports two daily and several weekly newspapers. It carries on a trade with the northern markets in early vegetables. Pop. (1870) 5849.

New Brigh'ton, a town of New York, U.S., on Staten Island, and on the opposite side of New York Bay from Brighton. It has the largest dyeing and printing work in the U.S., a silk-printing factory, a paperhanging factory, the 'Snug Harbour,' an institution for aged mariners, and another for sailors' destitute children. Pop. (1870) 7495.

New Brit'ain, a large island in the S. Pacific, lying to the N.E. of the eastern extremity of New Guinea, and situated in 4°–6° 30′ S. lat., 147° 40′–152° 25′, E. longitude. It is 300 miles long, with an average breadth of 40 miles, and possesses several excellent harbours. It is mountainous, and still in a state of volcanic activity. The vegetation is luxuriant, and includes yams, the sugar-cane, ginger, bread-fruit, sago and cocoa-nut palms, &c. The inhabitants, who are Melanesians, are numerous, and though addicted to cannibalism, are said not to be fierce. Several Wealeyan mission stations were started on the island in 1876. N. B. is of interest as being the sole remaining habitat of the mooruk (*Casuarius Bennetti*), a large bird allied to the extinct Dinornis (q. v.).

New Britain, a city of Connecticut, U.S., 9 miles S W. of Hartford by rail, manufactures iron, brass, and compressed bronze castings, cutlery, joiners' tools, white lead, hosiery, &c., and has a public park of 74 acres. Pop. (1870) 9480.

New Brun'swick (so named in 1783 in honour of the house of Brunswick), a province of the Dominion of Canada, is bounded N. by the province of Quebec and Chaleurs Bay, E. by the Gulf of St. Lawrence and Northumberland Strait, S. by the Bay of Fundy, and W. by the state of Maine. Area, 27,177 sq. miles; pop. (1871) 285,594. The coast-line is 410 miles in extent, exclusive of Miramichi Bay, Richibucto Harbour, and other indentations. N. B. is watered by the St. John (450 miles), Restigouche (200), Petitcadiac (100), Miramichi (200), and other rivers; and has numerous lakes, the larger of which cover an area of some 80 sq. miles. The surface, generally a flat sandstone plain, nowhere exceeds 800 feet of elevation, and is densely wooded by forests of pine, fir, cedar, larch, birch, maple, &c. Seven-ninths of the entire area are set down as cultivable, and the estimated average yield per statute acre in 1871 was 10·8 bushels of wheat and 137·6 tons of potatoes. The thermometer in the shade ranged (1874) between 80° in September and 20° in January, and the rainfall in that year measured 34·2 inches. In the years 1868–75 N. B. exported 53,892 tons of coal; and iron, manganese, lead, copper, limestone, marble, &c., are also found. The forests abound in bears, wolves, deer, lynxes, and fur animals; the streams in trout and salmon; and the salt waters in cod, herring, mackerel, haddock, &c.; while grouse, wild fowl, and geese are plentiful. There were (1871) 163,687 horned cattle, and 234,418 sheep. The leading industries are agriculture, mining, the lumber trade, shipbuilding (in 1872, 108 vessels of 33,353 tons), the fisheries (in 1871 employing 5161 men, and yielding £237,000 worth of fish), and manufactures of sugar, woollens, oils, iron, leather, &c. In 1874 N. B. had 1147 vessels of 277,850 tons, and the total tonnage of vessels]to and from ports outside the Dominion was 1,574,903 tons; while the imports (grain, hardware, cottons, woollens, &c.) amounted (1875) to £2,131,382; the exports to £1,363,137, viz. timber, £948,391; fish, £93,061; sugar, £50,403; coal, £12,551, &c. The revenue, expenditure, and public debt are included in those of the Dominion. The provincial government consists of a lieutenant-governor and a council of nine; the legislature, of an Upper House of eighteen, and a Legislative Assembly of forty-one members; and N. B. sends twelve senators and twelve members to the Canadian Parliament. The active militia comprises 56

corps of cavalry, artillery, infantry, and rifles, with a nominal strength of 3327 men; and the reserves number 59,923. There are 375 miles of railway within the province, of which 108 are worked by government; and the number of schools (1871) was 828; of newspapers (1873) 26. A large percentage of the inhabitants are of French descent, and these, with the Indians (1629 in 1874) are mostly Catholics. There are two Catholic dioceses, St. John and Chatham, served by 59 priests; and one Protestant, Fredericton, with 62 clergy. The chief towns are St. John, Portland, St. Andrew, Fredericton (the capital), and Woodstock. Discovered by Sebastian Cabot in 1498, N. B. from 1604 formed, with Nova Scotia (q. v.) and part of Maine, the French colony of Acadie. It was ceded to Britain (1713), divided from Nova Scotia and erected into a province (1784), its entire population then amounting to 11,457, and dates its prosperity from an Act of the English Parliament (1809) for the taxation of Baltic timber. It was united with Canada for imperial purposes, March 29, 1867.

New Brunswick, a city of New Jersey, on the S. bank of the Raritan River, 30 miles, S.W. of New York city, with which it is connected by rail. The seat of Rutgers College, with a library of 12,000 vols., and of a theological seminary, both under the Reformed (Dutch) Church, N. has 16 churches, 2 daily and 2 weekly newspapers, and manufactures of India-rubber goods, paper-hangings, machinery, &c. Pop. (1870) 15,058.

New'burg, a city of New York, U.S., is on the W. bank of the Hudson River, 60 miles N. of New York City by rail. It has a public library, a free academy, twenty-two churches, two daily and three weekly newspapers. The manufacture of machinery is its chief industry. The theological seminary of the Associate Reformed Church is here. Pop. (1870) 17,014.

New'bury, a market-town of England, in Berkshire, on the Kennet, 17 miles W.S.W. of Reading by rail, has three churches, a corn-exchange (1860), town-hall, theatre, &c. There are silk and paper-mills, and a trade in corn and malt. Here lived the famous 'Jack of N.', who led 100 of his weavers to the Field of Flodden. Doddington Castle, in the neighbourhood, belonged to Chaucer. In the indecisive battle of N. (1643) fell the gallant Falkland (q. v.), to whom a monument has been erected (1877) in the market-place. A second battle (1644) was a victory for the Parliamentary forces. Pop. (1871) 6602.

New'buryport, a city of Massachusetts, U.S., 35 miles N.E. of Boston by rail, contains the University of Modern Languages, the Putnam Free School, a public library and free reading-room, five cotton-mills, eight shoe-manufactories, and four shipbuilding yards. In 1874 its annual imports amounted to $227,353, its exports to $39,076. Pop. (1870) 12,595.

New Caledo'nia, a large island in the South Pacific Ocean, lying between 20°–22° 30′ S. lat., and 164° 10′–167° 33′ E. long., 750 miles E. of Queensland. It was discovered by Captain Cook in 1772, and in 1854 was taken possession of by France. The island is now 200 miles long, and 30 wide, but the coral reefs which gird its shores show that it was once much larger. These reefs extend beyond the land 150 miles to the N., and 50 miles to the S., and in many places to a distance of 30 miles from the shore. They are most continuous on the W. or leeward side of the island. N. C. is composed of metamorphic rocks, and is traversed longitudinally by a triple range of mountains, varying from 2000 to 7000 feet in height. The soil is fertile, and well-adapted to the growth of tropical produce. N. C. is believed to be rich in minerals, but as yet the deposits of nickel alone are worked, upwards of 1000 tons being exported in 1877. The mines are chiefly worked by Victorian capital. The natives of N. C. belong to the Melanesian race, and are ferocious cannibals, whom the Roman Catholic missionaries have had little success in improving. Their number is estimated at 30,000. For some years N. C. has been used as a French penal settlement, and on the 1st January 1876 there were 3575 convicts in the island. Since 1872 many Communist prisoners have been transported to N. C., but are confined on the Isle of Pines, 28 miles to the S.E. Noumea is the chief town of N. C., and the seat of government.

Newcastle, a town in New South Wales, at the mouth of the Hunter river, and 75 miles N. of Sydney. It is the shipping port of an extensive coalfield which has been worked for 33 years, and the coal from which is exported to all parts of the Australian colonies, as well as to India, China, Japan, the Sandwich islands, and the Pacific ports of North and South America, the annual export exceeding a million tons. The coal seams, which are in close proximity to the town, are worked with less danger than in Great Britain, explosions of fire-damp being almost entirely unknown. The harbour is safe and commodious, but rather difficult to enter. The town, which is the see of a bishop, is well built and laid out. Pop. (1875) of the municipality, 7600; with the seamen on board the vessels in harbour, probably 10,000.

Newcastle, Thomas Pelham Holles, Duke of, the eldest son of Lord Pelham of Loughton, was born 21st July 1694. When only a boy he was adopted by his uncle, John Holles, Duke of N. and Earl of Clare. In 1714 George I. made him Viscount Pelham, and Earl of Clare, in 1715 Marquis of Clare and Duke of N. He served continuously under Walpole, whom he betrayed, and the broad-bottomed administration of Pulteney, from which he and his brother Henry Pelham excluded Carteret. In 1754 he became Premier, his brother having just died. In this capacity he yielded up Admiral Byng to the public clamour against him. He remained the nominal chief of Pitt, to whom his great connections and inexplicable popularity in both the Houses were necessary, but deserted him at a critical moment in the Seven Years' War, when the jealousy of the Whig party had grown too strong. On the formation of the Bute Ministry he retired, and after this only held the Privy Seal for a short time in the Rockingham administration. He died 17th Nov. 1768. His most conspicuous vices were flattery and jealousy. He was marked by a childish fussiness of character, and was entirely destitute of ability, except in the pricing of members and seats according to the corrupt system of Walpole. As Horace Walpole said, 'Mr. Pitt does everything, and the Duke gives everything.' He was succeeded by his nephew **Henry Fiennes Clinton**, ninth Earl of Lincoln, whose career was unimportant. His son, **Henry Pelham Fiennes Pelham Clinton, Duke of N.**, born 30th Jan. 1785, succeeded to the dukedom at the age of ten, was in France with his mother when the Peace of Amiens was broken, and was kept a prisoner by Napoleon till 1807. This appears to have made him a fanatical Tory for life. He was particularly odious to the English people about the time of the first Reform Bill, and subsequently withdrew in disgust from the discharge of his public duties as a hereditary legislator. He died 12th January 1851.—**Henry Pelham Fiennes Pelham Clinton**, fifth **Duke of N.**, was born 22d May 1811. At the Oxford 'Union' he met Gladstone and Herbert. Returned, when Lord Lincoln, in 1832 for South Notts, he was for a few months in 1834 a Lord of the Treasury under Peel. In opposition he spoke frequently and well on home affairs, and in 1841 Peel, to whom he was strongly attached, gave him the 'Woods and Forests,' and in 1846 the Chief Secretaryship for Ireland, in which capacity he had charge of the Irish Coercion Bill. As he had become 'unsound' on Protection, his father turned him out of South Notts, but he was returned by the Falkirk Burghs. In 1851 N. passed to the Upper House, and in 1853 was chosen along with other Peelites for the Aberdeen Coalition Ministry, of which he became Colonial Secretary. On the beginning of the Crimean War he devoted himself night and day to the War Department. The old military administration broke down under the unusual strain, and N., who along with his friend Herbert, was accused of both incapacity and indifference, resigned office in a memorable and pathetic speech in session 1855. His successor Lord Panmure testified to the energy with which he had done his best. From 1859 to 18th April 1864 N. was Colonial Secretary of the Second Coalition Government. He visited Canada and the United States with the Prince of Wales, and was enthusiastically received by the Orange lodges. He died 18th October 1867. The family of Clinton is said to be the oldest represented in the House of Lords except those of Berkeley and Neville.

Newcastle-under-Lyme (*i.e.*, under the *lime* or border of the county-palatine of Cheshire), a market town of England, in Staffordshire, 40 miles S. of Manchester by rail, contains two churches, a guildhall, theatre, grammar school (1602), and a literary institute. There are twenty-seven factories (sugar refineries, silk and cotton mills, potteries, pipe works, tanneries, &c.), and a trade in corn, flour, and the coal and iron of the surrounding district. The hat manufacture has declined. N. returns two members to Parliament. Pop. (1871) 15,948.

Newcastle-upon-Tyne, the chief town of Northumberland, on the N. bank of the Tyne, opposite Gateshead, and in the centre of the largest coalfield in England, 15 miles N. of Durham, 275 N. of London, and 120 S.E. of Edinburgh, on the N.-Eastern Railway. North Shields and Blythnook are its subports, and the river, some 20 feet deep at ebb-tide, is here crossed by the famous High Level Bridge, by the Redheugh Suspension Bridge, and by a swing bridge. The first of these structures, one of the engineering triumphs of Robert Stephenson, dates from 1846–50, and comprises a broad carriage-way, passenger-paths, and above these a railway-level with three lines of rails. Supported by six massive stone piers, 125 feet apart, it spans the river by an equal number of arches of open iron-work. Its extreme length is 1375 feet, and the upper bridge is 112 feet above high water. The Redheugh Bridge (1871) crosses the river some distance above the High Level, and has a height of 92 feet above high-water mark, and a span of 345. The swing bridge, one of the largest of the kind in the world, was constructed in 1873–75 by Sir W. Armstrong, to replace the old Tyne Bridge of 1781, but immediately on its completion was greatly damaged by fire, and was only opened on 17th July 1876. Situated below the High Level, it is of special importance in allowing the free navigation of the river. The old part of the town skirts the river bank, which is lined by quays, and extends for some two miles. Narrow dingy streets wind up the steep bank to the platform on which the modern town is built. The houses here are in great part built of freestone, and among the principal thoroughfares are Grey, Clayton, and Grainger Streets. The chief extension of the town has been on the N. side, towards Brandling village in Jesmond Township. To the W. lies the suburb of Rye Hill, in the townships of Elswick and Westgate, while to the E. near the river is an extensive commercial district, occupied mainly by large stores and factories. At the top of Grey Street stands the Grey Monument, a lofty Ionic column, surmounted by a statue of Earl Grey, and erected in 1836. N. has 16 churches of the Establishment, 8 Presbyterian, 4 Roman Catholic, and several other churches. The mother-church of St. Nicholas (1359, restored 1877), is a grand cruciform structure, partly in Decorated, partly in Perpendicular style, with a fine pointed tower 194 feet high, a spired lantern, and peal of eight bells, and contains an altar-piece by Tintoretto, and many old tombs of the Percys. Among the chief secular buildings are the town-hall (completed 1858), comprising a council chamber, a corn exchange, a music hall seated for 2500 persons, municipal offices, &c.; a new county court-house (1865) in Ornate Italian style; the Moot Hall (1810) or old court-house; the Central Exchange, remodelled in 1867; the Old Exchange and Guildhall (1658, restored 1809), a spacious edifice with a steeple; the Central Station (opened 1850), where all the railways entering N. terminate; the Police station and courts, completed in 1873; the Post-office, built 1873–77; the Tyne Theatre (1867), seated for nearly 3000 persons; and the Royal Theatre. The improvements in the town are in great part due to the enterprise of Richard Granger (died 1861), a builder of humble origin, who in five years is estimated to have constructed buildings of a rental of one million sterling. N. has an infirmary, two orphanages, asylums for the blind, the deaf and dumb, &c.; also an institute of mining, a college of medicine, and a college of physical science, established in 1871 in connection with Durham University. To the N.W. of the town are extensive barracks. To the N. are the Town Moor and Leazes, 1200 acres in extent, on which is the Hotspur Round, where races (including that for the Northumberland Plate), take place in June, and a public park, opened in 1873. The general market is one of the largest buildings of the kind in Great Britain, covering an area of nearly two acres. An important cattle market is held, to which in 1873 were brought 81,635 fat cattle, 350,638 sheep and lambs, and 39,585 swine. In 1876 there entered the Tyne ports 16,696 vessels of 5,154,362 (6667 steam of 3,217,412 tons) and cleared 17,133 of 5,455,213 tons (6980 steam of 3,445,330 tons). In 1876 the coal, cinders, and patent fuel exported from N. alone amounted to 4,009,739 tons (value £2,210,963), while the quantities and values of other exports were, of alkali, 2,472,355 cwts. (£747,669); iron (pig, bar, bolt, and wire), 27,807 tons (£131,302); iron railroads, 2093 tons (£16,743); all other kinds of iron, 16,878 tons (£192,320); of unwrought steel, 4005 tons (£2402); of wrought and part wrought steel, 83,354 tons (£342,870); of unwrought copper, 83,354 cwts. (£1864); of lead and lead ore, 235 tons (£197,483); of machinery, £94,494; of arms and ammunition, £58,317 (including 60,000 lbs. of gunpowder); of chemicals, £48,655; of cotton yarn, £14,951; of cotton piece-goods, £29,949; earthen and china-ware, £21,506; of glass, £24,108; and of painters' colours, £92,517. The total value of exports (1876) was £4,625,658, and of imports (foreign and colonial) £5,631,082. There are extensive manufactures of steam-engines, iron bridges, and ordnance (at the Elswick Works of Sir W. Armstrong), of soda, bleaching-powder, vitriol, and other chemical products, of stained, plate, crown, and flint glass and bottles, of sheet lead, lead pipes, and shot, litharge, red and white lead, of paper, pottery, hemp and wire ropes, Portland and other cements (11,000 tons yearly), and especially of fire-bricks. The making of fire-bricks is a recent industry, and no fewer than eighty millions of these bricks are produced annually. In 1876 (a bad year) there were launched at N. 38 vessels of 25,861 tons, and of these only 3 of 57 tons were of wood; at the Tyne Ports (*i.e.*, at N. and North and South Shields) the launches were 75 of 27,551 tons, all iron except 15 of 205 tons. The N. quarries send forth some 100,000 grindstones yearly. The atmosphere of N. is much obscured by smoke, and the general dulness is ten times intensified when the dense fogs of the North Sea come sweeping up the Tyne. N. sends two members to Parliament, and is governed by fourteen aldermen and forty-two councillors, of whom one is mayor. There are published here two daily and five weekly newspapers. Pop. (1872) 128,443, with Gateshead, 177,070. Where N. now stands, the Romans had a stationary camp, Pons Ælii, near the E. end of Hadrian's Wall. Many interesting remains of this period were found in 1810. During the Old English period the camp became a noted residence of monks, and took the name of Monkchester. A memorial of the time when pilgrims flocked hither to visit the holy well of Jesus' Mount (now Jesmond) is still preserved in the name of Pilgrim Street. From a stronghold built (about 1080) by Robert, eldest son of the Conqueror, the town took its modern name of 'New Castle.' The present castle was built by Henry II. between 1172 and 1177, and, though sadly dilapidated, is one of the best extant specimens of Norman military architecture. The first charter entitling the townspeople to dig coal was granted by Henry III. in 1239. During the Scottish wars of the Edwards, N. was the frequent rendezvous of the English forces. After the battle of Marston Moor it was besieged and taken by the Scotch (1644), and in 1745 it was occupied by Wade.

New College, Oxford, was founded in 1386 by William of Wykeham (q. v.), for a warden, seventy fellows and scholars, ten chaplains, three clerks, and sixteen choristers. By ordinances made in 1857, and amended in 1866 and 1871, there are thirty fellowships and forty scholarships, fourteen of the former and thirty of the latter being restricted to students of Winchester College of at least two years standing. All the scholarships are tenable for five years, and are of the annual value of £80 with tuition free. The hall of the N. C. was restored by Sir G. Scott (1866), and new buildings erected (1872). He is at present engaged on the restoration of the chapel, the largest in Oxford, with its windows of Flemish glass, noble organ, and exquisite cloisters. N. C. presents to 41 livings, and in 1876 had 151 members of Convocation, 130 undergraduates, and 379 members on the books.

New England, the name of the eastern portion of the U.S., comprising Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. Originally called North Virginia when granted by James I. to the Plymouth Company for colonisation in 1606, the region subsequently received its present name from Captain John Smith, who explored and made a map of the coast in 1714. The inhabitants, mostly of Puritan and Scottish descent, are known distinctively as Yankees, and are distinguished for quickness, adaptability, and enterprise.

New Forest, in the S.W. corner of Hampshire, is about 14 miles long from N. to S., by 16 wide. Of its 66,790 acres, 17,532 are (1877) enclosed plantations, the rest being open oak and beech woods, bog, heath, &c. The absence of underwood gives a parklike appearance to the N. F., which, watered by the Ex and Boldre, and commanding frequent glimpses of the Solent and Isle of Wight, is the most beautiful of all the English forests. Gipsies, squatters, and deer have disappeared, but not its peculiar breeds of swine and ponies. It forms part of the Crown demesnes, and is under the charge of a lord warden, two rangers,

four verderers, &c. Lyndhurst, the 'forest capital,' has a fine parish church (860), with a spire 130 feet high, and an altarpiece by F. Leighton. Pop. (1871) 1544. At Minstead, 2½ miles to the N., is the stone that marks the scene of William Rufus' death. The sites of other villages that stood within the present area of the Forest prior to its afforestation by the Conqueror are indicated by such names as Hinton, Winsted, Tackbury, &c. See Gilpin's *Forest Scenery* (1791); Wise's *The N. F., its History and Scenery* (Lond. 1874), and *N. F. Handbook, Historical and Descriptive* (Lyndhurst, 1875).

Newfoundland (Fr. '*Terre-Neuve*'), a large island between the North Atlantic and the Gulf of St. Lawrence, 90 miles N.E. of Cape Breton Island, and 14 S.E. of Labrador, from which it is separated by the Strait of Belle Isle. Along with many adjacent islets and the coast of Labrador, it forms the British colony of N. The greatest length of the island from N. to S. is 335 miles, and from E. to W. 330 miles; area, 40,200 sq. miles; pop. of colony (1874) 161,386 (58,091 Roman Catholics, 50,683 Anglican Episcopalians, and 28,639 Wesleyans). The coast-line, bold, rocky, and much indented by deep bays (of which Placentia Bay on the S. and Trinity Bay on the E. leave only an isthmus 4 miles wide between the peninsula of Avalon and the rest of N.), forms a rough triangle, the extreme points of which are Cape Bauld in the N., Cape Ray in the S.W., aud Cape Race in the S.E. The other chief inlets on the E. and N. are Conception, Bonavista, Notre Dame, and White Bays; on the W., St George's Bay; and on the S., Fortune Bay and St. Mary's Bay. The surface is generally rocky and uneven, rising in some places to 1000 feet. The rocks are metamorphic, and of Laurentian age, while the Cambrian, Huronian, Lower Silurian, Upper Silurian, and Devonian are occasionally found. There are numerous lakes (called 'ponds') and rivers, the largest of which, the River of Exploits, nearly bisects the island, and falls into the Bay of Notre Dame. The interior is little known, and largely consists of great marshy plains, covered with scrubby vegetation, resting on deep layers of peat, and frequented by herds of deer and moose. According to the latest survey, only 726 sq. miles of land (chiefly along the banks of streams) are available for settlements. The Cape Breton coal measures extend to the S.W. part of N. The other minerals found are iron, copper, nickel, gypsum, graphite, petroleum, and marble. Many parts of the interior are rich in pine and other timber. Most of the inhabitants are in the peninsula of Avalon, and on the E. and S. coasts. The climate is cold and bleak on the coast, but milder inland. At St. John's, the extremes of temperature in 1874 were 83° F. in July and 14° F. in March. Oats, potatoes, turnips, and hay are raised, but the chief employments are the fishing for cod and seal on the shores of N. or Labrador, the manufacture of oils, mining, and wood-cutting. In 1869 there were in N. 14,726 horned cattle and 23,044 sheep. N. comprises 11 electoral districts, besides the 'French Shore,' a narrow strip of coast on the W., N., and E. sides of the island, occupied by the French for the purpose of curing fish. The revenue (nearly all derived from customs duties) was in 1874 £185,634; expenditure, £198,920; public debt, £239,395. In the same year the total tonnage of vessels that entered and cleared the ports of N. (exclusive of coasting-trade) was 476,141 tons (British 466,209). In 1869, when the last census was taken, N. had 26 ports of entry, the entries at which numbered 1200; 673 of these were at St. John's, after which Harbour Grace, La Poile, Channel, English Harbour, and Burin had the largest number. In 1870, 196 vessels, averaging 100 tons each, and including 13 steamers, were employed in seal-hunting. Besides the 'Shore Fishery,' in which small vessels are employed, there is the extensive 'Bank Fishery' on a tract (S.E. of N.) about 600 miles by 200, over a plateau from 20 to 108 fathoms below the sea. In 1876 the exports of the United Kingdom to N. and the coast of Labrador amounted to £455,428, and the imports from N. (copper, 24,003 tons; fish, 202,900 cwts.; oil, 6308 tuns; and 344,285 skins and furs) to £699,077. The cod-fishery, commenced by the Portuguese and French in 1501-2, was claimed by the English, who seized the foreign vessels engaged in it (1585). James I. incorporated the N. Fishing Company in 1610. The fishery was prohibited to the United States in 1775, but was reopened to them by the Treaty of Washington, 7th January 1854.

N. was discovered (24th January 1497) by John Cabot, who called it *Prima Vista*, explored by Jacques Cartier in 1534, and taken possession of by Sir Humphrey Gilbert for Queen Elizabeth, 5th August 1583. Colonies were settled by Sir George Calvert in 1621, Lord Falkland in 1633, Sir David Kertk in 1654. In 1708 the colonists were partly conquered by the French, but the Treaty of Utrecht (1713) confirmed to England the possession of N., to which Anticosti and the coast of Labrador were annexed in 1809. The first governor was appointed in 1729. The present constitution, granted in 1832, consists of a governor and council exercising both legislative and executive functions, appointed by the Crown, and a House of Assembly elected by the people. See Pedley's *History of N.* (Lond. 1863).

Newfoundland Dog, is so named from having originally been brought from Newfoundland. It is allied to the Spaniel, and is notable for its love of the water and its swimming power. There appear to be two varieties of the N. D. One is named the Labrador Dog, or St. John's N. D. It is smaller than the other, which has received the name simply of 'N. D.' The Labrador variety attains an average height of 23 or 24 inches, and its colour is darker than that of the other breed, in the coat of which black and white hues are boldly marked. The legs and feet of the N. D. are strong and broad, and the web between the toes is larger than that seen in other dogs. The N. D. is exceedingly intelligent. It may be trained to fetch and carry objects, and to seek with success for lost articles. Not its least notable characteristic is its devotion to man in danger, and its ability to save life in cases of shipwreck and disaster at sea. In Newfoundland the dog is employed as a beast of burden.

New'gate, a famous gaol in London, at the W. end of Newgate Street, opposite the Old Bailey. As early as 1218 it stood at the *new gate* of the city of London, of which it is still the chief criminal prison. It was rebuilt by the executors of Sir Richard Whittington probably about 1430, and was destroyed in the great fire of 1666, but was soon afterwards again rebuilt. In the year 1779, when N. was taken down and rebuilt a third time, it had become a hotbed of noisome pestilence, but from that date the utmost care has been taken to ensure cleanliness. The *Newgate Calendar* contains a remarkable collection of lives of noted criminals who have been confined in N.

New Granada. See UNITED STATES OF COLOMBIA.

New Guin'ea, or **Pap'ua,** is next to Australia the largest island in the world. It is situated in 0° 30'—10° 44' S. lat., 131° 20'—150° 25' E. long., and has a length from N.W. to S.E. of nearly 1300 miles. Its breadth is very variable, the western portion being nearly insulated by Geelvink Bay and M'Clure Inlet, which approach within 17 miles of each other, while near its centre N. G. is fully 350 miles wide. The eastern extremity consists of a narrow and mountainous peninsula.

The first European who is known to have visited N. G. was the Portuguese Jorge de Meneses, in 1526, who called the island *Papua*, a word whose meaning is variously interpreted to refer to the frizzly hair or the dark colour of the inhabitants. In 1528 the Spaniard Alvaro de Saavedra sailed along the N. coast and called the island N. G., on account of the resemblance of the natives to African negroes. Ortiz de Retes, another Spaniard, also visited the N. coast in 1546, and in 1606 Torres skirted the S. coast and discovered the strait which bears his name. In 1676 the Dutch under Schouten and Le Maire had a disastrous encounter with the natives. Bougainville in 1768, Cook in 1774, and other subsequent explorers, sighted the coast but did not land. Flinders, however, landed in 1791. Subsequent explorations were made by the French under D'Urville, and in 1828 by the Dutch, who having acquired the rights of the Sultan of Tidore, now claimed all the island W. of 134° E. long., and made an abortive attempt at a settlement at Triton Bay. In 1845 a British expedition under Captains Blackwood and Owen Stanley surveyed part of the S. coast, and the latter officer continued till 1850 the survey of the southern shores of the eastern peninsula. In 1858 a second Dutch expedition explored the N.W. coast, and in the same year the Dutch boundary of annexation was extended to 140° 50' E. long., so as to include Humboldt Bay. In 1873 Captain Moresby, in H.M.S. *Basilisk*, continued the work of Captain Owen Stanley, and ascertained the true form of the E. extremity of the island. He found it to be fork-shaped, and to be skirted by an archipelago of small islands through which he discovered a passage to which he gave the name of China Strait, as it shortens by 300 miles the steam voyage between Australia and China. Important explorations

have also been carried on since 1871 by the Russian Dr. Miklucho Maclay, the Italians Dr. Beccari and Signor D'Albertis, the Rev. Messrs. Macfarlane and Lawes, of the London Missionary Society, and Mr. Octavius Stone. To these six gentlemen is due most of what is yet known regarding the interior of the island, which is still, however, for the most part a complete *terra incognita*, the N.W. peninsula alone having been fairly explored.

N. G. is a very mountainous country, and some of its peaks exceed in altitude any others in the Pacific. The N., N.W., and N.E. coasts are almost everywhere skirted by mountains, which rise in the Arfak range to 9520 feet. From the head of Geelvink Bay there extends eastward the Charles Louis range, which is snow-capped, and is believed to reach a height of fully 17,000 feet. Further explorations may prove the suspected connection of this chain with the Owen Stanley range in the S.E. peninsula, whose loftiest peak is 13,205 feet high, the average height of the range being 8000 feet. The N.E. coast consists of a succession of large bays, terminating in bold headlands, and bordered by steep mountains, while the sea is very deep. Traces of volcanic action have been found in N. G., but are apparently ancient. On the S. coast to the E. of Torres Strait there is a great curve known as the Great N. G. Bight. Its shores are flat and marshy, and are intersected by numberless fresh-water channels. All the S. coast is fringed by coral reefs and mud banks. The climate of N. G. being very humid, several of the rivers are of considerable size. The largest as yet known is the Fly, which discharges into the W. side of the Great Bight. It was ascended by Mr. Macfarlane in a small steam-vessel for 150 miles, and he thought the same vessel might have proceeded 100 miles farther up the river. The Baxter or Maikassa river, whose mouth is in 9° 8′ S. lat., 142° 18′ E. long., and is 2 miles wide, was ascended by Mr. Macfarlane for 91 miles, and was then 30 feet wide and 12 deep. On the N. coast the Ambernoh appears to be an important stream. All the rivers have bars at their mouths, and their navigation is frequently impeded by mud banks and fallen trees. No lakes have as yet been discovered in N. G.

The vegetation of N. G. is most luxuriant, the country being for the most part buried in dense forests, though these in some parts give place to expanses of rich grass, six feet high. Among the principal trees are the cocoa-nut, nutmeg, canary wood, candlenut, sago-palm, betel-nut, mango, and banana. The bread-fruit, yam, taro, sugar-cane, tobacco, and cotton are cultivated by the natives and thrive well, but none of them is indigenous. The forests are inhabited by a profusion of beautiful birds, of which a good many species are confined to N. G. Chief among them are the magnificent Birds of Paradise (q. v.), of which several species are found in the W. portion of the island. Fruit-eating pigeons, parrots, and lories are very abundant, and the cassowary and mound-building turkey are also natives of N. G. The mammals are less numerous, and with the exception of two kinds of bat, a peculiar pig (*Sus Papuensis*), and two species of echidna, they are marsupials. They include kangaroos (both terrestrial and arboreal), opossums, and the cuscus, the last being a curious little animal which seems to unite in itself several of the characteristics of the opossums and sloths. Snakes are very plentiful, but appear to be less commonly poisonous than in Australia. A species of python attains a large size. Insects are most abundant, and most of the moths are very large and beautiful, while the ants and spiders are formidable. The coasts abound in fish, turtle, and bêche-de-mer, and the pearl oyster is plentiful in Torres Strait.

The inhabitants of N. G. belong to the Papuan or Melanesian race, which seems to occupy a position midway between the Polynesian race on the one hand, and the aborigines of Australia on the other. Their usual colour is a sooty-brown of various degrees of darkness, but never reaching black except in the natives of the Arfak Mountains, whom Mr. A. R. Wallace regards as the true indigenes of north-western N. G. Dr. Beccari has also established the existence of a race of Negritos, similar to those of the Philippine Islands; while the Mafor or Mefoor Papuans in the N.W. peninsula give unmistakable evidence of the admixture of Hindu blood. In eastern N. G. the Polynesian race has made numerous settlements. The true Papuan is about 5 ft. 5 in. in height, and muscular, but with thin legs and large feet. His hair is long and frizzled, but though it appears to grow in tufts, Signor D'Albertis has ascertained that it is equally distributed over the scalp. The brows are prominent, the nose large and arched, and the lips protuberant. Unlike the Malays, the Papuans are very demonstrative, being fond of boisterous laughter and noisy discussions, in which men, women, and children all join. They are fierce and warlike, and commonly cannibals. The skulls and lower jaw-bones are kept as trophies, some tribes wearing the latter as ornaments, and others painting and otherwise decorating the skulls of their slain victims. The bow and arrow are in common use, except among the mixed eastern tribes, who use spears. The Papuans have but dim ideas on the subject of religion, though some of them believe in a future state and in the existence of spirits, especially evil ones. Circumcision is not practised, and polygamy is rare. The women do all the field work. The Papuan language is much harsher than the Malay, and is divided into numberless dialects. The Papuans live in houses measuring in some cases from 300 to 500 feet in length, and built on piles. Clothing is usually dispensed with, or at best is of the scantiest description, though Signor D'Albertis obtained in the interior some petticoats made of human hair. Ornaments are almost universally worn, the chief being bracelets and anklets of grass or plaited rattan, often decorated with shells, besides ear and nose-rings, and plumes of cassowary feathers. Mr. Lawes saw at Hood's Bay a young woman with 27 tortoiseshell ear-rings in each ear, and nose-rings besides. The N.W. tribes comb the hair into a fan shape with a wooden instrument, which also does duty as a fork. The Papuans make excellent pottery, while with their sharp stone axes they hew fine canoes out of the solid trunks of trees. They especially excel in carving, in which their proficiency is wonderful. In the S.E. some of their villages are regularly laid out in streets and squares, are kept scrupulously clean, and even have flower gardens. In the N.E. they practise a system of terrace culture with much skill and success. Mr. Wallace predicts the early extinction of the Papuan race if the tide of colonisation should be turned to N. G., on account of its warlike and independent character. An agitation was commenced in Australia in 1874 for the annexation by Great Britain of N. G. to the east of the Dutch boundary, but as yet the movement has been without result. At present the exports from the island are birds of paradise, sandal wood, massoy bark (the produce of *Cinnamomum kiamis*), tripang, tortoiseshell, and pearl shell, but with proper cultivation it might be made to yield almost every kind of tropical produce in abundance.

See *Narrative of the Voyage of H.M.S. 'Rattlesnake,'* by John Macgillivray (Lond. 1852); *Nieuw-Guinea ondersocht en Beschreven door eine Nederlandsche Commissie* (Amst. 1852); *Neu Guinea und seine Bewohner*, by Otto Finsch (Bremen, 1865); *The Malay Archipelago*, by A. R. Wallace (Lond. 1869); *Die Reisen der Nederlanders naar Nieuw-Guinea en de Papoesche Eilanden in de 17de en 18de eeuw, door P. A. Leupe* (The Hague, 1875); *Reistochten naar de Geelvinks baai op Nieuw-Guinea in de Jaren 1869 en 1870, door C. B. H. Rosenberg* (The Hague, 1075); *Discoveries and Surveys in New Guinea and the D'Entrecasteaux Islands*, by Captain Moresby, R.N. (Lond. 1876), and a number of papers by different authors, in the *Leisure Hour* for 1874-75; *Geographical Magazine* (vol. iii. 1876); *Nature* (vols. xiv. and xv., 1876–77); and the *Journal of the Anthropological Institute of Great Britain and Ireland* (vol. vi. 1877).

New Hamp'shire, one of the New England or eastern States of the American Union, is bounded N. by Quebec, S. by Massachusetts, E. by Maine and the Atlantic Ocean, and W. by Vermont, from which it is separated by the Connecticut River. Area, 9280 sq. miles; pop. (1870) 318,300, of whom only 603 are coloured, including 23 Indians. The State, nearly triangular in outline, is 178 miles long from N. to S., and 90 miles broad at the base in the S., while in the N. it has only a breadth of 4 miles. The sea-coast of 28 miles is low-lying, and in parts marshy, but some thirty miles inland the surface becomes broken and picturesque. As a country of mountains and lakes, N. H. has been called the 'Switzerland of America.' It is traversed by the Appalachians, part of which range, known as the White Mountains, contains the highest peaks in the north-eastern States. Among the chief heights are Mounts Washington (6285 feet), Jefferson (5794), Adams (5714), Clay (5553), Monroe (5384), Madison (5365), and Franklin (4904). This highland region, intersected by many fertile valleys and romantic glens, is clad with rich forests of oak, pine, beech, sugar-maple, birch, and other trees, and in the S. the river-courses are traced with a heavy growth of chestnuts, elms, poplars, locusts, willows,

hickories, &c. Besides the Connecticut and Piscataqua, which respectively bound the State W. and S.E., the chief river is the Merrimack. Many lakes—the Winnipiseogee, Squam, Ossipee, &c.—give variety and beauty to the scenery. The formation is mainly Eozoic, the surface rocks being granite, gneiss, mica, and quartz. Iron and graphite are extensively mined, and other minerals found are silver, copper, lead, zinc, tin, talc, manganese, sulphur, magnesia, 'Bath brick,' jasper, amethysts, and garnets. In 1874 N. H. produced 1,239,000 bushels of Indian corn (value $1,387,680) 174,000 of wheat, 41,000 of rye, 1,033,000 of oats, 84,000 of barley, 86,000 of buckwheat, 3,400,000 of potatoes ($2,006,000), 180,000 lbs. of tobacco, and 767,200 tons of hay ($10,073,336). In 1875 the live-stock comprised 47,000 horses, 211,900 cattle, 242,400 sheep, and 37,000 swine—total value, $14,107,542. The State contains (1876) 940 miles of railway, and publishes sixty-one newspapers and periodicals. Concord is the capital, Manchester, the largest city, and Portsmouth the only port of entry. Settled first in 1623 by colonists from Hampshire in England, the territory was for some time joined to Massachusetts. It received its present constitution in 1783, and ratified the constitution of the United States in 1788.

New Har'mony, a village of Indiana, U.S., on the Wabash River, 23 miles N.W. of Gransville. It was settled by the 'Harmonists,' a German religious sect, in 1815, transferred to Robert Owen for a socialistic experiment in 1824, and finally became the seat of a 'school of industry' founded by William Maclure. Success has attended none of these enterprises, and the village has only a pop. (1870) of 836.

Newha'ven, a seaport of England, in the county of Sussex, stands at the mouth of the Ouse, 56¼ miles S. of London by rail. It derives its chief importance from the mail-packets which ply twice daily to and from Dieppe. In 1876 there entered the port 908 vessels of 189,303 tons; and cleared, 745 of 148,043 tons. The principal imports in that year were wine (152,824 galls.), leather (326,379 lbs.), gloves (100,371 doz. pairs), silk manufactures (£5,378,285), cotton manufactures (£55,059), and chemicals (£42,213); exports, wool (2,565,055 lbs.), raw silk (285,539 lbs.), and tin (11,134 cwts.). The N. shipbuilding yard has turned out 10 vessels of 809 tons during the years 1872–76. Pop. (1871) 2549.

Newhaven, a Scotch fishing-village 2 miles N. of Edinburgh, has a pop. (1871) of 1721. Its fishers and fishwives form a distinct community, rarely intermarrying with any other class, and have been depicted by Charles Reade in his *Christie Johnson* (Lond. 1853).

New Haven, the largest city in Connecticut, U.S., on a sandy plain at the head of a shallow harbour opening on Long Island Sound, and around the mouths of Mill, West, and Quinnipiack rivers, 76 miles E.N.E. of New York, with which it is connected by rail and by lines of steamers. A beautifully built city, it is the seat of Yale College (q. v.), and has 40 churches, a splendid city hall, many broad, elm-shaded streets, and important manufactures of rifles, iron-wares, carriages, &c. A new bridge over the Quinnipiack is (1876) being erected at a cost of $136,000. There is a considerable foreign trade. N. H. was settled by Theoph. Eaton, the Rev. J. Davenport, and their followers in 1638. It was made joint capital with Hartford by the charter of 1662 and so continued,—the legislature meeting alternately in each place,—till 1873, when the latter became the sole seat of government. Pop. (1875) 55,667.

New Heb'rides, a group of islands in the South Pacific Ocean, lying between 14°–20° S. lat., and 166°–170° E. long. The area of the group is about 2500 sq. miles, and the principal islands are Espiritu Santo (160 miles in circumference), Mallicolo, Vaté, Erromanga, Api, Ambrym, Tanna, and Aneiteum. The N. H. are volcanic, and consequently their shores are nearly free from coral. Ambrym and Tanna contain large active volcanoes. The islands are very fertile, and produce yams, cotton, maize, bananas, and sandal-wood. A tiny species of pig, no larger than a rabbit, is the only native quadruped. The natives, who are very ferocious and degraded, belong principally to the Melanesian race, but there are Polynesian settlements on some of the islands. The two races do not amalgamate, and the number of dialects spoken in the group is marvellous. Missionaries from various societies in Great Britain, the Australasian colonies, and North America, have long laboured in the islands, and a translation of the Bible in the dialect of Aneiteum is now (1877) in the press. Erromanga was the scene of the murder of the eminent missionary, the Rev. John Williams, in 1839, and of the Rev. Mr. Gordon and his wife in 1860. The present pop. of the group is probably not more than 20,000, one-third of the inhabitants having been carried off by an epidemic of measles in 1876.

New Holl'and, the former name of Australia (q. v.).

New Inn Hall, Oxford, formerly known as Trilleck's Inn, from its belonging to John Trilleck, Bishop of Hereford (1334), during the Civil War served as the royal mint (1642–46), and was restored to its academic purposes by Dr. Cramer, the late principal (1831–34). A chapel was added in 1868. In 1876 N. I. H. had 12 members of Convocation, 15 undergraduates, and 39 members in its books.

New Ire'land, an island in the South Pacific Ocean, situated in 2° 35′–5° S. lat., 150° 30′–152° 45 E. long., and separated from New Britain (q. v.) by St. George's Channel. Its length is about 200 miles, and its breadth 12 miles on an average, though only one mile in some places. N. I. is hilly and covered with dense vegetation, while its shores abound with turtles and fish. The natives belong to the Melanesian race, and, like those of most of the adjoining groups, are cannibals. The women of N. I., however, unlike those of New Britain, are partially clothed, and seem to occupy a higher social position.

New Jer'sey, one of the original States of the American Union, is bounded N. by New York, S. by Delaware Bay, W. by the Delaware River, which separates it from Delaware and Pennsylvania, and E. by the Hudson River, Staten Island Sound, Raritan Bay and the Atlantic. Area, 7656 sq. miles; pop. (1875) 1015,370, including a few Indians, Chinese, and Japanese. Its length from the extreme N. to Cape May in the S. is 170 miles, its greatest breadth 59 miles, and its least 32 miles. The coast-line, including the bays, is 540 miles long, and is bordered to the extent of 295,474 acres by tide-marshes, much of which by ditching and banking has been rendered productive. In the N. the State is traversed by ranges of the Appalachians, the chief heights being Rutherford's Hill or Hamburg Mountain, 1488 feet, and Wawayanda Mountain, 1450 feet, near the New York boundary. Schooley's Mountain and the Musconetong Mountain are favourite summer resorts. The southern half of N. J. is a great plain, the surface of which is broken only by a few low hills, and in some parts eroded to a considerable depth by the streams. The State is watered by the Passaic, Hackensack, and Raritan, as well as by the boundary rivers Hudson and Delaware. With the exception of the Carboniferous, Permian, and Jurassic, all the geological formations are represented in the rocks and soils. A Triassic belt crosses the State from N.E. to S.W., and comprises Red Sandstone, with eruptions of trap, as best seen in the famous Palisades, a perpendicular ridge 200–500 feet high, extending along the W. bank of the Hudson for 15 miles. N. J. is rich in minerals. In 1874 there were 214 large mines of magnetic iron ores, and 12 of hæmatite iron ores, while bog iron ores are found all over the State in the wet meadows and swamps. The yield of iron ore in 1874 amounted to 525,075 tons. Clay, pure and shell marls abound, and are used as manure to the extent of 200,000 tons yearly, having already rendered the farming lands of N. J. of a higher average value than those of any other State. Among the other minerals are zinc, lead, potter's clay, glass sand, roofing and writing slates, hydraulic lime, and Potsdam sandstone. The soil is mainly a slight sandy loam, but the surface has been converted into a garden, chiefly by the industry of German settlers. The mountain region of the N. has great forests of oak, hickory, chestnut, hornbeam, tulip trees, sassafras, &c.; in the S. there are pine tracts, with some cedars in the swamps. In 1874 the produce of Indian corn was 9,397,000 bushels (value $7,705,540); of wheat, 1,986,000 ($2,581,000); of rye, 480,000; of oats, 3,284,000; of buckwheat, 267,000; of barley, 7300; of potatoes, 2,919,000 ($2,276,820); and of hay, 520,300 tons ($8,439,266). The fruit crops are also very valuable. In 1875 the live-stock comprised 115,700 horses, 15,000 mules, 986,900 cattle, 127,100 sheep, and 164,600 swine—total value, $28,500,000. N. J. ranks seventh in the list of manufacturing States. Within the State there are (1876) 1601 miles of railway. Of all kinds of newspapers there are 122. Trenton is the capital, and the largest cities are Newark, Jersey City, and Paterson. The earliest settlements seem to have been made by

Dutch traders in 1620. The whole territory was taken from the Dutch by an English force sent by Charles II. in 1664. It was subsequently given to Lord Carteret, then governor of Jersey Island, and hence received its name of *N. J.* Recovered along with New York by the Dutch for a short time in 1674, it was eventually sold to Penn and his associates in 1682, and became a refuge for the persecuted Quakers. During the War of Independence N. J. suffered severely from the incursion of British troops, and was the scene of the battles of Trenton, Princeton, Millstone, Monmouth, and Red Bank. Its constitution of 1776 allowed universal suffrage, but in 1807 women were deprived of their votes owing to the disclosure of certain corrupt practices.

New Jersey College, founded under the auspices of the Presbyterian Synod of New York, was chartered by New Jersey in 1746, and opened in Elizabethtown in the following year. It was removed to Newark in 1748, and finally to Princeton in 1757. The Rev. Dr. James M'Cosh, elected president in 1868, has greatly advanced the interests of the college. In 1875 it had sixteen professors, four other instructors, and 483 students, endowments to the amount of $600,000, libraries comprising 44,000 volumes, various museums, and observatory.

New Lon'don, a city of Connecticut, U.S., on the Thames River, 3 miles from its entrance into Long Island Sound, 50 E. of New Haven by rail. It communicates daily with New York and Boston by rail, and daily with New York by steamer, is protected by Fort Trumbull, and has one of the finest harbours on the Atlantic. Its industrial products are chiefly cottons, woollens, ironwares, and biscuits. Pop. (1870) 9576.

Newman, John Henry, the son of a banker, was born in London, February 21, 1801, and educated at Ealing. As a boy of fourteen, although 'very superstitious,' he found pleasure in the works of Paine and Hume, but in 1816 a study of Romaine and other Calvinist writers effected an 'inward conversion of which,' he says, writing in 1864, 'I am still more certain than that I have hands and feet.' From this year too he dates his vocation to celibacy. Entering Trinity College, Oxford (1817), he graduated (1820), was elected a fellow of Oriel (1822), took orders (1824), and was Whately's vice-principal at Alban Hall (1825). In 1826 he became a tutor of Oriel, and beginning to be known by one or two essays and university sermons, came out of his shell, and remained out of it till 1841. Bred in a Liberal and Evangelical school, N. gained the opinions that led him along the 'Via Media' to Catholicism from Anglican divines, living and dead,—the doctrine of Baptismal Regeneration from Sumner's *Treatise on Apostolical Preaching*, of a Visible Church from Butler's *Analogy*, of Tradition from Dr. Hawkins, and of Apostolical Succession from the Rev. W. James, while from Whately he imbibed those anti-Erastian views that mark Tractarianism (q. v.). A study of Church history and Patristic theology taught him how Donatists and Arians had 'protested' and passed away, and his friendship with Keble, Pusey, and Hurrell Froude developed in him an admiration of the Church of Rome and dislike of the Reformation, a belief in the Real Presence, and a devotion to the Blessed Virgin. Vicar of St. Mary's and chaplain of Littlemore (1828–43), he visited Italy (1832), where he wrote *Lead, Kindly Light*, and other hymns marked δ in the *Lyra Apostolica;* edited the *British Critic* (1838–41); and wrote twenty-four of the *Tracts for the Times*, the condemnation of the last and nineteenth of which, on the 'elasticity' of the Thirty-nine Articles (1841), was followed by N.'s resignation of his livings (1843) and reception into the Catholic Church (October 8, 1845). During the Oxford and Protestant portion of his life, he published the *Life of Apollonius Tyanæus* (1824), *History of the Arians* (1833), *Parochial Sermons* (8 vols. 1838–44), *Annotated Translation of St. Athanasius* (1842–44), &c. Shortly after his conversion, N. was ordained priest at Rome, and became head of the Birmingham Oratory; in 1854 he was appointed rector of the Catholic University of Dublin; and since 1858 he has conducted a higher-class school at Edgbaston, near Birmingham. In the Catholic Church N.'s position is somewhat like Falkland's in the camp of the Royalists. His convictions are at variance with his sympathies, and the *Reply to Mr. Gladstone* (1875) is characterised by a 'minimising' interpretation of the Vatican Decrees, being less a confutation of the statesman than a subtle attack on the 'insolent and aggressive faction' of the Ultramontanes. Other works of N. are *Loss and Gain, or the Story of a Convert* (1848), *Anglican Difficulties* (1850), *Lectures on the Turks* (1854), *Office and Work of Universities* (1854–56), *Apologia pro Vita Sua* (1864), *Grammar of Assent* (1870), and a *Collection of Poems* (1868), in which the *Dream of Gerontius* discovers a true poetic spirit. See Leslie Stephen's *Dr. N.'s Theory of Belief* in the *Fortnightly* (1877).—**Francis William N.**, brother of the preceding, was born in London, June 27, 1805, and passed from a private school at Ealing to Worcester College, Oxford (1822). He obtained a double first and Balliol fellowship (1826), but refusing from conscientious scruples to subscribe the Thirty-nine Articles for a master's degree, resigned his fellowship (1830), and quitted England for a three years' tour in the Levant. On his return he became classical tutor at Bristol College (1834), and at Manchester New College (1840), and in 1846 was appointed Latin professor in University College, London. This post N. resigned in 1863, and has since wholly devoted himself to literature. Diametrically opposed to his brother in religion, N. in *The Soul, her Sorrows and Aspirations* (1849), seems to incline to Positivism; in *Phases of Faith: Passages from my own Creed* (1850), traces his gradual divergence from Anglican orthodoxy; whilst his *Theism* (1858) is opposed at once to the negations of atheism and the pantheism of Spinoza. N. has also published an immense number of works on ethics, philology, mathematics, and general literature, among them *History of the Hebrew Monarchy* (1847); *Lectures on Political Economy* (1851); *Regal Rome* (1852); translations of the Odes of Horace (1853) and the Iliad (1856) into unrhymed English metres; *Miscellanies Academical and Historical* (1869); *Europe of the Near Future* (1871); a Berber Grammar; Arabic Dictionary (1871), &c.

New'market, the racing capital of England, stands partly in Suffolk, partly in Cambridgeshire, 61 miles N.N.E. of London by rail. It contains the church of St. Mary (restored 1867), a Congregational chapel (erected 1863 on the site of a palace of Charles II.), the mansion of the Jockey Club, and numerous training establishments. The Beacon Racecourse, upwards of 4 miles long, is the finest in the world. There are seven annual meetings, and the great events are the Two Thousand, run in April, and the Cesarewitch in October. (See HORSE-RACING.) The 'Devil's Dyke,' a remarkable hollow 100 feet broad, extends for 5 miles along the Downs, and probably served as the 'march' or border between the kingdoms of East Anglia and Mercia. Pop. (1871) 4534.

New Mex'ico, a south-western territory of the U.S., is bounded N. by Colorado, S. by Texas and Mexico, E. by Texas and the Indian territory, and W. by Utah and Arizana. Area, 121,201 sq. miles. Pop. (1870) 111,303, including 19,429 Indians. It is 380 miles long from N. to S., and 352 broad from E. to W., and is traversed throughout from N. to S. by the Rio Grande, the valley of which (20 miles wide) separates the Rocky Mountains from the Sierra Madre. The whole territory is a continuation of the great Mexican tableland, from 3000 to 6000 feet above the sea. From this plateau several peaks of the Sierra Madre (Mount Taylor, Topped Peak, &c.) tower to a height of 10,000 feet. The S.-eastern portion of the territory is occupied by part of the Llano Estacado ('staked plain'), where the mesquite or gama-grass, valuable as forage for cattle, grows to a height of from 5 to 20 feet. The Rio Grande receives in N. M. the waters of the Pecos, Chama, and Puerco; the N.E. of the territory is irrigated by the Canadian River, and the W. by the affluents of the Colorado. Forests of pine, cedar, spruce, and other evergreens cover the mountain-sides; while the foot-hills and river bottoms have extensive tracts of piñon or nut-pine, cotton-wood, sycamore, and other deciduous trees. In the S. and S.W., the cactus-tree is a marked feature in the landscape. The rocks of the plateau are cretaceous, those of the two great mountain ranges Eozoic. There are three considerable volcanic tracts, marked by lava and by volcanic sand alternating with salt marshes. Gold and silver are abundant, but the ores are mostly 'base,' yielding in general only from $50 to $85 per ton. In 1874 the total yield of gold was valued at $500,000. Copper is also found in very rich ores in several parts, the Santa Rila mine alone producing 3000 lbs. of copper weekly. Galena mines in the Oregon mountains yield 80 per cent. of pure lead, besides $50 worth of silver to the ton. Other minerals existing in N. M. are lignite, bituminous coal, anthracite, iron, and salt. The crops are chiefly wheat, Indian corn, oats, and barley, but in 1874 also included 8587 lbs. of tobacco and

19,686 gallons of wine, and had a total value of $1,905,060. In 1874 N. M. had 26,500 horses, 6141 mules and asses, 202,718 cattle, 619,438 sheep, and 11,267 swine—total value, $2,389,157. A considerable traffic is carried on by waggons with Santa Fé, the capital (pop. 4765), and the mineral produce is conveyed by Denver to St. Louis or San Francisco. There are neither railways nor navigable rivers. In 1873 the Indians were reported to number 14,389 Utes, Apaches, and Navajoes (4278 warriors), and 7683 Pueblos, or peaceful village Indians. The Utes and Apaches alone are hostile and thievish. As early as 1537 the Spanish adventurer Alvar Nunez penetrated to this region, and between 1595 and 1599 the Spaniards here established forts, mining colonies, and missions. N. M. was ceded to America at the close of the war with Mexico in 1848, and made an independent territory in 1850.

New Orleans, the capital and the principal city and port of entry of Louisiana, U.S., beautifully situated on both banks of the Mississippi, but chiefly on the left or N. bank, 115 miles above its entrance into the Gulf of Mexico. The general direction of the river is here from E. to W., but a curve or bend in its course has given N. O. the name of the 'Crescent City.' Extending some 10 miles along the N. bank, the city is built entirely on the alluvial bank, and below high-water level, being protected from the yearly floods by a levee raised in front and extended back to Lake Pontchartrain, into which also the rainfall, sewage, and seapage is driven by powerful machinery. The flood-water rises here 15 feet above the level of the Gulf of Mexico. N. O. is the tenth city in the U.S., the junction of three important railways, and the centre of a vast network of steamship lines. The river, lined with wharfs and approached by fourteen landings, is crossed to the recently annexed suburbs of Gretna and Algiers on the S. by eight steam-ferries. Throughout the city stretch 67 miles of street railroads, on part of which are used the celebrated fireless engines. Among the chief buildings are the custom-house, in Quincey granite, the cathedral, court-halls, a white marble city-hall, the university, state-house (the St. Louis Hotel till 1874), and various hotels and theatres. Of 142 churches, 36 are Roman Catholic, 25 Baptists, 11 Episcopal, 5 Evangelical, 19 Methodist Episcopal, 11 other Methodists, 12 Presbyterian, 6 Jewish, 3 Lutheran, 1 Swedenborgian, 1 Unitarian, and 1 Greek. The streets in the original or old French part are narrow and irregular, those in the American part are spacious and elegant, in many cases shaded with beautiful trees. There are 11 public parks and squares, 3 commercial canals, 12 draining canals, and 16 markets. Among the charities are 46 asylums, 12 hospitals, and 3 infirmaries. The University of Louisiana, the literary department of which is at Baton Rouge, and is under military discipline, has here 14 professors in law, medicine, &c. The number of public schools is (1876) 147, with 471 teachers and 14,235 pupils. There are twenty-four newspapers—six daily (one French) and eighteen weeklies. The festival preceding the first day of Lent is observed as the carnival of the city, and is called *Mardi Gras*, or 'Flat Tuesday.' N. O. has long been the chief cotton-mart of the world, as well as one of the leading sugar-marts. Its trade reached its climax in these two staples in 1861, when there were received from the interior 2,255,448 bales of cotton, and 460,000 hogsheads of sugar. In 1875 the receipts of cotton were 1,157,597 bales; of sugar, 154,779 hogsheads; of molasses, 337,916 barrels; of tobacco, 8636 hogsheads; of rice, 104,415 barrels; of flour, 917,982 barrels; of wheat, 145,000 bushels; of hay, 60,000 bales; of pork, 72,000 barrels; of bacon, 25,000 casks; and of lard, 27,000 kegs. The total foreign imports in 1874 amounted in value to $14,506,940, and the duties thereon to $2,992,593; the foreign exports to $93,259,289. The chief articles of export were cotton, 999,492 bales, valued at $67,275,000; tobacco to the value of $1,214,794; and staves to that of $662,000. In the absence of good water-power the manufactures are neither extensive nor valuable. They employ, however, 517 steam-engines and 5640 operatives. The climate is not extreme, the temperature averaging about 69° F., but the marshes and shoal-waters in the vicinity cause much yellow fever. Pop. (1873) 205,000. Settled by the French in 1718, N. O. passed with Louisiana to the U.S. in 1804, when it had 10,000 inhabitants. During the Civil War it was closely blockaded, and finally forced to surrender to the Federal commander Farragut, 24th April 1862.

New'port, a river-port of England in Monmouthshire, stands on the right bank of the Usk, 4 miles above its mouth, and 12 N.E. of Cardiff by rail. It contains four churches, a castle (now converted into a brewery), a town-hall, custom-house, assembly-rooms (1861), market-house (1865), mechanics' institute, &c. A dock of 4½ acres was opened here in 1842, a second of 7¾ acres in 1858, and the Alexandra Dock, now (1877) approaching completion, is larger than either of its predecessors. In 1876 there entered the port 4035 vessels of 578,695 tons, and cleared 8703 of 967,706 tons. The imports in the same year amounted to £520,942; the exports to £1,043,789; and the customs to £50,179. As the junction of five lines of railway N. offers great facilities for the exportation of the coal and iron of the surrounding districts, and grain and timber are largely imported. There are shipbuilding and timber yards, chain-cable works, iron foundries, a shot manufactory, breweries, &c. With Usk and Monmouth N. returns one member to Parliament. Pop. (1871) 27,069. N. was anciently the port of Caerleon (q. v.), was held by the Earls of Hereford and Dukes of Buckingham, and was the scene of a great Chartist riot, November 4, 1839.

Newport, a town of England, capital of the Isle of Wight, 5 miles S. of Cowes by rail, at the head of the Medina estuary. It contains the church of St. Thomas (rebuilt 1857), with a monument to the Princess Elizabeth (daughter of Charles I.), erected by the Queen from designs by Marochetti, two other churches, a guildhall (1816), museum, assembly-rooms, &c. Near the town are the Parkhurst Barracks, with accommodation for 3000 soldiers, and the remains of Carisbrooke Castle. N. has manufactures of lace, mats, brushes, &c., and a trade in iron, flour, timber, and malt. It returns one member to Parliament. Pop. of municipal borough (1871) 7956.

Newport, a city of Kentucky, U.S., on the S. bank of the Ohio River, opposite Cincinnati, and separated from Covington by Licking River on the W., has a court-house, 16 churches, and numerous benevolent institutions. Its chief manufactures are in iron and steel. A detachment of United States troops is stationed here. N. communicates with Cincinnati and Covington by two suspension bridges and by steam ferry-boats. Pop. (1870) 19,802.

Newport, one of the capitals of Rhode Island, U.S., at the head of Narragansett Bay, 70 miles S. by W. of Boston, with which it is connected by rail and by a line of steamers. It has 14 churches, 2 libraries, and a daily newspaper, and is the torpedo station for the U.S. Fort Adams, one of the largest fortifications in America, is situated 1½ miles S.W. of the city. N. has many antiquities, and is much resorted to by families in summer for sea-bathing. In 1875 the annual entrances and clearances of shipping amounted to 668, with a total tonnage of 1,609,224. Pop. (1870) 12,521. Founded by Roger Williams and his followers in 1638, N. has been the annual meeting-place of the Society of Friends for upwards of 230 years.

Newport-Pagnell, a market-town of England, in Buckinghamshire, on the Ouse, 28 miles N.N.E. of Aylesbury, has a fine parish church, restored by Street in 1858, a paper-mill, coachbuilding establishment, and a soda-water manufactory; and a trade in coal brought from Staffordshire by a branch of the Grand Junction Canal. Pop. (1871) 3824.

New Red Sandstone. See TRIASSIC PERIOD.

New Ross, a river-port of Ireland, partly in Wexford and partly in Kilkenny, is situated on the Barrow, 12 miles N.N.E. of Waterford by rail. It has a commodious harbour, with new quays erected at a cost of £3000, and the principal industries are brewing, tanning, and the salmon fisheries. In 1870 there entered the port 628 vessels, of 62,382 tons; and cleared 403 of 46,674 tons. The imports in the same year amounted to £115,453; the exports to £4763; and the customs to £11,020. N. R. returns one member to Parliament. Pop. (1871) 7330. In the annals N. R. is called *Ros-mic-Treoin* ('the wood of Treoin's son'), and in spite of its name is a very old place.

New'ry, a seaport of Ireland, in the counties of Down and Armagh, situated at the head of Carlingford Lough, on a small river of the same name and a canal leading to Lough Neagh (32 miles), 15 miles N. of Dundalk by rail. N. has Episcopal

Presbyterian, Wesleyan, and Roman Catholic churches, three banks, and two newspapers. Linens, woollens, flour, spirits, beer, and leather are manufactured, and there is considerable trade in grain and provisions. In 1876, 1011 vessels of 260,647 tons entered, and 920, of 217,125 tons, cleared the port. In the same year the imports amounted to £525,208, and the customs to £18,574. N. returns one member to Parliament. The name N. is a corruption of the Irish Gael. *Iubhar-cinn-tragha* ('the yew-tree at the head of the strand'). The town was chartered in the reigns of James I. and II. In 1689 it was partly burned by the Duke of Berwick. Pop. (1871) 13,364.

New Sibe'ria, a group of uninhabited islands in the Arctic Ocean, N.E. of the mouth of the Lena, between 70° 50′ and 76° 20′. Area, 20,728 sq. miles. These islands, the largest of which are Novaia Sibir (Russ. 'New Siberia'), Fadeyevskij ('Thaddeus' Island'), Kotelnoi-Ostrov ('Kettle Isle'), and Blishnij or Lächowsky ('Lächow's Isle'), afford great quantities of primitive ivory, for which, and for the whale fishery, they are annually much frequented. Novaia Sibir was discovered in 1760, the rest before 1805; and in 1823 the group was surveyed by Lieutenant Anjou.

New South Wales, a British colony in the E. of Australia. It originally included all of that continent to the E. of the 135th meridian of E. longitude, but this unwieldy area was greatly reduced by the successive formation of the colonies of S. Australia (1836), Victoria (1851), and Queensland (1859). The present boundaries of N. S. W. may be generally described as follows:—On the N. the 29th parallel of S. latitude, the Dumaresq river and the Macpherson range; on the E. the Pacific Ocean; on the S. the River Murray and a land-line from the head of that stream to Cape Howe; and on the W. the 141st meridian of E. longitude. The total area of the colony is 323,437 square miles, or about three times that of the United Kingdom. N. S. W. was discovered by Captain Cook in 1770, and definitely taken possession of by Great Britain on 26th January 1788.

N. S. W. may be divided, physically, into four principal regions, viz.:—1. The coast and mountains, the former for the most part consisting of an alluvial plain of wonderful fertility, watered by numerous rivers, while the mountains form a portion of the great Australian Cordillera (see AUSTRALIA), and in N. S. W. are composed of seven ranges, including the highest land in Australia. They consist largely of primary rocks, but more usually form precipitous ridges than sharp peaks. 2. The tablelands, which lie to the W. of the Dividing Range, and are composed of a floor, so to speak, of primary rocks, overlaid with metamorphic rocks. 3. The western slopes, which form undulating downs, gradually merging into the fourth region, known as the Saltbush Plains from its being covered with a species of mesembryanthemum, whose saline berries are readily eaten by sheep. These plains belong to the Tertiary formation in common with most of the rest of the interior of Australia. The watershed is formed by the Dividing Range, whose proximity to the sea causes all the longest rivers to flow inland. Their names, reckoned from N. to S., are—The Darling (q. v.), Bogan (q. v.), Lachlan (q. v.), Murrumbidgee (q. v.), and Murray, the last belonging equally to Victoria. For part of the year all these rivers are navigable by steamboats of light draught. The rivers of the eastern watershed are shorter and more impetuous, being all more or less liable to heavy floods. The chief of them, from N. to S., are—The Clarence, Shoalhaven, Hunter, and Hawkesbury (q. v.). Lakes are very few and insignificant, but the Liverpool Plains (q. v.) are believed to have been at one time the bed of an immense lake, and in the western plains, especially near the confluence of the rivers which unite to form the Darling, and at the junction of the Lachlan with the Murrumbidgee, a large extent of country is usually under water in winter. The coast of N. S. W. is bold and rugged, and besides the splendid inlet of Port Jackson (q. v.), possesses good harbours at Twofold Bay and Port Stephens.

The climate of N. S. W. is necessarily very diversified, but it is almost everywhere salubrious. The highest mountains scarcely reach the line of perpetual snow, and on the coast snow rarely falls. At Sydney the mean annual temperature is 65°, and the annual rainfall 49·94 inches. The heat on the plains of the interior is excessive, reaching 100° in the shade during a great part of the year, and the same region is also liable to prolonged periods of drought.

The flora of N. S. W. is varied and interesting. Among the principal trees are the various kinds of Eucalyptus (q. v.), wattle, and Casuarina (q. v.). The first-named yield timber which in size and quality is almost unrivalled, and many of the smaller trees of the colony furnish handsome ornamental woods. Ferns and wild flowers grow in profusion, but the wild fruits are few. The total area under crops of all kinds on 31st March 1876 was 451,139 acres, the two principal crops being wheat (133,609 acres) and maize (117,582 acres). Oats are grown chiefly for fodder, and the cultivation of potatoes is limited. 6453 acres were under the sugar-cane, and 4458 acres under the vine. The yield of sugar was 2,310,860 cwt., and of wine 831,749 gallons. 19,407 acres were cultivated as gardens and orchards, orange-growing being an important industry in N. S. W. Among the other crops are barley, rye, millet, tobacco, and arrowroot.

N. S. W. abounds in animal life, the indigenous fauna including kangaroos of all kinds, the wombat, opossum, bandicoot, koala or native bear, echidna, ornithorhynchus, and many species of bat. Among the birds the most numerous are cockatoos, parroquets, owls, pigeons, and quails. The Laughing Jackass (q. v.) is also common, but the Emu (q. v.) has been driven to the remoter parts of the interior. Snakes are plentiful and very venomous, the most dreaded species being the death-adder and yellow snake. Insects are abundant to the last degree, and include many which are very obnoxious to man.

The mineral wealth of N. S. W. is very great, including coal in boundless quantity, besides gold, silver, iron, tin, copper, manganese, platinum, and precious stones. The value of the principal mineral exports during 1876 was as follows:—Coal, £1,319,918; kerosene shale, £47,994; tin, £439,638; copper, £249,978; silver, £15,456. During the same year 153,531 oz. of gold, valued at £600,000, were sent to the Sydney mint. As yet, however, the pastoral interest is the most important one in the colony, the live stock of which amounted in 1875 to 22,872,882 sheep, 2,856,699 cattle, and 346,691 horses. The sheep outnumbered those in all the other Australian colonies put together. Large numbers of horses run wild in the interior, and are frequently slaughtered for their hides. The wool shipped from N. S. W. in 1875 amounted to 87,500,000 lbs., of the value of £5,651,643, besides tallow, skins, and hides to the value of £306,000, and preserved meats to the value of £70,000. The total value of the exports of all kinds in 1876 was £8,277,520, and of the imports £11,567,485. The revenue for the same year was £5,037,661, of which £2,772,999 was derived from land, £1,000,000 from customs, and £678,391 from railways, of which there were 450 miles open. Favoured by the abundance of coal, the manufactures of N. S. W. are numerous and increasing, in spite of its free-trade policy. The most important are iron foundries and engineering works, shipbuilding, saw and flour mills, leather, woollen-cloth, and meat-preserving factories, breweries, distilleries, and sugar refineries.

From its foundation in 1788, N. S. W. continued to be a penal settlement until 1849, when the transportation of criminals thither was stopped in consequence of a very strong agitation in the colony against it. Two years later the discovery of gold near Bathurst (q. v.) caused a great influx of population, and started the colony on its prosperous career. N. S. W. is governed by a governor appointed by the Crown, assisted by an executive council of seven, who are responsible to a Parliament composed of two Houses—the Legislative Council and the Legislative Assembly. The former consists of not less than 21 members, all nominated by the Crown; and the latter of 72 members, elected by 60 constituencies. The suffrage is practically universal, and the parliaments are triennial. N. S. W. is subdivided into 118 counties, 99 of which are grouped under 13 pastoral districts. The pop. at the end of 1875 was officially estimated at 606,652. The capital is Sydney (q. v.), and the other chief towns are Newcastle (q. v.), Maitland (q. v.), Parramatta (q. v.), Bathurst (q. v.), and Goulburn. See *Gazetteer of N. S. W.*, by R. P. Whitworth (Sydney, 1866); *N. S. W. the Mother Colony of the Australias*, by G. H. Reid (Sydney, 1876); *The Australian Handbook for* 1877 (Lond. 1877); *Mines and Mineral Statistics of N. S. W.*, by the Hon. John Lucas and Rev. W. B. Clarke (Sydney, 1875).

News'papers. Although the *Acta Diurna* of the Romans contained daily official reports, and the Chinese claim to have

had a similar journal of much greater antiquity, N. are almost entirely the growth of modern times. The earliest regular newspaper we know anything of is the *Notizie Scritte*, published in MS. at Venice about the middle of the 16th c. This paper was to be seen at various places in the city, a small coin (*gazeta*) being charged for the privilege; hence the term 'Gazette.' There is some obscurity regarding the date of the first English newspaper. Copies of a print in the British Museum entitled the *English Mercury*, purporting to give news of the Spanish Armada, &c., have been conclusively proved to be forgeries. Not long afterwards, however, we come to the 'era of Mercuries,' these being casual publications, issued in the interests of various cliques, parties, and professions, rather than N. There was the *Mercurius Pragmatical*, the *Mercurius Bellicosus*, the *Laughing Mercury*, and Mercuries of all kinds. A favourite medium of supplying intelligence was in the form of 'news' letters, written to provincial magnates by residents in London, who sent their patrons the news of the courts and markets, and regaled them with the talk of the town and the gossip of the coffee-houses. In 1622, one of these letter-writers, N. Butter, printed the *Certaine News of the Present Week*, which was followed by a whole host of similar one-paged weeklies. In its early stages newspaper-writing was hot and spicy, brimful of personalities, and coarse and vituperative epithets, bearing no small resemblance to a style which is common at the present day 'out West' in America, but destitute of the grotesque and diverting humour of New World animosities. One journal was often started simply to fight or cry down another, the *Weekly Discoverer* being followed, for example, by the *Discoverer Stripped Naked*. The news was chiefly limited to foreign affairs, domestic matters being scarcely discussed till after the abolition of the Star-Chamber. During and after the Civil War the Royalists and Republicans had their organs in the press, perhaps the most able writers on either side being Sir John Birkenhead in the former, and Marchmont Needham in the latter party. Under Charles II. a strict censorship of the press was established, and no journals were permitted save those authorised by the unscrupulous licenser of the press, Sir Roger L'Estrange, himself publisher of the *Observator*. The Government paper, *The London Gazette*, two pages in size (started in 1665), came out on Mondays and Thursdays. Although the experiment had been repeatedly tried before, the first daily newspaper that established itself firmly was the *Daily Courant* in 1709, which consisted of one page of two columns. The imposition in 1713 by Act 10 Anne, c. 17, of a stamp duty of 1d. on N. larger than half a sheet (½d. if otherwise), which tax was gradually increased by various statutes (in 1756, 1789, and 1797) till it amounted to 4d., was a great hindrance to the progress of the press in the 18th c. Among the most famous papers of this period may be mentioned *The Public Advertiser* (started as the *London Daily Post* in 1726), which had attained at the time of Junius' Letters to its publisher a circulation of from 6000 to 7000; the notorious but short-lived *North Briton* of John Wilkes, which ran through 217 numbers (No. 45 being burned by the common hangman); *The Englishman* and *London Evening Post*, which were both indebted to the classic pen of Edmund Burke; and the *Jesuit*, a Whig organ, satirically so called, launched by Sheridan in 1782. At the beginning of the 19th century the leading London papers were the *Morning Chronicle*, the *Morning Post*, and the *Times*. The *Chronicle* (founded in 1766) had three remarkably able editors in succession—Woodfall, Perry, and Black—and was for a considerable time the leading journal. The *Post* (1772), then as now, was the fashionable paper *par excellence*, and impressed much of the literary genius of the day into its service. The *Times* was established by the first John Walter in 1785 as the *Daily Universal Register*, assuming its present name in 1788. In 1800 it had a circulation of 1000, greatly less than that of the *Chronicle* or *Post*. In 1803 the second John Walter became manager and joint-proprietor, and under his energetic sway it grew to be the greatest paper on the globe. It owed its success firstly to the business capacity of Mr. Walter, who saw that the newspaper which gave the earliest and the best news would command the greatest amount of public favour, and who acted energetically on that conviction. It was also greatly indebted for its success to the independent tone of its leaders, and the high talent of its contributors, while the application of steam-power to its printing-press in 1814, enabling 1100 copies to be thrown off in an hour, or more than four times the number of any other daily, gave it a great impetus. Mr. Barnes held the editorship from 1814 to 1841, when he was succeeded by J. T. Delane, who has now (1877) resigned, and is succeeded by Mr. Chenery, Professor of Arabic in Oxford University, and who has long been a contributor. The *Times* appeared as an eight-page paper (forty-eight columns) on January 29, 1829. In 1846 its average circulation had reached 23,000, and in 1854, during the Crimean War, when W. H. Russell's brilliant letters initiated the War-Correspondence feature of modern journals, attained an average of 51,648, or twice that of all the other London dailies. In 1836 the Act 6 and 7 William IV. c. 76, imposed, in place of the old 4d. tax, a duty of 1d. on a newspaper containing 1530 square inches, 1½d. if above 1530 and under 2295 square inches, and 2d. if the latter size, a reduction signalised by the establishment of sixty-one new papers in Great Britain. This tax was altered to 1d. for every sheet under 2295 square inches in 1853, and by Act 18 Vict. c. 27, was finally abolished in 1855. The 5d. papers (followed shortly by the *Times*) reduced their price to 4d., and a number of penny dailies were started, the most successful of which have been the *Daily Telegraph* (1855), and the *Standard* (1857). Various statutes have since been passed which have greatly helped the wonderful development and popularising of N. The paper-duty was repealed in 1861, when the *Times*, *Morning Post*, and other papers reduced their prices to 3d., and a number of penny papers increased their size from four to eight pages. In 1869, by Act 32 and 33 Vict. c. 24, the provisions in Act 1 Will. IV. c. 73 and 6 and 7 Will. IV. c. 76, requiring deposits of sureties and other burdens, were cancelled. The present power of the press can scarcely be exaggerated. The fierce light it has thrown upon every social and national abuse, the searching and minute criticism of every step in legislation, the full, free, and untrammelled expression it has given to the nation's voice, have not unfrequently decided the fate of measures and of administrations. It is impossible to estimate the importance of N. socially, commercially, and politically. The completeness, variety, and extent of news in every impression of the *Times* is indeed one of the greatest triumphs of civilisation.

The staff of a leading London newspaper includes the editor-in-chief, the assistant-editor, the city editor, having charge of the commercial news, leader-writers and other contributors, the sub-editors, dealing with various departments, and a complete corps of reporters and local correspondents. It has a representative in most of the great capitals in the world, from whom and from Reuter's Telegram Company foreign telegrams are constantly obtained. In the year 1877, 74 reporters were accommodated in the two Houses of Parliament. They represented the various London dailies and news associations supplying the provincial papers. These associations are assumed to represent sufficiently the papers out of London; but a feeling prevails strongly that the more important of the latter should have access to the Reporters' Gallery. At present (1877), while the leading country dailies spend large sums of money to get their own reports of Parliamentary debates, they have no recognised right of admission for their reporters. The less important country papers rely for their Parliamentary reports exclusively upon the Press and Central News Association. In the busy life of the age, newspapers form the only reading of thousands of people, and must therefore be made as universal in contents as possible. Besides the leaders, telegraphic intelligence, and paragraphs, its columns are accordingly opened to reviews of current literature, notes of travel, musical and dramatic criticism, approved letters from correspondents, &c. The machinery used in printing the great papers (by the Walter, Hoe, Victory, &c., presses) is of the most perfect description. The Walter Press has printed the whole impression of the *Times* since 1870. The paper is supplied in huge long rolls, and is printed, cut, and folded by one machine at the rate of from 12,000 to 15,000 copies an hour. The enormous expense of a paper is seldom covered by a sale however large, and proprietors therefore look to advertisements for their profit. The highest-class journals do not solicit advertisements, but the majority of papers have regular canvassers in the advertising department.

According to Mitchell's *Newspaper Press Directory* for 18— (an annual and useful publication), there were in the beginning of that year 1692 newspapers in the United Kingdom, as follows:—

England—		
London	320	
Provinces	991	
		1311
Wales		56
Scotland		164
Ireland		141
Islands		20
		1692

Of those published in the Metropolis, 18 only were daily (13 morning and 5 evening) papers; 5 of these were purely commercial journals, and 1 (the *Sportsman*) a turf paper.

CHIEF LONDON MORNING PAPERS.

Newspapers.	Founded.	Price.	Politics.
Times	1788	3d.	Liberal, but reflects National Opinion.
Morning Post	1772	3d.	Conservative.
Morning Advertiser	1794	3d.	Independent.
Daily Telegraph	1855	1d.	Liberal in Domestic, Maintenance of 'British Interests' in Foreign Politics.
Standard	1857	1d.	Conservative.
Daily News	1846	1d.	Liberal.
Daily Chronicle	1855	1d.	Liberal.

The ordinary size of the *Times* is 16 pages, but frequently it extends to 20 pages. The strictest censorship is exercised in the advertisement department, and its revenue from that source is the greatest in the kingdom. Original telegraphic intelligence is published every morning from all the leading cities of Europe and various parts of the world. Everything necessary for the production of the paper (except ink and paper), including printing presses, types, &c., is manufactured at the *Times* office, which is characterised by completeness of arrangement and perfection of mechanical details. Next to the *Times*, the highest place must be given to the *Telegraph*, the *Standard*, and the *Daily News*, which are admirably conducted in every department. The *Telegraph* is understood to have the largest circulation (average 267,189, October 1877), and the *Standard*, which has long been famous for its parliamentary reports, probably comes next to it (199,000, morning and evening issue, October 1877). As an instance of the public spirit of the *Telegraph*, the recent expedition to Central Africa of Mr. Stanley at the joint expense of that paper and the *New York Herald* deserves recognition. The *Daily News*, started with Charles Dickens as editor in 1846, reduced from 3d. to 1d. in 1868, signalised itself in 1876 by obtaining earlier information of the Bulgarian massacres from its representatives in the East than the Government from Her Majesty's Consuls, and by the letters telegraphed by Mr. Archibald Forbes during the Russo-Turkish struggle (1877)—in many respects the best war correspondence which the history of journalism records.

CHIEF LONDON EVENING PAPERS.

Newspapers.	Founded.	Price.	Politics.
Pall Mall Gazette	1865	2d.	Independent.
Globe	1803	1d.	Conservative.
Evening Standard	1827	1d.	Conservative.
Echo	1868	½d.	Liberal.

The *Pall Mall Gazette* must be allowed the palm for literary excellence. The halfpenny *Echo* has a larger circulation than all the other evening papers combined. The circulation of the London dailies (78,000 in 1854) is probably in 1877 not less than 1,000,000.

In January 1877, 9 papers were published in London twice a week, 5 three times a week, 247 weekly, and 41 fortnightly and monthly. The non-daily papers are for the most part local, trade, class, or sectarian organs. The *Observer*, published every Sunday (price 4d.), gives late, reliable, and important news. The *Mail*, published in connection with the *Times*, contains a weekly summary of the best of that journal. *Lloyds' News* (1842) and *Reynolds' News* (1850) take the lead among the many widely-circulating working-class weeklies. The circulation of *Lloyds'* is said to exceed half a million. The highest place among critical journals must be assigned to the *Saturday Review* (1855), the *Spectator* (1828), and the *Examiner* (1808). The *Athenæum* (1828) is the first literary weekly, its most successful rival being the *Academy* (1869). The *London Gazette* (1665), published on Tuesdays and Fridays, price 1s., is the appointed organ for all announcements of the Government. Among the papers printed in foreign languages are the *Courrier de l'Europe* (French), and the *Londoner Zeitung* (German). The *Illustrated London News* (1842) and the *Graphic* (1869) are *facile principes* as illustrated N. *Punch* is undoubtedly the best comic publication the world has ever seen. Its cartoons are often masterpieces of satiric or pathetic humour; its other illustrations have reflected with marvellous felicity the inexhaustible phases of English life. Its first editor, Mark Lemon, gathered about him the brightest wits in London, and gave it a tone at once popular and refined, which it has sustained with ease to the present day. *Judy*, *Fun*, *Figaro*, *Funny Folks*, &c., are engaged in the manufacture of jokes for the million. The *World*, started in 1874, and its subsequent imitators, *Truth*, *Mayfair*, &c., are dear to the lovers of piquant scandal and unscrupulous banter.

Of the 991 English provincial papers, 54 were morning (15 Conservative, 23 Liberal, 16 neutral) and 29 evening (5 Conservative, 10 Liberal, 10 neutral) issues. 41 of the morning papers were priced one penny, 13 one halfpenny. With one exception (the *Cheltenham Evening Telegram*) all the evening were halfpenny papers. Liverpool has 7 daily papers; Manchester and Newcastle, 5; Birmingham, Leeds, and Sunderland, 4; Bolton, Bradford, Brighton, Bristol, Exeter, Hull, Leicester, Nottingham, and Sheffield, 3; Huddersfield, Middlesbrough, Plymouth, and Shields, 2; and Ashton, Banbury, Barrow, Bury, Cheltenham, Darlington, Dewsbury, Eastbourne, Gloucester, Hanley, Ipswich, Newport, S. W., Norwich, Oldham, Penzance, Scarborough, Southport, Wolverhampton, and York, 1 each. 255 towns possess more than one weekly paper, the common size of which is eight pages, and the price usually one penny or twopence. As a rule the provincial dailies will not stand comparison with the metropolitan. We may mention, however, the *Manchester Guardian* (which has rivalled the London papers in lateness and accuracy of home and foreign news), the *Manchester Examiner*, the *Liverpool Courier*, the *Liverpool Mercury*, the *Leeds Mercury*, and the *Newcastle Chronicle* as brilliant examples of the energy, intelligence, and culture of the English provinces.

In Scotland there were 12 morning and 6 evening papers, of which 9 proclaimed themselves Liberal, 2 Conservative, and 7 Independent or neutral; 5 were published in Edinburgh and Leith, 6 in Glasgow, 3 in Dundee, 2 in Aberdeen, 1 in Greenock, and 1 in Paisley. The earliest Scotch newspaper was the *Caledonian Mercury*, which as the *Mercurius Caledonius* made a spasmodic appearance as far back as 1660. This ancient print some twelve years ago finally merged into the *Weekly Scotsman*. The *Edinburgh Courant*, the Conservative and Established Church organ, has a history dating from 1702. It has not of late years received adequate support from its party, but it is now striving with unwonted energy for recognition as the organ of the liberal and cultivated Conservatives. The *Scotsman*, founded in 1817 in the Whig interest, has always been one of the ablest and most consistent of that party's organs, and fought the battles of Reform and Free Trade with indefatigable vigour. Under the editorship of Charles M'Laren, J. R. M'Culloch, and particularly Alexander Russel, it distanced all competitors, and has now (1877) attained a circulation of 60,000, being immensely greater than that of any paper in Britain out of London. Mr. Russel received in 1875 a compliment never before or since paid to a journalist, when he was elected an honorary member of the Reform Club, in acknowledgment of his services to the Liberal cause. The *Scotsman* was the first to initiate various enterprises, in which it has been followed with commendable alacrity by several other Scotch papers, such as the establishment of special telegraphic wires to London and the running of special trains to different parts of the country for the transmission of early editions. It also introduced the 'Walter Press' into the printing department before any other non-metropolitan journal. It has two special London wires and three Walter presses. Under its present management it has shown a resolute determination to throw off the reproach of provincialism (which Mr. Russel's editorship, brilliant though it was, tended to confirm), has boldly challenged the infallibility of the London Press, and on several notable occasions anticipated the latter in the publication of important news. It has also conspicuously widened the range of its intellectual sympathies—Literature, Education, and

Social Progress receiving a much larger and more liberal attention than formerly. The Edinburgh *Daily Review*, founded in 1861, took the place of the old *Witness* as the leading Free Church paper, and during the present year (1877) has specially signalised itself by an almost uninterrupted series of attacks on the Church of Scotland. It is certainly the most vehement and persistent organ of Disestablishment north of the Tweed. The *Glasgow Herald* (1782) is a remarkably well-written paper of great influence in the W. of Scotland. In politics, whether secular or ecclesiastical, it is candid, temperate, and rational. The space devoted to literature is a compliment to the intelligence of Glasgow. The *Herald* is understood to be the best newspaper 'property' in Scotland—next to the *Scotsman*. The *North British Daily Mail* (1847) has distinguished itself in social questions. Of all newspapers recently started in the United Kingdom, none has so speedily acquired such a position as the Conservative *Glasgow News* (1873), which has now (1877) passed from the hands of a company to that of a single proprietor. Two evening papers, the *Citizen* and *Times*, are largely patronised. The former has long been noted for the literary felicity of its paragraph leaders. The leading newspaper in the N.E. of Scotland is the *Dundee Advertiser* (1801).

15 morning and 5 evening papers were published in Ireland (9 Conservative, 7 Liberal, and 4 neutral). Dublin had 8; Belfast, 6; Cork, 3; and Limerick, Londonderry, and Waterford, 1 each. The Irish papers are smaller in size as a rule than those published in Great Britain. The Dublin *Irish Times* and *Freeman's Journal*, the Belfast *Northern Whig*, and the *Cork Examiner* are among those most deserving of notice.

Before proceeding to a short review of the foreign press we may be permitted to point out how faithfully a country's N. reflect the national genius. The English paper, large and bulky, crammed full of advertisements, of political, legal, mercantile, and foreign news, bears witness to the busy life, commercial energy, and far-reaching interests of England, while the strong assurance and reliant tone of the leaders are indications of the inherent common sense and independent spirit of its people. The smaller and neater French journal, bright and vivacious, deals less with trade, but sparkles with witty paragraphs and incisive sentences; is full of airiness and raillery; devotes a *feuilleton* to novelettes, dramatic criticism, and gossip; and in the contrasted fierceness of its political articles betrays the weakness of unsettled institutions, and the sense of wrongs wrought by corrupt parties on a great and generous people. The German *zeitung*, careful and methodical in tone, stern, immovable, and unswayed by sentiment, is a reflex of solidity, iron determination, and national strength. But it also exhibits the pernicious influence of *bureaucratism* or government officialism. It is too often 'kept' or subsidised; and it shows frequent trace of the government scissors—in a word, it is able, but it is not free. Most pronounced of all are the characteristics of the American press, which in the form of extravagant advertisements, sensational headings, feverish activity, irrepressible go-aheadness, and sometimes of unblushing personalities, illustrate while they exaggerate the vices and the weaknesses of the nation. It would be unfair on the other hand to ignore the humour, sprightliness, keen sense, and generous enthusiasm which no less faithfully reflect the national virtues.

FRANCE.—French N. were under very strict laws before the Revolution, nor has the country since ever experienced to the full the blessings of a free press. The oldest paper was the *Mercurie François* (1605-45), a semi-historical compilation. The *Gazette de France* was published from 1631 to 1792. The *Journal de Paris*, 1777–1825, was the first daily political paper. In the memorable year of 1789 a number of journals were started—Marat's famous *Ami du Peuple*, which preached the gospel of Rousseau and sounded the death-knell of Louis XVI.; the *Journal des Débats*, always famed for moderation and ability; and the *Moniteur Universel*, which remained consistently for eighty years the organ of whatever government happened to be in power. Under the Empire only five political journals were permitted in Paris, and a strict censorship was established, which remained in full force till 1821. The liberty of the press again suffered under the Ordinances of 1830, and was fettered still further in 1835. During Louis-Philippe's reign the most popular papers were the *Siècle* and the *Constitutionnel*, which latter had in 1846 a circulation of 180,000, and the *Presse* of Emile de Girardin, which by reducing its price to forty francs per annum, was the pioneer of cheap journalism. On the establishment of the Empire by Louis Napoleon in 1851, he crushed the opposition press with unparalleled determination. The *Presse*, *Pays*, *Patrie*, *Union*, *National*, *Débats*, *Paris Journal*, *Charivari* (humorous), *Figaro*, *Gaulois*, *Galignani's Messenger* (printed in English), and the *Journal Officiel*, which superseded the *Moniteur Universel* as the government organ in 1869, were among the principal N. of his reign. Rochefort's libellous *Lanterne* (1868) was an extraordinary success. Since 1870 a multitude of N. have sprung up, the *Soir*, *Bien Public*, *Constitution*, &c., and M. Gambetta's *République Française*, which in 1877 received such rough treatment from the Macmahon Government. The journals of Paris numbered 791 in 1875, of which 113 were political.

Germany was early in the field of journalism. The *Relationen* of the 16th c. disseminated records of striking events and extraordinary occurrences throughout the country. The *Frankfurter Oberpostamte Zeitung*, founded in 1616, lasted exactly 250 years (till 1866). In the middle of the 17th c. N. were placed under government censorship, and their number was unimportant, while their contents were little more than official news till the date of the French Revolution. The *Allgemeine Zeitung*, now of Augsburg, started at Tübingen in 1798, has been the most successful German journal, and at the present day holds the leading place for literary excellence, variety of contents, and reliable and extensive correspondence. Under the French rule the national tone disappeared from the German press, and a strict censorship initiated in 1819 impeded its development. Since 1848, and particularly after 1870, there has been a great increase in the number and ability of journals. In March 1872 there were 1743 real N. in the empire, 951 of which were in Prussia. The leading journals of Berlin are the *National Zeitung*, the *Norddeutsche Allgemeine Zeitung*, *Neues Berliner Tageblatt*, *Volks Zeitung*, *Tribüne*, *Post*, &c., and the humorous *Kladderadatsch*. The *Deutscher Reichsanzeiger* is the official gazette. The *Kölnische Zeitung*, *Stettiner Zeitung*, the *Allgemeine Zeitung* of Augsburg before mentioned, and the *Deutsche Allgemeine Zeitung* of Leipsic, are a few of the best provincial journals.

ITALY.—In Italy the press has been comparatively free since 1861, and all the large towns have a number of journals. *L'Italia* is the government mouthpiece for foreign affairs. *Il Diritto* is perhaps the best of the liberal papers. *La Voce della Verità* is the papal organ.

AUSTRIA.—The ablest paper in Austria is the *Neue Freie Presse* (daily). The Viennese press includes the *Wiener Zeitung*, *Deutsche Zeitung*, *Neues Wiener Tageblatt*, and *Fremdenblatt*. The *Bohemia* at Prague, *Ellenör* at Pesth, and *Triester Zeitung* at Trieste may be mentioned.

RUSSIA.—The N. of Russia are almost confined to St. Petersburg, Moscow, Warsaw, Riga, and Odessa. Peter the Great established the first Russian journal at Moscow in 1703. During the reign of Nicholas the *Northern Bee* had the greatest influence. The *Golos* (the Voice) is now the most popular paper in the empire, and during the present war has been the most anti-English in tone. The *Invalide Russe* is the leading military authority, and the *Journal de St. Petersburg* is a semi-official publication, the mouthpiece of the Imperial Foreign Office. Almost every minister of state has his organ. The *Moscow Gazette* is of great political importance and has a circulation of 15,000.

SPAIN AND PORTUGAL.—The press has been uniformly prosecuted in Spain, and there is no country of equal standing in Europe with so few important journals. Satire and humour are greatly aimed at as prominent and attractive features. *El Emparcial*, *El Pueblo*, and *L'Epoca* are the chief dailies of Madrid. N. in *Portugal* are principally commercial. The *Diario de Lisboa* is one of the best Lisbon papers, the *Diario do Governo* being the official organ.

BELGIUM AND HOLLAND.—Some very influential papers are published in Belgium, including the *Indépendance Belge*, the leading liberal journal, the clerical *L'Étoile Belge*, the official *Echo du Parlement*, *Le Nord*, a Russian organ (Brussels), and the *Journal d'Anvers* (Antwerp). The *Amsterdamsche Courant* and *Handelsblad* (Amsterdam), *Dagblad van Zuidholland*, and *Vaderland* of the Hague are leading journals in *Holland*. The history of the Dutch press dates from 1623.

SWITZERLAND.—Switzerland has in proportion to size a wonderfully active press, a plethora of local prints being issued in French, German, and Italian. Of some 400 papers the *Journal*

de Genève, *Gazette de Lausanne*, and *Neue Züricher Zeitung* are among those most extensively read.

DENMARK.—About 200 papers are published in this little country. The oldest and most celebrated, *Berlingske Tidende* (founded in 1749), is a semi-official organ.

NORWAY AND SWEDEN.—Among the more prominent papers are *Morgenbladet*, *Aftenbladet*, *Christianiaposten*, *Bergens Tidende* (Bergen), and *Dagens Nyheter* and *Aftenbladet* of Stockholm.

TURKEY.—Such N. as are published in Turkey are mainly issued in Constantinople. *Le Courrier d'Orient*, *Bassiret*, *Stamboul*, and *Levant Herald* (English) may be mentioned.

GREECE.—The principal papers are the *Messager d'Athenes* and the *Hermopolis* of Syra.

ASIA.—In *China* the *King Chau* (Court Transcripts), known to Europeans as the *Pekin Gazette*, an official compilation of news, is circulated among the officers of state in different parts of the empire. A similar journal exists in Japan. The *Shanghai Herald*, *China Mail* (Hong Kong), and *Japan Herald* (Yokohama), are well-known English N. in that part of the world. *The Friend of India* (Serampore), *Times*, *Telegraph*, and *Gazette* (Bombay), and *Englishman* (Calcutta), are leaders in Anglo-Indian journalism. *Hicking's Gazette* (1781) was the first Anglo-Indian paper. Until 1835 the press in India was under a censorship, and the control of the E. India Company, but in that year all restrictions were removed.

AUSTRALIA has a rising and energetic press, including the *Argus*, *Age*, and *Herald* (Melbourne); the *Herald* and *Empire* (Sydney), &c. In *New Zealand* the *Southern Cross*, *New Zealand Gazette*, &c., are published.

SOUTH AMERICA has a large number of journals, though few are of cosmopolitan importance. Brazil has 60, and Peru 40 dailies.

NORTH AMERICA.—The United States has been more prolific of N. than any other country. The earliest American newspaper, *Publick Occurrences both Foreign and Domestick*, was published by B. Harris at Boston, September 25, 1690, but was immediately suppressed. It was followed by the *Boston News Letter*, a weekly paper, 1704–76. The *New York Gazette* (1725) was the first newspaper issued in that city. In 1776, 37 papers were in existence, all of which were weeklies, with the exception of the semi-weekly *Advertiser* of Philadelphia. The *Daily Advertiser*, started at Philadelphia in 1784, was the first daily paper in the U.S. The *Commercial Advertiser*, the oldest of present New York journals, was established in 1797. In the year 1800, the number of N. in the States was 200; in 1828 it had increased to 852. A table is given in Rowell's *American Newspaper Directory* (New York) for 1874, giving the number of N. then published in the States as 678 daily and 5554 weekly, and in British America, 46 daily and 315 weekly. The same work for 1875 gives a list of 506 journals in N. America, with an average circulation each of over 5000, of which 123 (17 daily) were published in the city of New York, 44 (11 daily) in Philadelphia, and 50 (7 daily) in Boston. The great variety of sects in America occasions a vast quantity of religious papers. 337 journals were printed in German, 27 French, 26 Scandinavian, 23 Spanish, 8 Dutch, 2 Italian, 5 Welsh, 4 Bohemian, 2 Polish, and 1 Portuguese in the year 1875. Foremost in popular favour and in circulation in America is the *New York Herald*, established in 1835 by the late J. G. Bennet, as a 2 cents paper. The price was afterwards raised to 4 cents. Under the management of J. G. Bennet, Jr., the present proprietor, the paper has attained a circulation of 65,000 (1875). It is the organ of no political party. No paper in the world surpasses it in enterprise or audacity. The successful mission of H. M. Stanley, at the expense of the *New York Herald*, to look for Dr. Livingstone deserves commemoration. The *New York Tribune* (edited by Horace Greeley 1841–72, circulation 44,000 in 1875) comes next in importance. Under Greeley it was always able, high-toned, and enthusiastic, but not always consistent. It is as vigorous as ever under Mr. Whitelaw Reid, but is no longer a vehicle of the most advanced and the most absurd crotchets. The *New York Times*, the organ of the extreme republicans (founded in 1850, circulation 42,000), *The Sun* (price 2 cents, circulation 119,792), and the *Evening News* (1 cent, circulation 127,360) are among the most popular journals. The *World* (Democratic, 1860) and *Evening Post* (1801) have more literary finish than most of their contemporaries. Mr. W. Cullen Bryant edited the latter paper for many years. The *New York Graphic* (1873) was the first attempt at a daily illustrated paper. Ten New York papers form the New York Associated Press, which collects news at an annual expense (1875) of about $1,000,000. *Harper's Weekly* and the *New York Ledger* have each an enormous weekly circulation. The *Nation* is an admirable critical journal, the *Saturday Review* of America. The leading paper of Philadelphia is the *Public Ledger*, started in 1836 at 1 cent. It was the first paper to use the Hoe machine (1844). Its present (1877) proprietor is G. W. Childs, its price 2 cents, and its daily circulation 90,000. Its printing-office is the finest in the U.S. The *Boston Herald* and *San Francisco Chronicle* are important and influential N. The type used in American journals is not so large or so clear as in British papers. In the Southern and Western States the press is still in a very primitive condition, but its progress is only a matter of time. At present the American press faithfully reflects the intellectual condition of the people, that is to say, it is the most energetic but not the most cultivated press in the world. If energy continue, culture will come. The most popular papers in Canada are the *Toronto Globe* and the *Montreal Witness*. 29 out of 75 newspapers published in the Province of Quebec are in the French language.

References.—Besides the works already mentioned see *The Fourth Estate*, by F. Knight Hunt (Lond. 1859), *History of British Journalism*, by A. Andrews (Lond. 1859), and *The Newspaper Press, its Origin, Progress, and Present Condition* (Lond. 1871).

Laws Regarding N. in Great Britain.—The provisions of the law of Copyright (q. v.) apply to articles published in N. They belong to the proprietors, who have paid for them. But if a contribution be gratuitous, probably it will be held to belong to the author. The *Goodwill* (q. v.) of a newspaper is property transmissible to heirs; and if on the dissolution of a partnership carrying on a newspaper, by the death of one of the partners, the surviving partners refuse to buy the deceased's share, then it must be otherwise sold on behoof of his representatives.

New Style. See CALENDAR.

Newt, a name given to various vertebrate animals belonging to the class *Amphibia* (q. v.). The newts are 'tailed' amphibians or *Urodela*—that is, the tail with which the young N. or *tadpole* is provided persists throughout life. In the frogs and toads, on the other hand, it becomes abortive. The newts, like all other amphibians, possess gills in early life. As adult life is attained, the gills are cast off, and these animals, even although inhabiting water, breathe exclusively by lungs. The newts are well-known inhabitants of ponds. The common N. (*Triton cristatus*) is a little lizard-like creature, having a blackish body marked with yellow spots. The male bears a crest along the back. The food consists of worms, the larvæ of insects, &c. Another species is the marbled N. (*Triton marmoratus*) of S. Europe, which has a body olive-brown above with whitish markings. The smooth N. (*Lissotriton punctatus*) is not so exclusively aquatic as the species previously mentioned. It may be found often far removed from water. It has a smooth, non-warty skin, and is smaller than the common N. The colour is brownish-grey above and a bright orange on the under parts, the belly being marked with round black spots. The average length is 3½ inches. The N. is (contrary to popular belief) quite innocuous. It is noted for an extraordinary facility in replacing or reproducing members that have been destroyed.

New'ton, a city of Massachusetts, U.S., on the Charles River, 8 miles W. of Boston by rail, contains 27 churches, several libraries, and the large Baptist seminary known as the N. Theological Institution. It has 2 weekly newspapers, and numerous factories. Pop. (1870) 12,825.

Newton, Sir Isaac, was born at Woolsthorpe, 8 miles S. of Grantham, in Lincolnshire, England, December 25, 1642 (old style). He seems to have early displayed a mechanical turn of mind, and after being educated at Grantham school, he was sent to Cambridge, entering Trinity College in 1660. When he first applied himself seriously to the study of mathematics is not known, but there is no question that before the end of 1666 he had discovered the Binomial theorem, established the principles of his method of fluxions, and demonstrated from Kepler's laws the nature of the force which held the planets and sun together. He graduated M.A. in 1667, and succeeded Dr. Barrow as Lucasian Professor of Mathematics in 1669. Before this he had speculated upon the identity of the terrestrial force of gravity

which makes an apple fall to the ground with the force that keeps the moon in its orbit round the earth and the planets in their orbits round the sun—a wrong measurement of the earth being all that prevented him from then establishing the whole dynamical system of the universe. At this time accordingly he discarded his hypothesis without having divulged it to any, and turned his attention to the construction of telescopes. This led to his great discovery of the composite character of white light, the connection between the refractive power and colour, and the explanation of chromatic effects of ordinary refracting telescopes. His attempt to attain achromatic combinations was unsuccessful, owing to a faulty experiment, whereupon he turned to the consideration of reflecting telescopes, a new form of which he proposed and constructed in 1669. His theory of optics, though now disproved, is one of extraordinary subtlety, worthy of the intellect that conceived it. In 1672 N. became a member of the Royal Society. In 1682, when he was attending a meeting of the Royal Society, mention was casually made of Picard's recent measurement of the arc of the meridian. His old speculations regarding the law of gravitation were reawakened; and with the new value for the earth's radius he renewed his calculations. The agreement between theory and observation was established. A series of papers soon appeared before the Royal Society, which afterwards formed the basis of the famous *Philosophiæ Naturalis Principia Mathematica* (1687). The publication of this work is mainly due to the exertions of Halley, who alone of all Newton's countrymen seems to have recognised the vast importance of the work N. had done. The *Principia* consists of three books. The first, after establishing the fundamental conceptions of dynamics, proceeds with a clearness and conciseness never perhaps equalled to investigate the motion of unresisted bodies, rectilinear, circular, elliptic, cycloidal, and other motions, besides the important subject of attractions. The second book discusses resisted motion, and closely connected therewith the properties of fluids, the theory of wave-motion, and the paths of projectiles. The third book (*De Systemate Mundi*) is a complete statement of the Newtonian doctrine of the universe. The irregularities of planetary motion are recognised and explained, the lunar theory is stated in detail, and methods are given for calculating the paths of planets and comets from observations of position. In the opening sections of the first book, the fundamental principles of the differential calculus are demonstrated by rigid geometry, while in the discussion of the surfaces of equilibrium in a rotating mass of fluid the first step in the history of mathematics is taken into the domain of the calculus of variations. N. was one of the representatives of Cambridge University in the parliaments of 1688–89 and 1703–1705. During the later years of the 17th c. his pecuniary circumstances seem to have been rather straitened, and an accident, in 1692, by which he lost the fruits of twenty years' labour (the story of the dog Diamond is discredited by Brewster), appears to have for a time impaired his intellect. In 1695 he was appointed Warden of the Mint, with a salary of over £500, and in 1699 was promoted to the Mastership. In 1705 he was knighted by Queen Anne, and was annually re-elected President of the Royal Society from 1703 till his death at Kensington, March 20, 1727. The latest edition of the *Principia* is that by Professors Blackburn and Sir W. Thomson (Glasgow, 1871), which follows the text of the second edition by Cotes (1713). Newton's other chief works are *Optics* (1704), *Arithmetica Universalis* (1707), *Analysis per Equationes Numero Terminorum Infinitas* (1711), *De Systemate Mundi* (1728), a popular account of the truths of the third book of the *Principia*, *The Chronology of Ancient Kingdoms Amended* (1728), *Optical Lectures* (1728), *Observations on the Prophecies of Daniel and the Apocalypse of St. John* (1733), *A Method of Fluxions and Analysis by Infinite Series* (1736), besides papers published by the Royal Society, and a quantity of mathematical MS., a list of the contents of which is given in Hutton's *Dictionary*. The work which N. did can never be over-estimated. Like many true geniuses, he was in advance of his time, and recent discoveries have shown this more and more by making intelligible many of his almost prophetic utterances. The controversy with Leibnitz regarding the invention of the fluxional methods, and the quarrel with Flamsteed, the astronomer-royal, are the only episodes that troubled his calm but momentous life. See Brewster's *Life of N.* (1831). N.'s correspondence with Cotes was published by Mr. Eddleston in 1850.

Newton, Rev. John, son of the master of a merchant-ship, was born in London, 24th July 1725, led a wild life in his youth, but was afterwards converted, and having attained a certain knowledge of Latin and Greek, was ordained curate of Olney, Buckinghamshire, in 1764. Here he made the acquaintance of Cowper (q. v.) the poet, over whom he exercised an influence more intense than wholesome. Together they wrote the famous *Olney Hymns*. In 1779 N. was presented to the living of St. Mary-Woolnoth, London. He died 31st December 1807. N. was deeply, not to say darkly, evangelical. The shadow of a libertine youth threw a gloom over his theology. In his views of human depravity we recognise the distorted image of his earlier self; but no man merits blame who, from whatever cause, is deeply impressed with 'the exceeding sinfulness of sin.' N. wrote, among other things, *Cardiphonia, or the Utterance of the Heart; the Messiah, a Series of Sermons;* and a *Narrative of his own Life*.

Newton, Rev. Thomas, an English divine, born at Lichfield, January 1, 1704, and educated at Lichfield grammar-school, Westminster, and Trinity College, Cambridge, was rector of St. Mary le Bow, 1744–61, and bishop of Bristol from the latter year till his death, 14th February 1782. He published a critical edition of Milton's Poetical Works, with a biography, in 1749, but is best known by his popular *Dissertation on the Prophecies* (1754–58). See Memoir prefixed to the second edition of his works, published in 1787.

New'ton-Abb'ot, a market town of England, in Devonshire, at the head of the Teign estuary, 16 miles S. of Exeter by rail. The chief buildings are the cruciform church of St. Pauls (1861), the town hall, assembly rooms, and market house. There are breweries, iron-foundries, a tannery, and convenient wharves for the loading of corn, coal, timber, and potter's clay, of which last 6000 tons are sent yearly to Staffordshire. Here William III. published his first proclamation after his landing at Torbay (1688). Pop. (1871) 6082.

Newton-in-Makerfield, a town of England, in Lancashire, 15 miles W. of Manchester by rail, contains two churches, a Roman Catholic chapel (1865), an ancient court-house, market cross, assembly rooms, machanics' institute, &c. The London and North-Western Company's works for the manufacture of railway trucks employ 800 hands, and there are also an iron foundry, glass works, sugar refinery, paper mills, &c. Pop. (1871) 8244.

Newton-Lim'avady, a market-town in Ireland, county of Londonderry, on the river Roe, 16 miles E.N.E. of the town of Londonderry by rail. N.-L. has Episcopalian, Roman Catholic, and Presbyterian churches, two banks, some trade in flax, and manufactures of whisky. It occupies the site of a castle of the O'Cahans called in Irish Gael. *Leim-a-madha* ('Dog's Leap'). N. was chartered in the reign of James I. Pop. (1871) 2918.

Newton's Rings, so called from their having been discovered and first discussed by Newton, form a beautiful illustration of the Interference (q. v.) of light. A slightly convex plate of glass is pressed close against the under surface of a plane plate. If the apparatus be now viewed from above in monochromatic light, such as that emitted by sodium burning in a Bunsen flame, a series of concentric rings of alternating light and dark is seen. This is due to the interference of the rays reflected internally from the lower surface of the plane plate with those reflected from the exterior surface of the convex plate. According to the distance between these two surfaces, the one set of rays lags behind the other by one, two, three, or more half-wave lengths. When the difference in phase is one, three, five, or any odd number of half-wave lengths, darkness is the result; but when the difference is any even number of half-wave lengths, the result is increased brightness. When the apparatus is viewed in diffuse daylight, the alternating bands vary through all the tints of the rainbow, on account of the different wave lengths of the different coloured rays, and therefore the correspondingly different conditions necessary for the interference of these various rays. When the plates are sufficiently close, a dark spot forms the centre of the rings, which increases or diminishes in size with a simultaneous expansion or contraction of all the concentric rings as the plates are pressed close together or separated more from each other. The phenomenon evidently gives an easy method of measuring wave-lengths of light.

New'ton-Stew'art, a town in the S.W. of Scotland, county of Wigton, on the river Cree, 50 miles W.S.W. of Dumfries by the Caledonian Railway. Its chief buildings are the town-house, and the 'Ewart Institute,' a public school under trustees, which has attained some repute as an educational institution. N.-S. has an Established church, a U. P. church, a Roman Catholic chapel, two Free churches, and three branch banks. Pop. (1871) 2873.

Newton-upon-Ayr, a burgh of regality in the county of Ayr, Scotland, on the N. bank of the river Ayr, is united to the town of Ayr by three bridges. It derives its chief importance from its proximity to the harbour. Its principal trade is the export of coal. Ecclesiastically it is noted in Scotland for superior discernment in the selection of parish ministers. Pop. (1871) 4677.

Newtown, a town in New South Wales, forming a suburb of Sydney, but under distinct municipal government. As a place of residence it is much in favour with the Sydney merchants. Pop. (1875) 5570.

Newtown, a town in Wales, county of Montgomery, in a fertile valley on the river Severn and the Montgomery Canal, 13½ miles S.S.W. of Welshpool by rail. It has the ruined church of St. Idloes, a new church (1847), Independent (1877), Baptist, Wesleyan, and other chapels, and two banks. Formerly a small village called Llanfair Ynghedrevain, or St. Mary's, N. has risen rapidly to be the centre of the flannel trade of Montgomery. It has more than fifty factories, chiefly for fine flannels. Leather, beer, delf, and machinery, are also manufactured. Pop. (1871) 5744.

Newtownards', a market-town in Ireland, county of Down, near the head of Strangford Lough, 7 miles W.S.W. of Donaghadee by rail. N. has seven Presbyterian churches and chapels, a Roman Catholic chapel, a Methodist chapel, and a bank. There are manufactures of muslin, linens, and embroidery. N. was chartered under James I. Pop. (1871) 9437.

New-Year's Day fell with the Jews on the 1st Tizri (October); with the Romans on the 1st January; and with the Franks, on 1st March under the Merwings, on the 25th March under the Karolings, on Easter Sunday under the house of Capet, and on 1st January since 1564 (see DATES). The Jewish feast of Trumpets, and the No-Ruz of the Parsees, it was consecrated by the Romans to Janus Bifrons, and was marked by the interchange of presents and good wishes. (Suet. *August*, 57.) The early Church regarded the New-Year's festival as a relic of heathendom, and the Trullanian Synod of Constantinople (692) forbade its observance. Nevertheless, whether as the Feast of the Annunciation (March 25) or of the Circumcision (Jan. 1), the day has for centuries been regarded as a holiday of obligation. Among the Wesleyans it is ushered in by a midnight service termed the 'Watch Night,' and in the Catholic Church by a solemn chanting of the *Te Deum*; while from almost every belfry of England the Old Year is still tolled out, and the New rung in. The Scotch custom of 'first-footing,' and the French *étrennes* (Lat. *strenæ*, 'gifts of sweetmeats') are survivals of the ancient festival of Janus. See Brand's *Popular Antiquities* (new ed. Lond. 1876).

New York, the most important of the United States, called 'The Empire State,' and one of the original Confederacy of 1776–88, is bounded N. and N.W. by the Dominion of Canada, from which it is partly separated by St. Lawrence River, Lake Ontario, Niagara River, and Lake Erie, also on the N. by Long Island Sound and the Atlantic; E. by Vermont and Lake Champlain, Massachusetts, Connecticut, N. Y. Bay, and the Atlantic; S. by the Bay, the Atlantic, and the States of New Jersey and Pennsylvania. Area, 45,658 sq. miles; pop. (1875) 4,705,208, of whom 500,000 were coloured and 5000 Indians. The shape of N. Y. is that of a triangle, with its apex towards the ocean. The coast line, however, though only 58 miles in extent, is the most important in the Union, including as it does Manhattan and Long Islands, on which the cities of N. Y. and Brooklyn are built. Besides these and Staten Island, there are hundreds of smaller islands belonging to this State, situated partly in Long Island Sound, partly in the Hudson and St. Lawrence Rivers, and partly in the lakes above named. The surface is agreeably diversified with mountain, valley, and plain, the highest peaks being Mount Marcy or Tahawas (5467 feet), Dix Peak, Mount M'Intyre, and Sandanoni, all above 5000 feet, in the Clinton Range. The principal rivers are the Hudson, St. Lawrence, Oswego, Genesee, Niagara, and Alleghany. The geology is of a very mixed character, the principal rocks being sandstones, limestones, and slates. The most important minerals are iron, plumbago, lead, and salt, as well as many fine building stones, such as granite, white and coloured marble, and paving-stone. The most of the soil of N. Y. is arable, and some of it very fertile, while the hilly portions afford fine grazing lands, and yield the best butter, milk, and cheese. Till lately, half the area of the State was covered with forests of pine, oak, ash, elm, maple, &c.; but the great demand for timber has within the last few years greatly reduced the forest area. In 1874 the produce of oats was 30,302,000 bushels, of Indian corn, 16,807,000; of wheat, 9,161,000; of barley, 6,463,000; of buckwheat, 2,917,000; of potatoes, 25,423,000; of tobacco, 1,593,000 lbs.; and of hay, 5,291,800 tons. The live-stock comprised 665,800 horses, 669,900 oxen, 1,467,000 milch cows, 1,996,400 sheep—total value, $153,006,101. In manufacturing industry N. Y. is the first State of the Union. In 1870 the capital invested was $366,994,320, and the value of annual produce $785,194,651. The chief manufactures are flour, sugar, tobacco, leather, iron, machinery, and ready-made clothing. There were in 1876, 5525 miles of railway. Albany is the State capital, but the great centre of activity and influence is the city of New York. The principal other towns are Brooklyn, Buffalo, and Rochester. For the history of the early colonisation of N. Y. see under the city. Its first State constitution was adopted in April 20, 1777. The Articles of Confederation for the States were approved by N. Y. in February 1778, and the Constitution ratified by it on July 26, 1788.

New York, the largest and most important commercial city and seaport in the United States, is situated on Manhattan Island, at the mouth of the Hudson or North River, where it joins the strait known as the East River, 18 miles from the Atlantic at Sandy Hook, and 150 miles S. of Albany, the capital of the state. Manhattan Island, separated from the mainland on the E. by Harlem River, on the W. by Spuyten Duyvel Creek, has an area of upwards of 22 sq. miles, being 13½ miles in length, with an average breadth of 1¾ miles. Blackwell, Ward, Randall, Bedloe, Ellis, and Governor's islands lying near, contain about 300 acres, and are used for almshouses, penitentiaries, &c.

Streets, Parks, and Public Works.—Excepting the southern end of the city, which is irregularly built, the plan of N. Y. is a model of regularity, with straight avenues 8 miles in length and 100 feet wide, running to the northern end of the island, and traversed at right angles by streets which, designated like the avenues merely by numbers, reach from one side of the island to the other. Broadway, exceptionally possessed of a name, is the most famous of these avenues, and with its 6 miles of shops and hotels is one of the gayest streets in the world. The finest architecturally is Fifth Avenue, where are situated the most superb private houses, churches, and club-houses. The public parks are eighteen in number, the largest of which is the Central Park, 2½ miles long and half a mile wide. It is in the form of a perfect parallelogram, divided into the Upper and Lower Parks by two large reservoirs of water, and is magnificently laid out. Water is supplied to the city from the Croton River, 40 miles distant, by an aqueduct of solid masonry, 8½ feet deep by 7½ feet wide, having a capacity of 106,000,000 gallons a-day. It crosses Harlem River on the High Bridge, a granite structure 1450 feet long, 21 feet wide, and 114 feet high; and is distributed through 350 miles of pipe. Among the great public works of N. Y. may be mentioned the Brooklyn Suspension Bridge. The piers, which are planted on the opposite shores of the East River, are 1620 feet apart, and 280 feet in height; the total length of the bridge, including the approaches, is over a mile. The span of the bridge is 130 feet above the channel of the river, and the roadway includes a railroad track, a carriage-way, and a side-walk. In 1876 it was arranged to construct a new bridge spanning the arms of the East River at Blackwell's Island. The total length of the new bridge when completed will be 10,532 feet. The roadway will be 34 feet wide, comprising a roadway and carriageway.

Public Buildings, Libraries, &c.—The chief public buildings are the City Hall, in the Park, an elegant structure of white marble erected in 1803; the new Courthouse adjoining it, also of marble; the Customhouse, formerly the Merchants'

Exchange, a massive granite edifice, with columns 38 feet high and 4½ feet in diameter; the old Customhouse, now occupied by the Sub-Treasury, a beautiful marble building; the new Post-office, the grandest public structure in the city (1869–75). Specially remarkable for the immense height of its tower is the brick building lately erected for the *N. Y. Tribune* in Printing-House Square. Among others may be mentioned the offices of the Western Union Telegraph Company and of the *Evening Post* in Broadway, and the Grand Central Railroad Depôt, the Windsor Hotel, and the Gilsey House. The hotels of N. Y. are the largest in the world. There are 23 libraries, of which the principal is the Astor Library, founded on a bequest of John Jacob Astor, and opened in 1854 with a collection of 70,000 volumes, which had in 1875 increased to 150,306. The only other free library is the Lenox, incorporated 1870, and including, besides the collection of the founder, James Lenox, the largest ever formed of books on early American history, a fine-art gallery and a museum of curiosities. The oldest library in the city is the N. Y. Society Library, organised in 1740, which has 70,000 vols. The N. Y. Historical Society contains, besides 60,000 vols. of books, a large collection of American antiquities, the Abbot Egyptian collection, the Lenox Nineveh marbles, and one of the best art galleries in the country. The library of the Mercantile Literary Association in Astor Place has 158,000 vols. of current literature. Other large special collections are those belonging to the American Geographical Society, the Union and Episcopal Theological Seminaries, the American Institute, the Law Institute, and the Chamber of Commerce. Several fine-art associations exist. The National Academy of Design, instituted in 1826, and the Metropolitan Museum of Art, incorporated in 1870, both contain large and valuable collections.

Churches.—There are in N. Y. 470 congregations, of which 92 are Protestant-Episcopal, 70 Presbyterian, 58 Methodist-Episcopal, 46 Baptist, 40 Roman Catholic, and 27 Jewish. The largest and finest churches architecturally are Trinity, Grace, St. George's, the new Fifth Avenue Presbyterian, the Reformed Collegiate, and the Jewish Synagogue. These, however, will all be exceeded in size and splendour by the new Roman Catholic cathedral in course of erection (1877), which covers an entire block, and is a Gothic structure of white marble.

Schools, Colleges, &c.—Besides 287 public schools, which are under the charge of a Board of Education, there are in N. Y. two important literary colleges. Of these, Columbia College (q. v.) was established in 1753 by royal charter under the name of King's College. The second is the University of the City of N. Y. It has four departments—arts, sciences, medicine, and law. In 1873 there were 33 professors and 373 students. Besides these there are the College of St. Francis Xavier, Manhattan College, and the Reitgers Female College. The chief schools of medicine are the College of Physicians and Surgeons, medical department of Columbia College above mentioned, the Homœopathic Medical College, the N. Y. Medical College and Hospital for Women, the Eclectic Medical College, the N. Y. College of Dentistry, and the N. Y. Free Medical College for Women. The amount expended on education in 1874 was $3,808,321.

Charities, Clubs, Theatres, &c.—N. Y. is celebrated for its charities. The municipal institutions of a charitable nature, which number 27, and include hospitals, asylums, almshouses, nurseries, &c., are placed under a board called the Commissioners of Public Charities and Corrections, who expend upwards of $1,540,000 annually in their maintenance. Among them are an almshouse, hospital for incurables, blind asylum, charity, fever, small-pox, and infants' hospitals, inebriate asylum, lunatic asylum, and epileptic and paralytic hospitals. Commissioners of Emigration have special charge of homeless immigrants arriving in the city. The numerous clubs of various kinds in N. Y., amounting to about 40, form quite a feature in the social life of the city. The most notable of these institutions are the Union, with a full roll of 1000 members, the Union League, with a still larger membership, the New York, Knickerbocker, Travellers', Century, Lotos, and German Clubs, all of them possessing fine buildings. N. Y. has 18 theatres, including 2 German theatres, an opera-house, and circus.

Newspapers, Journals, &c.—In 1875 there were 123 newspapers published in N. Y. Of these 17 are daily. The leading newspapers are the *N. Y. Herald*, the *N. Y. Tribune*, the *Evening News*, the *Sun*, the *World*, the *Times*, and the *Staats Zeitung*. Illustrated papers are *Harper's Weekly*, *Frank Leslie's Illustrated News*, and the *Graphic*. Papers devoted to stories are the *N. Y. Ledger* and the *N. Y. Weekly*. The chief literary and scientific journals are *Scribner's Monthly*, the *New Atlantic Monthly*, *Harper's Monthly*, and the *N. Y. Nation*. See NEWSPAPERS.

Industry, Commerce, &c.—There is scarcely a branch of industry which is not represented to some extent in N. Y. Shipbuilding and the construction of machinery are most actively carried on. The shipbuilding for 1874 comprised 89 sailing and 69 steam vessels, besides 247 barges, with a total tonnage of 64,000 tons. In 1870 there were in all 7624 manufactories of various kinds, employing, besides 1261 steam-engines and 6 water-wheels, 129,577 hands. The total number of entrances of vessels at the port was 6723, with a tonnage of 5,049,618 tons. The total imports of N. Y., through which nearly 60 per cent. of the whole foreign trade of the United States passes, were in 1874 $395,133,622, the total exports $340,360,260. Of the former, the principal articles were woven fabrics, sugar, and tea; of the latter, besides the precious metals, petroleum, cotton, and tobacco. In 1876 the total number of British vessels engaged in commerce with N. Y. was 1821, with a total tonnage of 2,149,616 tons. In the direct trade of Great Britain and the British possessions with this port the number of British vessels which entered at this consulate was 1119, and the total tonnage 1,789,937 tons. The population, which in 1731 was only 4622, amounts, according to the census at the end of 1875, to 1,046,037.

History.—Manhattan Island was first settled by the Dutch under Hendrik Christiansen, an agent of the Holland and East Indian Company. In 1625 the new colony, which consisted of about 250 persons, received the name of New Amsterdam, and was fortified. The population, who carried on a trade in furs, amounted in 1656 to 1000 souls in 130 houses. Eight years later the English took possession of the place, and changed its name to N. Y. The industry and commerce of the colony now made rapid progress, and in the beginning of the 18th c. N. Y. had become the chief market for the products of the northern colonies. After the Declaration of Independence, the town took an immense stride, although about this time it was much ravaged by fire and fever epidemics. In 1785 the first Congress met at N. Y., where in 1789 the solemn inauguration of Washington as President took place. In 1807 Robert Fulton made the first voyage in a steamboat up the Hudson from N. Y. to Albany, and in 1812 opened the first steamboat route with Brooklyn. Since 1817 N. Y. has been in regular steam communication with Europe. The Erie Canal was completed in 1826. In 1853 the second grand exhibition of the industries of all nations was held here. In August 1858 the successful laying of the Atlantic Cable was celebrated on Sept. 1 by a holiday and a grand public demonstration. On July 12, 1871, a serious riot occurred between the Orangemen, or Protestant Irish, and the Ribbonmen, a Roman Catholic Association, in which many lives were lost, and which had to be suppressed by military force. In 1872 the notorious 'Ring' swindlers, who had so long controlled the city government, were brought to justice. In 1873 there occurred an unprecedented business panic, having its origin in the unstable basis on which the currency of the country exists, the effects of which are still (1877) felt.

New Zealand, a group of islands forming a colony of Great Britain, and situated in the S. Pacific between the parallels of 34° and 48° S. lat., and the meridians of 166° and 179° E. long. It consists of two large islands known as the North Island and South or Middle Island, which are separated by Cook Strait (q. v.), and a third one of much smaller size, called Stewart's Island, separated from the South Island by Foveaux Strait (q. v.). The area of the North Island is 44,736 sq. miles; of the South Island 55,224 sq. miles; and of Stewart's Island 1300 sq. miles, the total area of the group thus being much the same as that of Great Britain and Ireland. The neighbouring groups of the Chatham Islands (q. v.) and Auckland Islands (q. v.) are dependencies of N. Z.

N. Z. abounds in evidences of volcanic action, which has not yet ceased, the high mountain Tongariro (6500 feet) being still active, while the district extending from it N.E. nearly to the Bay of Plenty abounds in geysers, solfataras, &c. Earthquakes are not uncommon, especially at Wellington, but the shocks are not severe. N. Z. is a mountainous country, the mountains occupying a tenth part of the N. Island, and four-fifths of the S.

Island. In the former the highest summits are those of the isolated extinct volcanoes, Ruapehu (9100 feet), and Mount Egmont (8300 feet). The S. Island is traversed from N. to S. by the Southern Alps, a range many of whose summits are clad with perpetual snow, and whose culminating point is Mount Cook (13,200 feet). Several minor ranges of considerable altitude cross the island from the Southern Alps eastwards. There are nevertheless several fine plains, the principal in the N. Island being in the districts of Auckland and Hawke's Bay, and in the S. Island in those of Canterbury and Otago. The extensive mountain system gives rise to many large rivers, of which the chief are:—In the N. Island, the Waikato and Wanganui. In the S. Island, the Hurunui, Rangitata, Waitaki, Taieri, Clutha (q. v.), Mataura, Grey, and Buller (q. v.). Owing to the rapidity of their courses, the only rivers to any degree navigable are the Waikato, Clutha, Grey, and Buller. The lakes are numerous, and some of them are of large size. Lake Taupo, in the heart of the N. Island, has an area of 200 sq. miles, and in Otago are the three large lakes Te Anau, Wakatipu, and Wanaka, whose areas are 132, 112, and 75 sq. miles respectively. The coasts of N. Z. contain a number of fine harbours, the principal being those of Auckland, Port Nicholson, Queen Charlotte's Sound, Port Cooper, Akaroa, Otago, and the Bluff. The S.W. coast is indented by a series of sounds closely resembling the fjords of Norway, the mountains rising precipitously from a great depth of water to a height of several thousand feet, and being clad with forests and seamed by waterfalls, the whole forming scenery of the grandest description.

The climate of N. Z. necessarily varies much according to latitude and altitude above the sea level, but as a whole deservedly enjoys a high reputation for salubrity. At the sea-coast frost and snow never continue throughout the day. The mean annual temperature of the N. Island is 57°, and that of the S. Island 52°, that of London being 51°. The annual rainfall varies from the maximum of 119 inches on the W. coast of the S. Island to the minimum of 25 inches on the E. coast of the same island, the average for the entire colony being 54 inches. The healthiness of the climate is largely owing to the strong winds which are everywhere common.

N. Z. possesses magnificent forests, producing excellent timber, of which the best is that of the celebrated Kauri Pine (q. v.). The undergrowth is exceedingly dense. The hills are everywhere covered with abundance of long coarse grass, which affords pasture to immense flocks of sheep; and the Phormium (q. v.), formerly called N. Z. flax, grows wild up to 1500 feet above the sea-level. The indigenous fauna of N. Z. included no mammals save a small species of rat now extinct, and two kinds of bat, besides several species of seals and whales in the adjoining seas, which swarm with fish of fine quality. The avifauna of the country is extremely interesting, including many species not found elsewhere, as well as the singular forms of bird life represented by the Apteryx (q. v.), Dinornis (q. v.), and Notornis (q. v.). Snakes are wholly unknown, and the colony contains no creature more poisonous than the mosquito save a very rare species of spider (*Latrodectus katipo*) whose bite sometimes results fatally.

N. Z. is exceedingly rich in minerals. Gold is found in payable quantities in the districts of Otago, Westland, and Nelson in the S. island, and Auckland in the N. Island, but for some years gold-mining has been a declining industry. In 1876 the colony exported 318,367 oz. of gold, valued at £1,268,559, and the total quantity exported up to that date since gold was first discovered in 1857 was 8,277,311 oz., of the value of £32,278,114. Of this amount 3,584,179 oz., valued at £14,077,688, were exported from Otago. Silver, copper, lead, antimony, and manganese are also found in the colony, and are beginning to be worked. Iron is abundant, especially in the form of titaniferous iron sand on the sea-shore of Taranaki (N. Island), and in beds of haematite ore near the N.W. extremity of the S. Island, but as yet these riches are practically untouched. Coal is widely distributed, but in many parts is of an inferior brown description. On the W. coast of the S. island, however, in the basins of the Grey and Buller rivers, coal of the best quality is found in inexhaustible quantities.

Notwithstanding its mineral wealth, N. Z. is still in the main a pastoral and agricultural country. In 1875 there were in the colony 11,705,000 sheep, 495,000 cattle, 124,000 pigs, and 100,000 horses; and in 1876 the export of wool amounted to 54,01,5440 lbs., valued at £3,395,816. In February 1877 there were 2,682,758 acres of land under crop, of which, however, 2,202,644 acres were in sown grasses. The area under cereals was 352,470 acres. The cultivation of wheat for export is rapidly increasing with the spread of railways, and that of oats as rapidly decreasing. The exports of preserved meats and dressed phormium fibre are both much less than they were a few years ago. The total exports of all kinds from N. Z. in 1876 amounted to £5,626,333, and the total imports for the same year to £6,904,889. The revenue for the financial year ending 30th June 1877 was £3,061,594, and the public debt of the colony at the same date was £20,895,311. There were then 212½ miles of railway open for traffic in the N. Island, and 647½ in the S. Island, while 274 miles were in course of construction.

Auckland was the capital of N. Z. until 1865, when the seat of government was removed to Wellington on account of its central position; but Dunedin is much the largest and most important town in the colony. The pop. of N. Z. at the end of 1876 was estimated at 399,075, exclusive of the Maoris (q. v.), or native inhabitants, who numbered (1874) 45,470. N. Z. was discovered and named in 1642 by the Dutch navigator Tasman. It was next visited in 1769 by Captain Cook, who subsequently explored a great part of its shores. In 1814 the Church Missionary Society established a mission station at the Bay of Islands (q. v.), and soon afterwards trade with New South Wales commenced. The first regular settlement was made by the N. Z. Land Company in 1840, and the first governor was appointed in the same year. As settlement progressed, the colony was in course of time divided into a number of different provinces, as follows:—In the North Island—Wellington, founded in 1840 as already stated; Auckland, established by Governor Hobson in the same year; Taranaki, founded by the N. Z. Land Company in 1841; and Hawke's Bay, separated from Wellington in 1858. In the South Island—Nelson, founded by the N. Z. Land Company in 1841; Otago, founded by an association connected with the Free Church of Scotland in 1848; Canterbury, founded in 1850 by an association connected with the Church of England; Marlborough, separated from Nelson in 1860; and Westland, separated from Canterbury (in the first instance as a county) in 1866. Stewart's Island was included in the province of Otago. Each of the provinces had a lieutenant-governor, termed a superintendent, and a Provincial Council, besides sending representatives to the general legislature; but the provincial system was abolished in November 1876, and a system of counties established in its place. The colony is now governed by a governor appointed by the Crown, with a Ministry responsible to the General Assembly or Colonial Parliament, which consists of the Legislative Council and the House of Representatives. The members of the former are nominated, and those of the latter elected by the constituencies. See *The Official Handbook of N. Z.* (Lond. 1875), *The Australian Handbook* for 1877 (Lond. 1878), *Transactions of the N. Z. Institute*, vols. 1 to 9 (Well., N. Z., 1869–77), and works enumerated under MAORI.

New Zealand Flax. See PHORMIUM.

Next Friend is in English law the person through whom an infant—that is, a person under the age of 21—sues at law. The father is usually the N. F., but any one may be so whom the Court may consider able to be responsible for costs.

Next of Kin is a legal phrase, denoting those that are nearest to a person in relationship by blood. The wife of a testator is not included in the meaning expressed by this phrase, she not being a blood relation, *non affinis, sed causa affinitatis*.

Ney, Michael, a famous French marshal, was the son of a cooper, and was born at Sarlouis, January 10, 1769. He received a moderate education, acted for two years as a lawyer's clerk, and entered the army, December 6, 1788. By 1794 he had risen to the rank of captain, and had earned for himself the name *Indefatigable*, by his bold assaults upon the Austrians with a corps of 500 men out of the army of the Sambre and Meuse. N. distinguished himself at the siege of Maestricht (November 4, 1794), was severely wounded at Mainz (December 2), took a prominent part in the capture of Altenkirchen (December 16, 1795), and was raised to the position of General of Brigade after the battle of Forcheim (August 8, 1796). Next year he took part in several combats

on the Rhine, and was made prisoner at Steinberg for a few days. In March 1799 he became a General of Division, joined the army of the Danube, and successfully operated at Andelfingen and Winterthur, where he was wounded. He passed to the Rhine as General-in-Chief of the army, September 17, and at the head of 9000 men he overcame 20,000 peasants under the walls of Frankfurt. Second in command to Moreau (q. v.), he fought at Burkheim, Engen, Moeskirch, Hochstedt, Ingolstadt, Wasserburg, and Hohenlinden. In 1802 he married an intimate friend of Hortense de Beauharnais, and was thereby linked with the fortunes of Napoleon. He received a Marshal's baton in 1804, obtained the Legion of Honour (1805), and was entitled Duke of Elchingen in honour of that victory. The same year he chased the Archduke Johann from the Tyrol, and in 1806 was present at Jena. In 1807 he fought at Deppen and Eylau, and by the end of the campaign had won from the soldiery the title *Brave des Braves*. Against his will he operated in the Spanish campaign of 1808, in 1810 he captured Ciudad-Rodrigo, and conducted a retreat as creditable to his genius as any victory. Not less did he distinguish himself in the Russian war, and for his conduct at Moscow he was created Prince de la Moskowa. During the struggle with the allied troops, N. was constantly under fire, but when Napoleon's abdication was pronounced he rallied to the new government. But his loyalty to the Emperor returned after his escape from Elba, and he fought with him at the battle of Waterloo. N. was shot as a traitor to Louis XVIII. in the garden of the Luxembourg, December 7, 1815. A handsome monument was raised to him (1852) on the spot where he fell. N. was one of the most cool and dashing soldiers of the Revolution, and perhaps the most efficient strategist among the marshals of the empire. He left three sons, who published his *Mémoires* in 1833. See Thiers' *Hist. du Consulat et de l'Empire.*

Ngam'i ('the waters'), a large lake in S. Africa, situated between 20° 12′—20° 26′ S. lat., and 22° 38′—23° 10′ E. long. It was first visited by Livingstone and Oswell in 1846, and was more fully explored by Andersson in 1853. It is situated in a table-land 3700 feet above the sea-level, and the country around it is so flat that the rivers at times flow both into and out of the lake. It is fed principally by the Tonku or Tes-ge River, which is supposed to be an anastomosing branch of the Zambesi, and discharges by the Zouga, also an affluent of the latter river. The lake varies in size according to the season, but on an average measures about 50 miles by 7. The shores are low and densely wooded, and that on the N. is bordered by a belt of sand a mile wide. The water is bitter to the taste, but fish nevertheless are plentiful, and the lake and rivers swarm with crocodiles. Hippopotami, elephants, and buffaloes are numerous in the vicinity, though decreasing, and ivory is sent in large quantities to Walfisch Bay for shipment to Cape Town. The inhabitants of the region are the Batoana, a tribe of the Bechuans (q. v.). Andersson describes a curious phenomenon in Lake N., the waters of which daily recede and return as in the ocean.

Ngan-hoi, a province in the E. of China, having an area of 54,001 sq. miles, and a pop., according to the last census, of 36,596,988. The capital is *Ngan-King*, on the left bank of the Yang-tse-Kiang, 190 miles S.W. of Nanking. It is noted for its green tea, porcelain, silks, ink, and varnish, and is the commercial depôt of a rich mineral district.

Niag'ara (an Iroquois word, meaning 'thunder of waters'), a river of N. America, which separates the State of New York, U.S., from the province of Ontario, Canada, and flows N. from Lake Erie to Lake Ontario, a distance of 36 miles, making a total descent of 333 feet. In its upper course of 16 miles it is navigable though impeded by many islands, its average depth being 25 feet, and its fall only 20 feet. Below the celebrated Falls it is again navigable from Lewiston to Lake Ontario, a distance of 8 miles, in which its fall is only 2 feet, and its depth varies from 100 to 150 feet. On the Canadian side the Well and Canal connects the navigation of the upper and lower course, which is interrupted by the Rapids and Falls, and the river is here crossed by two suspension bridges, one about 2 miles below the Falls, 245 feet high and 821 long, constructed in 1855, the other within one-eighth of a mile of the Falls, 190 feet high and 1190 long, completed in 1864. At Grand Island, about 10½ miles above the Falls, the river is nearly 3 miles broad, but subsequently it contracts into a narrow current, and for about a mile before it makes the final leap it descends 52 feet in a series of foaming rapids. Goat Island, with an area of 70 acres elevation of 40 feet, hanging on the very brink, separ river into two cataracts. On the Canadian side is t Horse-Shoe Fall, 600 yards broad and 150 feet hig American Fall is 14 feet higher, but has only a breadth 220 yards. What makes the Falls unique is the i volume of the river, some 2 million tons of water bein over the ledge every minute, with a roar that fills the several miles. After its magnificent leap, the river has a of 104 feet in its course to Lewiston (7 miles), flowing a deep, precipitous gorge, varying in width from 200 to and accessible only by stairways. About 3 miles b Falls is a violent eddy known as the 'Whirlpool.' The which the cataract pours is the so-called N. limestone, so soft as to have been hollowed along the wall of the from the Canadian shore to Goat Island, into a rough, pathway, the 'Cave of the Winds,' half subterranean, marine. Goat and Bath Islands are reached from the side by iron frame bridges resting on piers. Profess Hall made a trigonometrical survey of the Falls in 18 Sir Charles Lyell's *Travels in N. America* (1845).

Nias'. See PULO'-NIAS.

Nibb'y, Anto'nio, a distinguished antiquary, born 4th October 1792. At seventeen he was so good a scholar come founder of a school of Hellenists. Employed in the library, he afterwards became secretary to Louis Bona 1820 was appointed lecturer on archæology in the C Rome, finally holding a similar appointment in the France. He died 29th Dec. 1839. Of his numerous w most important are *La Grecia di Pausania* (1817–1 *Viaggio Antiquario ne' Contorni di Roma* (1819); *La Roma* (1820); *Elementi di Archeologia* (1828); *Analisi topografico-antiquaria della Carta dei Dintorni di Rom* 38). See Tipaldo's *Biogr. degli Italiani illustri*, vii.

Ni'belungenlied, or Der Nibelungen Noth, the epic of Germany, is preserved to us in numerous M fragments of MSS., which fall into two principal gro first represented by the Hohenems-Lassberg MS., clos the words 'Daz ist der Nibelunge liet;' the second, or with 'Daz ist der Nibelunge nôt.' The story turns firs murder of Siegfried, the dragon-slayer, invulnera Achilles, save in a single spot, who, having wrested unearthly Nibelungen race their hoard of gold and g married Kriemhild, a Burgundian Princess; and sec Kriemhild's vengeance for that murder, in which she by Etzel (Attila) and Dietrich of Bern (q. v.), and havin plished which, she is herself slain. The lamentatio fallen is expressed in the *Klage*, an inferior contin the lay, which seems to have been originally composed by a priest of the 12th c. Though tournaments and are mentioned in the N., its general characteristics a heathen, dating from a period long antecedent to the tion of either chivalry or Christianity. It cannot be that it belongs to that common stock of Aryan traditio all Epic Poetry (q. v.) sprang, or that in the *Elder Ed* we meet with the self-same tale in all its essential featu while Dasent regards the *Elder Edda* as 'the far older, and grander original of the N. of the 13th c.,' Germ have decided that the nomenclature of the Norse Saga, tinctly German, presupposes an older German form, ex. is, prior to the 6th c. Composed originally of detac ments, welded together by succeeding generations, the lieved to have been cast in its present form by a minne the 12th or 13th c., variously stated to have been Wolf Eschenbach, Heinrich von Ofterdingen, and Konrad v burg. Certain it is that, whoever was its compiler, he w versed in courtly manners and habits of thought. It w people, however, that the lay gained the strongest ho evinced in the number of its MSS., the frequent emend its text, and above all in the host of imitations to whic rise, such as the *Lied vom hürnen Seifrid* (13th c.), Ha *Tragedia*, and the prose *Volksbuch von Siegfried*. It popularity, which had slumbered since the Reformat been recently revived by Richard Wagner (q. v.) in logy, *Der Ring des Nibelungen* (1870). Brought to Bodmer (1751) and Myller (1782), the N. was first handled by Lachmann (q. v.), the advocate of the 'Rh

theory. His views have been adopted by Müllenhoff (1855), Lutencron (1856), and Pasch (1863); and opposed by Holtzmann (1814), Zarncke (1855), and Fischer (1859). Of translations may be noticed Simrock's (1827), Scherr's (1860), and Bartsch's (1867), and the most recent editions are by Bartsch (Leips. 1875), and Edzardi (Hann. 1875). For a complete bibliography of the subject see H. Fischer's *Die Forschungen über das N. seit K. Lachmann* (Leips. 1874).

Nicæ'a, or **Nice**, an ancient city of Bithynia, at the E. point of Lake Ascania, built by Antigonus, son of Philip, in the 4th c. B.C., and named by Perdiccas, general of Alexander the Great, N. in honour of his wife. After the foundation of the Latin empire, N. was from 1206 to 1261 the seat of a Greek empire, founded by Theodore Lascaris. It fell to the Turks in 1330. Isnik, which marks its site, is little more than a heap of ruins. In Church history N. is celebrated as the seat of the *first* Œcumenical Council (A.D. 325) over which Constantine the Great presided, and in which the doctrines of Arius (q. v.) were condemned. The Seventh Œcumenical (?) Council was also held here, A.D. 787, under the auspices of the Empress Irene, and established image worship. See COUNCIL; ICONOCLASTS; IMAGE WORSHIP; and NICENE CREED.

Nicarag'ua, a republic of Central America, is bounded N. by Honduras, E. by the Caribbean Sea, S. by Costa Rica, and W. by the Pacific. Area, 58,167 sq. miles; estimated pop. 250,000, the great mass of whom are Indians and mestizoes. The eastern portion of N. forms the Mosquito Coast (q. v.); the western is traversed by a branch of the Cordilleras and by a volcanic range, running parallel with the Pacific at a distance of 10-20 miles, and rising in Cosequina to 3835 feet. Between these ranges are the Lakes N. and Managua. The chief rivers are the Estero Real, flowing into the Pacific, and the Coco, Escondido, and San Juan into the Caribbean Sea. With a soil of extreme fertility, vast forests of mahogany, rosewood, and dye-woods, magnificent pastures, and abundance of gold, silver, coal, and other minerals, N., under the influence of a bad climate and shameful misgovernment, has left these resources almost wholly undeveloped, and is now in a state of hopeless bankruptcy. In 1874 the revenue was $595,100 and the expenditure $758,500, while the public debt was estimated at $9,500,000. In 1875 there entered and cleared the port of Grey Town or San Juan del Norte, the only harbour of the republic, fourteen vessels of 3560 tons; and the value of the imports was $126,720, of the exports (india-rubber, specie, coffee, cocoa-nuts, &c.) $302,723. Managua (q. v.) is the capital. The religion is Roman Catholic; and the executive is vested in a president, elected for four years, the legislative in a Senate of ten, and a House of Representatives of eleven members. Discovered by Gil Gonzalez Davila in 1521, N. broke loose from Spain (1821), and has since been the scene of countless revolutions. In the early part of 1876, a conference that met at Guatemala to confer on a scheme for the union of the five Central American Republics broke up in confusion, and since then N. has been kept on a war footing, a state of siege proclaimed, and all supplies raised by forced loans.—*Lake N.*, in the republic of the same name, is separated from the Pacific by a volcanic range, 48 feet high at its lowest and 4 miles broad at its narrowest point. It stands 134 feet above the Pacific, and 128 feet above the Caribbean Sea, is 140 miles long by 40 broad, and has an average depth of 80 feet. Countless islets, on which idols of black basalt and other Indian antiquities have been discovered, stud the surface of the lake, which has but one outlet, the San Juan del Norte. This river enters the Caribbean Sea after a course of more than 100 miles, the average depth of its channel being 17 feet, and forms the basis of a projected ship-canal, to unite the Pacific and Atlantic Oceans, the length of which would be 181 miles, and the estimated cost $65,722,000.

Nicas'tro, a town of S. Italy, province of Catanzaro, 28 miles S. of Cosenza, is the seat of a bishop, and has numerous churches, an episcopal palace, and a ruined castle, in which Frederick II. imprisoned his eldest son Heinrich (1235). N. is the trade-centre of all the smaller communes on the Gulf of St. Eufemia. Pop. (1874) 13,181.

Nicco'la, Pisa'no, was born at Pisa (as his name indicates) about the beginning of the 13th c. All we know of him is derived from a couple of inscriptions, a few contracts, and a legendary *Life* by Vasari. A few ancient sarcophagi in his native town seem first to have led him to a study of the antique, the spirit of which he taught the Italian artist to blend with his own observations of nature. His first masterpiece was the 'Bologna Urn' (1231) ornamented in bas-relief of such dramatic force and noble proportions that he was called 'Niccola of the Urn.' In 1231 he visited Padua, where he designed the magnificent basilica of St. Antonio, only finished in 1407. Venice obtained from him the beautiful 'Church of the Frari' (1250), Florence that of 'Santa-Trinita;' and he designed 'San Lorenzo' at Naples. N. added to the triumphs of his 'Urn' by his 'Deposition from the Cross' (1235, some say 1237), a high-relief, placed over a door of St. Martino at Lucca. About 1260 he executed his 'Pisan Pulpit,' a hexagon of marble supported on nine columns, the sides covered with mingled bas-relief and detached statuary, the whole distinguished by the most marvellous freedom of design and masterliness of execution. It is not to be wondered at that N., struggling to embody Christian ideas in the forms of ancient art, while he gained breadth and force, should lose the subtle qualities of beauty. His heads are often disproportionate to the bodies, and his grouping is generally crowded and clumsy. His pulpit in the Baptistry of Pisa was followed by a similar one at Siena. The market-place fountain of Perugia, and the shrine of St. Dominic at Bologna are also specimens of his work. He died about 1273. N. was the Phidias of Italy—the father of Renaissance art. His son Giovanni, Andrea Pisano, and the numerous pupils who had worked for him wherever he went, extended his principles, seizing not only upon such assistance as the antique lent them, but welcoming eagerly the noble Gothic architecture which had just then accomplished its journey from the dim North. An exultant eclecticism soon sprang up in art; and almost ere the bones of the master were cold, such men as Orcagna, Donatello, Ghiberti, Brunelleschi, Michael-Angelo, had travelled far on the road he opened for them. See Lord Lyndsay's *Sketches of the History of Fine Arts*, vol. ii., Ruskin's *Val d'Arno* (1874), and Symonds' *Renaissance—The Fine Arts* (1877).

Niccoli'ni, Giovanni Battista, was born of noble family at San Giuliano, near Pisa, 31st October 1785. He became professor of history and mythology at the Florence Academy of Fine Arts, acting also as its librarian. In 1804 appeared his poem *La Pesti di Livorno*. N. subsequently wrote the frigidly classical *Polissene*, *Medea*, *Ino e Temisto*, *Edipo*, *I sette a Tebe*, *Matilda* (1815), an effort in the direction of the Romantic school, *Antonio Foscarini* (1827), for inherently dramatic interest the best of his works, *Lodovico Sforza*, *Rosamonda d'Inghilterra*, *Beatrice Cenci*, *Agamemnone*, *Arnaldo da Brescia*, *Filippo Strozzi*. He died at Florence, 20th September 1861. His most successful drama, *Nabucco*, portrayed the story of Napoleon's downfall, with fictitious names. N., like his French contemporary Delavigne, gained the public ear mainly by the political sentiments freely expressed in all his pieces. His admirers hoped for a national poet in him, but nearly all he wrote is dead already. The best collection of his tragedies is that in 2 vols. (Capolago, 1835.) Professor Corrado Gargiolli of Milan began in 1862 a complete edition of N.'s *Opere*. See the *Cornhill* (vol. x. p. 683).

Nice (It. *Nizza*), capital of the department of Alpes-Maritimes, France, beautifully situated at the foot of the Alps, at the mouth and on both sides of the Paglione, 14 miles W.S.W. of the Italian frontier, and 100 E.N.E. of Marseille by rail. The broad stony bed of the Paglione or Paillon, a small stream frequently dried up, is lined by handsome quays and crossed by several bridges. To the N.E. of the town rises the Castle Hill, 320 feet high, crowned by the ruins of a castle destroyed by the Duke of Berwick in 1706. The hill is now laid out in beautiful grounds, where palms, oranges, cypresses, and aloes grow profusely. N. has a Gothic church of Notre Dame, a marble cross commemorating the meeting of Karl V. and François I. in 1538, a square formed by covering in the Paglione between the bridges Vieux and Neuf, and ornamented by bronze statues of Massena (1867), a town library of 40,000 vols., &c. The Promenade des Anglais, adjoining the Jardin Public on the W., was laid out by English residents in 1822-24, and greatly extended in 1862. N. is the winter rendezvous of invalids and others from all parts of Europe, especially from England, Germany, and Russia. The town is almost deserted in summer. The mean temperature in January and February is 47° F., in March 52°, in April 58°. Frost is

rare, and the Mistral, or N.W. wind, the scourge of Provence, is intercepted by the Montagnes de l'Estérel and du Var. The harbour only admits small vessels, those of larger tonnage entering the bay of Villafranca. There is considerable trade in wine, oil, hemp, silk, fruits, and essences. Pop. (1872) 52,377. N., anciently *Nicaea*, was founded by the Greeks of Marseille in the 5th c. B.C. Included in the county of Provence till 1388, and later in the duchy of Savoy, it was occupied by the French in 1792, restored to Sardinia in 1814, and finally annexed to France along with Savoy in 1860. The natives speak a mixed Provençal and Italian dialect. See Tisserand, *Histoire Civile et Religieuse de la Cité de Nice* (Nizza, 1862).

Ni'cene Creed is so called from having been put forth by the Council of *Nicæa* (325), although not in its present form. The creed adopted by that Council consisted of the ancient creed of Cæsarea, with the addition of the phrase *of one substance with the Father*, to meet the heresy of Arius (q. v.), and ended with *and in the Holy Ghost*. The final clauses were added by the Council of Constantinople (381). The insertion of the term Filioque (q. v.) by the Council of Toledo (589), led to the schism between the Eastern and Western Churches, which has continued from the 9th c. to the present time. The N. C., which had previously been the baptismal Confession of Faith, was embodied in the Liturgy by Peter Fullo, Bishop of Antioch, 471, and by the Patriarch of Constantinople in 511. See Canon Swainson's *Nicene and Apostles' Creeds* (Lond. 1875).

Niceph'orus, born at Constantinople in 758, held the post of *notarius* to Constantine VI. (780–797), opposed the iconoclasts at the second Council of Nicæa (787), and was raised to the patriarchate (806). Deposed by Leo the Armenian for his opposition to the edict against images (815), he retired to the convent of St. Theodore, on one of the islands of the Propontis, and died there June 2, 828. N. was one of the ablest of the Byzantine historians, his chief works—all in Greek—being *Breviarium Historicum*, a history of Constantinople from 602 to 770 (Par. 1616); *Chronologia Compendiaria* (Par. 1573); and *Indiculus Librorum Sacrorum* (Par. 1609).—**N. Callistus Xanthopulus**, born towards the close of the 13th c., and died about 1350, was the author of an *Historia Ecclesiastica* (Par. 1630), which won for him the title of *Thucydides Ecclesiasticus*. He wrote nine other separate works, besides hymns, sermons, epistles, &c.

Nice'tas Acomina'tus or **Chonia'tes**, a Byzantine historian, born at Chonæ (*Colossæ*) in Phrygia, about 1150, was appointed governor of Philippopolis by Isaac II. (1189), and later held the offices of *logotheta* and *præfectus sacri cubiculi*, with the title of senator. He fled from the sack of Constantinople by the Latins (1204) to the court of Theodore Lascaris at Nicæa, where he died about 1216. N.'s *Historia*, embracing in twenty-one books the period 1118–1206, was published by Wolf (Basel, 1557) and Becker (Bonn, 1835); his *Narratio de Statuis quas Franci destruxerunt*, by Wilken (Leips. 1830).

Niche (Fr. *niche*; It. *nicchia*), a recess in a wall for a statue or other erect monument. Niches, in Norman architecture, are usually shallow and square; in Early English they are deeper and more ornamental. In Early French buildings they are sometimes formed at the set-offs of buttresses, three sides being open, and the canopy supported by slender shafts.

Nic'hol, John Pringle, an eminent astronomer, was born at Brechin, in Forfarshire, 13th January 1804, studied at King's College, Aberdeen, and after some years spent as a schoolmaster in Hawick, Cupar-Fife, and Montrose, where he won great popularity by his brilliant lectures on astronomy and natural philosophy, was appointed in 1836 professor of the former subject in Glasgow university. Here he spent the remainder of his life. It was mainly by his exertions that the fine observatory in Glasgow was built. No Scottish professor was ever more sincerely loved and admired by his fellow-citizens than N. The chaste and lofty eloquence with which he expatiated on the wonders of his favourite science is still remembered in the West of Scotland; his generous sympathy with youthful ambition endeared him to all the liberal minds of the university. N. died at Rothesay 19th September 1859. His principal works are *View of the Architecture of the Heavens* (Edin. 1837), *The Solar System* (Edin. 1842), *The Planet Neptune* (Edin. 1848), *The Stellar Universe* (Edin. 1848), *The Planetary System* (Edin. 1851), and *The Cyclopædia of the Physical Sciences* (Edin. 1857; 2d ed. 1860).—**John N.**, son of the preceding, was born at Montrose, 8th September 1833, studied with distinction at Glasgow University and Balliol College, Oxford, where he graduated with first class honours in classics and philosophy in 1859. In 1861 he was appointed Professor of English Literature in Glasgow University, an office which he still (1878) holds. In 1873 he received from the University of St. Andrews the degree of LL.D. Besides contributing to the *Westminster* and other reviews, N. has written a historical drama, *Hannibal* (1872), marked by great beauty and terseness of dialogue, a genuinely poetical spirit, and a distinct power of dramatic conception.

Nic'holas, the name of six Popes.—**N. I.**, called 'the Great,' a Roman by birth, was Pope from 858 to his death (13th Nov. 867). His strength of mind and purity of morals fitted him for being the founder of the supremacy of the Papal See, which before N.'s time was wholly dependent upon the Emperors. He successfully interfered in the controversies of the German Church, and humiliated, after a long struggle, the powerful Archbishop Hincmar (q. v.) of Rheims, whose aim was to establish a national church independent of the Pope. This victory was gained by an appeal to the spurious 'Isidorian Decretals' (q. v.). The Frankish King Lothar II., who, contrary to the civil law, but aided by venal bishops, had put away his wife Thietberga to marry his mistress Waldrade, was forced by N. to submit to penance and the reinstatement of his queen. N.'s strife with the Patriarch Photius (q. v.) resulted in their excommunicating one another, and widening the breach between the East and West, but gained over the Bulgarians to the Romish Church.—**N. II.** formerly Bishop of Florence, was Pope from 1058 to June 24, 1061. He ruled under the influence of Hildebrand, opposing Berengarius (q. v.), of Tours and establishing a new law for papal elections, which placed the choice in the hands of the cardinals.—**N. III.** (1277–22d August 1280) obtained from the Emperor Rudolf of Hapsburg all imperial rights over the Exarchate (q. v.).—**N. IV.** (1288–14th April 1292) strove in vain to stir up a new crusade.—**N. (V.)** was in 1328 set up by Ludwig of Bavaria as anti-pope to John XXII., but in 1330 was delivered up to the latter, who kept him in prison till his death (1333).—**N. V.** (1447–55), properly Tomaso di Sarzano (his mother's home), was born at Pisa in 1398, and ascended the papal chair, 7th March 1447. N. strove to increase the prestige of the papacy, weakened through the influence of the reforming Councils of Constance and Basel. After the capture of Constantinople by the Turks, which he had struggled in vain to avert, he showed the greatest liberality to the learned Greeks exiled by that disaster. With a collection of 5000 MSS. N. practically laid the foundation of the Vatican Library. On the 17th of February 1448, he concluded the so-called Aschaffenburg or Vienna Concordat with Friedrich III.

Nicholas, St., the patron of children and sailors, and also the national saint of Russia, a native of Patac in Lycia, as Bishop of Myra was imprisoned in the persecution of Diocletian, opposed the Arians at the Council of Nicæa (325), and died in 342. His relics were translated to Bari in Apulia by Robert Guiscard, 9th May 1087. From his commemoration falling on 6th November, and from the legend of his dowering three poor maidens by leaving money on their window-sill, N. (or Santa Claus, as he is called in Holland) has long been regarded as the bearer of Christmas presents; and Dutch and American children still put out a shoe or stocking, expecting the saint to fill it during the night. In England his festival was celebrated by the installation of a Boy Bishop (q. v.).

Nicholas of Guildford, the author of a bright and picturesque poem, called the *Owl and the Nightingale*. It is a rare specimen of Transition English, written in the dialect of the south of England, but free from broad provincialisms. Though composed in the rhymed octo-syllabic verse of the French Romances, it is a genuine English work, not more than twenty words being of French origin in the whole 1792 lines of which the piece consists. It has been assigned on internal evidence to the reign of Henry III., and is certainly not of later origin. The poem was edited for the Percy Society by Thomas Wright, M.A., in 1843.

Nicholas Paulovitch, Emperor of all the Russias, born 6th July 1796, in the castle of Gatchina, near St. Petersburg, was the third son of the Emperor Paul I. and the Princess Sophie of Würtemberg. From his youth he was serious, re-

served, even unsocial, but deeply interested in military affairs. During the reign of his eldest brother Alexander, he remained without influence, stayed for some time in England, and after his marriage (1817) with Charlotte of Prussia, lived in retirement at St. Petersburg. His elder brother, Constantine, who resided as governor at Warsaw, had in 1822 resigned his birthright, yet, on the death of Alexander, N. caused him to be proclaimed (1st December 1825), and only after a second refusal took the crown himself (26th December). He had first to combat a military insurrection in the capital, due to a secret league under Prince Trubeskoi. Murderous artillery-fire, unsparing execution and banishment, quickly cleared his path. N.'s efforts to root out bribery and fraud were less successful, yet the so-called 'Radical Reform,' which established throughout the empire the Russian language, religion, and law, doomed the influence of French culture and policy. At the head of a well-organised military despotism he decided disputes in two continents. In 1828, through Paskievitch, at the Peace of Turkmanchai, he extorted from Persia, which had incautiously made war upon him, Erivan and Nakhichevan. His active measures against Turkey gained Greece to his interest, and by the Peace of Adrianople (1829) he obtained the islands at the mouth of the Danube and on the E. coast of the Black Sea, and secured the partial independence of the Danubian principalities. When the Poles rose for freedom in 1830, his Generals Diebitch and Paskievitch overpowered them, and N. punished them with the severest cruelty, removing the last shadow of their independence by the 'Organic Statute' of 1832. To destroy the influence of the Catholic Church he broke (1839) the 'Union' which had previously bound the Greek Catholics in Lithuania to the Pope, and brought the congregations over to the State Church. He showed the same zeal in relation to the Lutherans of the Baltic governments. After the July Revolution of 1848 he took a decided part against the movement for freedom throughout Europe, and on the 26th March issued an appeal to the people to hold fast by 'the Faith, the Emperor, and Holy Russia,' upbraiding the 'heathens' and 'spirits of sedition.' In July and August 1848, his troops had supported Prince Bibasco in Wallachia, and in May 1849 Paskievitch entered Hungary and compelled Görgei to capitulate at Vilagos (13th August). In the dispute between Austria and Prussia for the direction of Germany, N. took the reactionary side, and in the Slesvig-Holstein question he supported Denmark. He had now an extraordinary influence as the 'maintainer of order' in Europe, and believed himself able to carry out his favourite project of expelling the Turks, and seizing the inheritance of the 'sick man.' His arrogance led to the Crimean War, and brought against him England, France, and Sardinia. Repeated reverses, and the humiliation of seeing his greatest effort frustrated, broke his strength, and he died, 18th February 1855, after enjoining the arming of the whole people as a last resource. With him fell the last bulwark of absolutism in Europe. Three sons survived him, Alexander II. (q. v.), his successor, Constantine (q. v.), Michael (born 1832); and two daughters, Maria (born 1819, married in 1839 to Duke Maximilian of Leuchtenberg, who died in 1852, again married in 1856 to Count Gregor Strogonoff), and Olga, Queen of Würtemberg (born 1822).

Nichols, John, F.S.A., born at Islington, 2d February 1745, was the apprentice and successor of William Bowyer, and, during a busy life of authorship, edited the *Gentleman's Magazine* from 1778 till his death, which occurred 26th November 1826. Of the sixty-seven works of which he was either author or editor, the chief are a collection of *Miscellaneous Poems with Historical and Biographical Notes* (8 vols. 1780–82); *Biographical and Literary Anecdotes of William Bowyer, F.S.A., and of many of his learned Friends* (1782), a work recast and extended under the title of *Literary Anecdotes of the Eighteenth Century* (9 vols. 1812–15), and continued, with the aid of his son, in *Illustrations of Literary History* (8 vols. 1817-58); and *The History and Antiquities of Leicester* in four splendid folio vols. (1795–1815). See A. Chalmer's *Memoirs of J. N.* (Lond. 1826).—**John Bowyer N.**, son of the preceding, was born in London, 15th July 1779, educated at St. Paul's School in 1796, joined his father in business, and was sole proprietor of the *Gentleman's Magazine* from 1833 till 1856. From his press have issued many of the noblest specimens of English typography—*e.g.*, Ormerod's *Cheshire*, Clutterbuck's *Hertfordshire*, Surtees' *Durham*, Hoare's *S. Wilts*, Whitaker's *Histories of Whalley and Craven*, and Dallaway's *Rape of Arundel*. Among his own writings are a *Brief Account of the Guildhall* and *Anecdotes of Hogarth* (1833), and *Historical Notices of Fonthill Abbey* (1836). N. died at Ealing, Middlesex, 19th October 1863.—**John Gough N.**, son of the preceding, was born in 1806, and was long editor of the *Gentleman's Magazine*, which ceased to be the property of the Nichols family in 1856. N. was one of the founders of the Camden Society, and edited several important works issued by it and by the Roxburghe Club, &c. He died at Holmwood, near Dorking, 13th November 1873.

Nicholson, John, one of the most ardent of the heroes of the Indian Mutiny, was the son of an Irish physician, and was born at Dublin in 1821. At the age of fifteen he was appointed a cadet in the Bengal Infantry, whither three of his brothers followed. He was taken prisoner in the disastrous Afghan campaign of 1842, and served in the first Sikh War of 1846; but henceforward he entered the political branch of the service (a mixture of the diplomatic and the administrative). In this capacity he was with the army during the second Sikh War of 1848, and subsequently became one of the lieutenants of the two Lawrences in the government of the Punjaub. In 1850, while on furlough in Europe, he was involved in an attempt to rescue Kossuth, the Hungarian patriot, from a Turkish fortress. In his own district he was worshipped as a god; and, sorely against his will, he became the *gooroo* of a sect of 'Nikkul Seyns.' In 1857, at the outbreak of the Mutiny, his advice and prompt action contributed more than the conduct of any single man to preserve the Punjaub. He disarmed the mutineers, and hunted down those who would not surrender. Appointed to the command of the Punjaub movable column, his arrival gave new strength to the exhausted British force outside Delhi. He won the battle of Nujufgurh, and fell while leading the storming party at the Cabul gate on the 14th September 1857. See *Lives of Indian Officers*, vol. ii., by Sir J. W. Kaye (Lond. 1867).

Ni'cias, a distinguished Athenian general and statesman during the Peloponnesian War, was the son of Niceratus, a lessee of silver mines at Laureium. He inherited his father's fortune, which was estimated at 100 talents. Being thus naturally associated with the aristocratic party, he came forward after the death of Pericles as the opponent of the demagogue Cleon. N. gained numerous successes as a general by caution and wariness rather than by military genius or dash. In 427 B.C. he took the island of Minoa; in 426 B.C. ravaged the island of Melos and the coast of Locris; in 425 B.C., compelled the surrender of Sphacteria by the Spartans, and defeated the Corinthians; in 424 B.C. captured the island of Cythera, ravaged the Laconian coast, and took Thyrea. In 423 B.C., in conjunction with Nicostratus, he took Mende and blockaded Scione. On the death of Cleon N. endeavoured to bring about a peace with Sparta, which he accomplished 421 B.C. This is known as the *Peace of N.* In 415 B.C. he was appointed along with Alcibiades and Lamachus to the command of a great naval expedition to Sicily. Success at first seemed to favour the Athenians, but eventually they were signally defeated, and N. being compelled to surrender was put to death 413 B.C. See Plut. *Nicias; Thuc.* vi. and vii., and *The Histories of Greece* by Grote and Thirlwall.

Nick'el (symbol Ni, atomic weight 59) is a greyish-white metal, occurring associated with cobalt in its ores, and resembling this metal in its general properties. One of the principal ores is *Kupfernickel*, from which the name comes, and which was so-named by the German miners because it was liable to being mistaken for copper ore. Its constitution is given by the formula Ni As. *N. Glance* (Ni As_2-Ni S_2) and *Arsenical N.* (Ni As_2) are other ores—the latter corresponding to the tin-white cobalt. Like cobalt, N. may be obtained by igniting the oxalate. Ordinarily, however, the metal is extracted from the *speiss* formed in the preparation of cobalt, the oxide of N. yielding N. and carbon when strongly heated in contact with carbon. There are two oxides, the protoxide (NiO) and Sesquioxide (Ni_2O_3), the former of which is alone of any importance, forming salts, one of whose distinguishing features is their beautiful emerald-green colour when hydrated. When the solution of a soluble salt is treated with nitric acid, the oxide of N. is precipitated. The most important of the N. salts is the sulphate ($NiSO_4$ 7Ho), from which the oxalate, valuable as a convenient

source of the metal, is produced by the action of oxalic acid. The sulphate crystallises in beautiful green prismatic crystals, and forms double salts with potassium and ammonium sulphates. The carbonate ($NiCo_3$) is produced in a hydrated condition by mixing together solutions of N. sulphate or chloride and sodium carbonate, and is readily decomposed by heat. The chloride ($NiCl_2$) is easily prepared by the action of hydrochloric acid upon the oxide or carbonate. It is green in solution, but yellow when anhydrous. The chief use of N. in the arts is in the preparation of German silver, which contains 50, 30, and 20 per cent. of copper, zinc, and N. respectively. N. is strongly magnetic, losing this property, however, when heated to 350° C.

Medicinal Properties of N.—The sulphate of N. is prescribed in cases of chlorosis and severe headache, in doses of from ½ to 1 grain, two or three times a day. N. is best given on a full stomach, as, otherwise, it is apt to produce nausea.

Nicksics', or **Nikschitj'**, a fortress and capital of a district of the same name, Herzegovina, near the N. frontier of Montenegro, and 34 miles N.E. of Cattaro, was held by the Turks during the late insurrection in Herzegovina, but capitulated to the Montenegrins, 8th September 1877.

Nic'obar Islands, a group of islands in the Bay of Bengal, due S. from the Andamans, and midway between Ceylon and the Malay Peninsula. The three largest are called Sambelong, Carnicobar, and Nancowry. The N. I. seem to be of volcanic formation, and are fringed with coral reefs. From 1756 Denmark claimed sovereignty over them, but in 1848 surrendered her claims to the British. The inhabitants, who are of Malayan origin and about 8000 in number, live mainly on the produce of the cocoa-nut palm. They have an evil reputation for their treatment of shipwrecked mariners. In 1872–73 their trade with India showed an import of £426, and an export of £395. At Camorta, the chief place, there is a penal settlement in connection with Port Blair in the Andamans. There are about 240 convicts, but the site is unhealthy, and escapes are numerous.

Nic'ol, Erskine, R.S.A., was born at Leith in 1825, received his art education at the Edinburgh Academy, and in 1846 went to Ireland, where he resided for several years. After exhibiting pictures for some time in Edinburgh, and becoming a member of the Royal Scottish Academy, he proceeded to London in 1862, and was elected A.R.A. in 1866. His reputation is based on his masterly treatment of humorous Irish subjects, and on the masculine breath of his painting, which, though it bears the signs of an impetuous brush, is free from the affectation of coarseness. Among his best works are 'Renewal of the Lease Refused' (1863), 'Among the Old Masters' (1864), and 'A Deputation' (1865), 'Paying the Rent,' and 'Both Puzzled' (1866). N. is also favourably known as a painter in water-colours.

Nic'olai, Christoph Friedrich, a German publisher and the friend of Lessing, was born at Berlin 18th March 1733, and entered his father's business in 1759. He threw himself ardently into the literary struggles of the time, declaiming against philosophy as represented by Kant and Fichte, and attempting to ridicule Goethe in his *Freuden des jungen Werther* (1775) and *Geschichte eines dicken Mannes* (1794). He did far more for literature, however, as a publisher than as a writer. With Moses Mendelssohn he founded the *Bibliothek der schönen Wissenschaften* (1757). He also started the *Literatur-Briefe* (24 vols. 1759–66), to which Lessing contributed; and the *Allgemeine Deutsche Bibliothek* (106 vols. 1765–98). N. also wrote *Reise durch Deutschland* (1783–96); *Anecdoten von Friedrich II.* (1788–92), and a host of romances, essays, and biographies. He died 8th January 1811. See *N.'s Leben und Literarischer Nachlass*, edited by Göckingk (Berl. 1820).—**Karl Otto Ehrenfried N.**, a German composer, was born in Königsberg, June 9, 1810. Appointed organist to a chapel at Rome in 1834, he diligently studied the works of the old Italian masters under Baini. He was director of the orchestra at the Imperial Opera, Vienna, during 1839, after which he produced the operas *Enrico II.* at Trieste, *Il Templario* at Turin (1840), and *Il Proscritto* at Milan (1841). His most famous work, *Die Lustigen Weiber von Windsor*, was brought out in 1848 at Berlin, where he died, May 10, 1849. In opera N. was a follower of Rossini, his style being fresh and melodious, without possessing striking originality. He composed a number of works for a Requiem, a Te Deum, &c. His well-selected collection of ancient Italian MS. music was purchased after his death for the Royal Library, Berlin.

Nic'olas, Sir Harris Nicholas, was born in Cornwall, March 10, 1799, entered the navy, and rose to the rank of lieutenant (1815), but quitting the service on the close of the war, was called to the bar (1825), and thenceforward devoted himself to historical and antiquarian research. He was created a knight of the Guelphic Order (1831) and Chancellor of the Ionian Order of St. Michael and St. George (1832), and died at Cape Cure, near Boulogne, August 3, 1848. N.'s works are marked by singular industry and critical acumen, but also by an acrimony which embroiled him in frequent literary squabbles. The principal are—*Notitia Historica* (1824), *Scrope and Grosvenor Controversy* (1832), *Chronology of History* (1835), *History of the Orders of Knighthood* (4 vols. 1841–42), *Despatches of Lord Nelson* (7 vols. 1844), and an unfinished *History of the British Navy* (2 vols. 1847).

Nic'oll, Robert, a Scottish poet and journalist, was the son of a farmer, and was born in the parish of Auchtergaven, Perthshire, 7th January 1814. Misfortunes occasioned by his own generosity reduced the father to the position of a day-labourer, and N.'s youth was spent in hard toil. In spite of poverty and its accompanying disadvantages, the pure ardour of genius carried him victoriously forward. With the 'fee' he won as a herd-laddie he went to school in winter. By a study of the best English authors he gave himself the truest culture a man can obtain. After making the acquaintance of Robert Chambers, Mr. Johnstone, Mr. Tait, and other persons connected with literature, he opened a circulating library in Dundee in 1835, and in the following year was appointed editor of the *Leeds Times*. Here he fought the battle of Radicalism with an energy far beyond his strength. Attacked with consumption, he was in a year forced to abandon his post. Returning to his native country, he died at Leith in December 1837. During his brief career he wrote a number of lyrics both in English and in his native Doric, all of which are genuine, and some of rare beauty and humanity. *Bonnie Bessie Lee* is perhaps his sweetest lilt. The latest and best edition of his poems, with a touching memoir of the author, was published in 1877 by Alexander Gardiner, Paisley. The memory of this pure and eager spirit is justly dear to his countrymen.

Nic'olo, a variety of onyx, with parallel bands of a black or deep-brown and a bluish-white colour, found chiefly in Bohemia. It was much used by the Romans in gem-engraving.

Nicomedei'a, the capital of Bithynia, on the N.E. coast of the Bay of Astacus, was built by Nicomedes I. 264 B.C. In a short time it became one of the greatest and most important of ancient cities, and for more than six centuries continued to flourish. Under the Empire N. was the residence of Diocletian and Constantine when they were engaged in war against the Eastern nations. Earthquakes were frequent in its neighbourhood; but N., though it suffered greatly therefrom on several occasions, was, by imperial munificence, always restored. N. was the birthplace of Arrian, the historian of Alexander the Great, and the scene of the last hours of the great Carthaginian general, Hannibal. At his villa of Ancyron, close by the city, Constantine died, May 22, 337 A.D. The modern *Ismid*, which contains many interesting remains of antiquity, occupies the site of ancient N.

Nicop'oli or **Nicop'olis**, a fortified town in Bulgaria, Turkey, on the right bank of the Danube, opposite Turnu Margurelli, 20 miles W. of Sistova and 25 N.N.E. of Plevna. It stands on a height, and is defended by a castle and by ramparts mounting large guns. Here the Turks, led by Bajazet I., defeated the Hungarians under Sigismund, September 28, 1396. On July 16, 1877, it surrendered to the Russians, the Turkish garrison (6000) becoming prisoners of war. Pop. 5600, comprising Bulgarians, Wallachs, and Jews. At some distance, near the village Eski-Nikup, are the ruins of the ancient *Nicopolis ad Istrum*, founded by Trajan.

Nico'sia, a town of Sicily, province of Catania, 48 miles E.S.E. of Termini, has a cathedral, four large churches, and a college with a fine library. It carries on a lively trade in wine, oil, grain, and cattle, but has no manufactures, and is reckoned the most backward of all the Sicilian towns, 94 per

cent. of its inhabitants being unable to read. The dialect shows the place to have been a Lombardic colony, founded probably by Roger II. Pop. (1874) 14,789. N. is also another name of Lefkosia (q. v.) in Cyprus.

Nicotia'na. See TOBACCO.

Nic'otine ($C_{10}H_{14}N_2$), a powerfully poisonous alkaloid found exclusively in the tobacco-plant (*Nicotiana tabacum*). It is obtained in solution combined with malic and citric acids by boiling the leaves in water. This liquid is then strained, evaporated to a syrupy consistency, and mixed with alcohol, when it forms two layers, from the upper of which the salts of N. are drawn off dissolved in alcohol. The N. is then set free by the action of potash and dissolved in ether, which is subsequently evaporated, leaving a colourless oily liquid which becomes brown when exposed to the air. This liquid is N., and is readily distinguished by its pungent odour. It boils at 250° C., and is readily soluble in water, alcohol, and ether. See TOBACCO.

Nie'buhr, Karstens, born on the 17th of March 1733, at Lüdingworth in Hannover, studied mathematics at Hamburg and Gottingen, and entering the Danish service as lieutenant in the engineers (1760), was attached to an expedition fitting out at the cost of Frederik V. for the exploration of Arabia (1761). All N.'s colleagues perished in this unfortunate journey—the philologist Von Haven at Mocha (May 25, 1763), Forskål the naturalist at Jerim (July 11), the painter Baurenfeind on the voyage to Bombay, and at the last-named place Cramer the physician (February 11, 1764). N., who alone had adopted the Eastern habit and mode of life, with singular intrepidity now proceeded on his homeward journey by way of Persia, Mesopotamia, Palestine, and Cyprus, reaching Copenhagen in the November of 1767. He published the results of his invaluable researches in *Beschreibung von Arabien* (Cop. 1772) and *Reisebeschreibung von Arabien und andern umliegenden Ländern* (2 vols. Cop. 1778–78; vol. iii. supervised by his daughter, 1837), and edited Forskaal's *Descriptiones Animalium* (1775), and *Flora Ægyptiaco-Arabica* (1776). N. was made captain (1768), notary at Meldorf in Slesvig-Holstein (1778), a member of the Institute of France (1802), and councillor of state (1808). He died April 26, 1815, having latterly become quite blind. See his son's *Leben Karstens N.* (Kiel, 1817). —**Barthold Georg N.**, only son of the preceding, born at Copenhagen, August 27, 1776, was educated at Meldorf, and studied philology and jurisprudence at Kiel (1794–96). He was appointed supernumerary Secretary to the Royal Library of Copenhagen (1797), spent a year and a half in London and Edinburgh (1798–99), at the latter place meeting Walter Scott, and on his return to Denmark became assessor in the E. Indian department, and secretary to the African consulate (1800). In 1806 N. entered the service of Prussia as joint-director of the chief Berlin bank, and in 1809 was dispatched to Amsterdam to negotiate a loan. He exchanged his financial post for that of royal historiographer in 1810, the year of his election to the Prussian Academy, and of the masterly course of lectures on Roman history, published under the title *Römische Geschichte* (2 vols. Berl. 1811–12). The War of Liberation (1813–14) broke up the philological society consisting of N., Buttmann, Spalding, Schleiermacher, and other scholars. In 1814 he was again sent to Holland; 1815 he spent in writing a biography of his father, and in editing Fronto; and in 1816 he was appointed ambassador to the Papal court. At Rome N. continued to deepen and extend his studies, always, however, 'deploring with a sad heart' that he should have 'left the path of a teacher or professor to enter upon a life of trouble.' In 1822 he applied for his recall, and after visiting Albano and Naples, returned to Berlin (1823). Thence he withdrew to Bonn, where he founded the *Rheinische Museum* (1827), entirely recast his history (1827–28; Eng. trans. by Hare and Thirlwall, 2 vols. 1828–32), and continued to lecture in a non-official capacity until his death, January 2, 1831. N.'s *Römische Geschichte* marked, in the truest sense, an epoch in the writing of histories. From the mass of disjointed fable, hitherto accepted or thrown aside at the historian's caprice, he conscientiously strove, by the aid of philology, ethnology, and archæology, to sift a residuum of truth; and the success of his system is shown by its forming, not only the basis of all succeeding histories of Rome, but a model to historians generally. That system necessarily contained many minor inaccuracies, and left gaps to be filled in by later writers; N.'s style, too, was ponderous and ungraceful, and Macaulay, in the preface to *Lays of Ancient Rome*, speaks of him as 'a man who would have been the first writer of his time, if his talent for communicating truths had borne any proportion to his talent for investigating them.' N.'s posthumous writings include the third volume of his *Römische Geschichte*, bringing it down to 264 A.D. (Berl. 1832; Eng. trans. by Drs. Smith and Schmitz, 1851); *Vorlesungen über Röm. Gesch. an der Universität Bonn* (Jena, 1844; Eng. trans. 1848–52); *Gesch. des Zeitalters der Revolution* (2 vols. Hamb. 1845); *Sämmtliche historische und philologische Vorträge* (Berl. 1846). See *Lebensnachrichten über Barthold N.* (2 vols. Hamb. 1838); and Miss S. Winkworth, *The Life and Letters of Barthold N.* (3 vols. Lond. 1852).—**Markus Carsten Nikolaus von N.**, a son of the preceding, was born at Rome, April 1, 1817, and studied at Kiel, Bonn, Halle, and Berlin. After a lengthened residence in England, France, and Belgium, he became a journalist at Berlin, and travelled in Italy (1846–47). At first a warm advocate of reform, since 1848 he attached himself to the ultra-Conservative party, and rapidly rose to be councillor (1850), cabinet secretary (1851), and councillor of state (1854). Ennobled in 1857, he died at Oberweiler, worn out by overwork and the attacks of his opponents, August 1, 1860. Amongst other works he published a *Geschichte Assurs und Babels* (Berl. 1858).

Niel, Adolphe, a French marshal, was born at Muret (Haute Garonne), 4th October 1802, entered the *Corps du Genie* in 1825, became captain in 1835, and led a company at the storming of Constantine. He was head of Marshal Vaillant's staff in the Roman expedition of 1849, was made a general of division in 1853, accompanied the French expedition to the Baltic under Baraguay d'Hilliers, and directed the siege of Bomarsund, and afterwards that of Sebastopol. In 1857 he became a senator, commanded the 4th Corps d'Armée in the Franco-Austrian War of 1859, and fought with distinction at Solferino. In 1867 he was appointed Minister of War, and was actively engaged in reorganising the French Army when he died, 14th August 1869.

Niell'o Work consists in engraving a design on silver or other metal, filling the incisions with a black alloy, and then burnishing the whole surface to contrast effectively the bright metal with the dark design. The alloy is composed of silver, copper, lead, and sulphur, and is easily fused with the aid of borax. Owing to its black colour the Italians called it niello from the Low Lat. *nigellum*. This art is very ancient, and survived the dark ages only to be carried to greater perfection by the goldsmiths of Italy and Germany in the 15th c. It ceased to be practised in the 16th c., but not before it had given rise to the art of copper-plate engraving, which was a natural sequence to the improvements effected in taking casts or prints of N. W. in progress. N. W. has to some extent been revived of late years in France and Russia, and is applied to the decoration of jewel-boxes, sword and knife handles, &c.

Niem'cewicz, Julian Ursin, a distinguished Polish author and statesman, born, 1757, at Skoki in Lithuania, entered the Polish army in 1777, which he left in 1788 with the rank of major, to work in the Diet for a new constitution. In 1794 he was adjutant to Kosciusko, with whom he was taken prisoner, but liberated by the Emperor Paul, after which both went to America. In 1807 N. returned, and was made secretary of the Senate of the new grand-duchy of Warsaw, and in 1814 chairman of the Constitutional Committee, but lived chiefly on his estate, busied with study. After the failure of the Polish Revolution in 1830, he fled to England, which he afterwards left for Paris, where he founded a Polish library and historical society, and died 21st May 1841. His chief works are *Historical Songs of the Poles* (Warsaw, 1816, *et seq.*; Germ. trans. by Gaudy, Leips. 1833); *History of the Government of Sigismund III. of Poland* (3 vols. *ib.* 1819); *Collection of Memoirs for Ancient Polish History* (5 vols. *ib.* 1822); *Levi und Sara, Briefe Polnischen Juden* (Berl. 1825); the novel *John of Tenczyn* (3 vols. Warsaw, 1825; Germ. trans., Berl. 1828); and the posthumous *Notes sur ma Captivité à Pétersbourg* (Par. 1843). His poetical works were collected in 12 vols. (Leips. 1840), and his life was written by A. Czartoryski (Par. 1860).

Nie'men (Ger. *Memel*), a river of Prussia, 640 miles in length. It rises in Russia, becomes navigable at Grodno, 400

miles from its mouth, and at Winge, 8 miles below Tilsit, divides into the Russ and the Gilge, both of which fall into the Kurisches-Haff.

Niep'ce, Joseph Nicéphore, the first discoverer of photography, was born at Châlon-sur-Saône, March 7, 1765. On the outbreak of the Revolution he entered the army and served as a lieutenant in the Italian campaign in 1793. His weakness of sight, however, compelled him to return to France, where from 1795 to 1801 he acted as administrator of the district of Nice. He then settled in his native town and devoted his time to mechanics and latterly to chemistry. About 1813 the idea of taking pictures by sunlight appears to have suggested itself to him, and by 1824 the first practical difficulties had been overcome, and sun-pictures formed on glass or tin-plate. He communicated his discovery, concealing however his methods, in 1827 to the Royal Society of London, and two years later entered into a partnership with Daguerre, who after the death of N. published the process, simplified and improved no doubt, under his own name. N. died at Châlon-sur-Saône, July 5, 1833.—**Claude Felix Abel N. de Saint Victor,** nephew of the preceding, was born at St. Cyr, near Châlon-sur-Saône, July 26, 1807. He entered the army, and in 1854 was nominated Commandant of the Louvre. He early turned his attention to the chemistry of colouring matters, did great service in improving the photographic methods of his uncle and Daguerre, and communicated to the *Comptes Rendus* numerous papers upon these and allied optical phenomena. He has written *Traité Pratique de Gravure Heliographique* (1856).

Nier'stein, a village of Hessen-Darmstadt, Germany, 9 miles S.E. of Mainz, gives name to a delicate Rhenish wine produced in its neighbourhood. It has a pop. (1875) of 2761.

Nieu'wer Am'stel, a town of the Netherlands, province of N. Holland, 5 miles S.S.W. of Amsterdam, has some manufactures, and a pop. (1873) of 6171.

Nieuw'veld Mountains, a range constituting a portion of the chain which forms the watershed of Cape Colony, and extending from W. to E. in the parallel of 32° S. lat. from 21° 45′ to 24° E. long. On the inland side the N. M. form an elevated plateau with a very gradual slope, and are drained by the Zak, a tributary of the Orange River. Their average height above the sea is 5000 feet, and above the Karroo (q. v.) 2000 feet, but they rise in Bulbhouder's Bank to a height of 7300 feet above the sea level. The range is singularly destitute of trees.

Niè'vre, a central department of France, extends along the E. bank of the Loire and the Allier, and is watered by the Yonne, an affluent of the Seine, and by the N., a small tributary of the Loire. Area 2623 sq. miles; pop. (1872) 339,917. It is in great part hilly and woody, and yields, besides wheat for home consumption, some 6,000,000 gallons of wine, and a large supply of timber, iron, copper, lead, coal, and marble. Nevers is the capital; other towns are Cosne and Clamecy. N. is traversed by several important canals, and by the Paris and Lyons railway.

Nifl'heimr ('the mist-world,' Ger. *Nebelheim*), in Scandinavian mythology was one of the two worlds which existed before the earth was created. It lay in the extreme N., separated by Ginnungagap ('yawning gap') from its opposite, the bright and burning world Muspellsheimr ('fire-world') in the S., and was the abode of Hel (q. v.).

Nigell'a, a genus of annuals belonging to the natural order *Ranunculaceæ*, chiefly natives of the countries bordering the Mediterranean, and of the western parts of Asia. There are about 20 species. The black, peppery, and aromatic seeds of *N. sativa* or fennel flower—so called from its finely cut leaves—are commonly used in Eastern countries for seasoning purposes. In Egypt they are eaten by the ladies under the impression they effect improvement in the personal appearance. *N. Damascena*, a frequent border annual in gardens, bears the names of 'Love-in-a-Mist' and 'Devil-in-a-Bush,' from its flower in the one case, and its horned capsules in the other, being enveloped in a dense entanglement of the finely-divided involucre. Its properties are similar to those of the preceding species.

Ni'ger (properly *N.-eghirrĕu*), a great river of W. Africa, which is also called Joliba above Timbuktu, and Quorra in its middle course, all these names meaning simply 'river.' It rises in a recess of the Kong Mountains, behind Sierra Leone, flows first N.E., and then bends round to S.E., entering the Gulf of Guinea, after a course of some 2500 miles, its 22 mouths forming a delta larger than that of the Nile. Before reaching its most northerly point it splits into two branches, which enclose the island of Jimballa, 220 miles long. Below Kabara, the port of Timbuktu, the valley as far as Say is marshy and broken by numberless creeks; from Say to Bussa the stream is impeded by rocks and shoals. Receiving its two great affluents, the Sokoto and Benue, from the watershed which separates its valley from the basin of Lake Tchad, it rounds the eastern shoulder of the Kong Mountains, where the scenery is singularly romantic. The delta, intersected by the main branches, Bonny, Mari, and Nun, is covered with a rank forest of mangroves. The best known states in the upper N. valley are Bambarra, a country of the Mandingos, Masina, including Timbuktu, Songhay, a marshy country, and Gando, to which belong the towns Say and Bussa. Among the explorers of the N. are Mungo Park, Caillié, Lander, Allen, and Dr. Barth. Great part of the river is still unknown, and the *Société Géographique* of Paris announced its intention in October 1877 of sending an expedition to complete the work of exploration. See F. de Lanoye, *Le N. et les Explorations de l'Afrique Centrale* (Par. 1860).

Niger Liber, the name given to the black book, or register, in the Exchequer.

Night'hawk, otherwise named the Virginian Goat-sucker and the Mosquito Hawk, is an *Insessorial* or Perching bird, belonging to the suborder *Fissirostres* (q. v.), and to the family of *Caprimulgidæ* or Goat-suckers. The N. is the *Chordeiles Virginianus* of ornithologists. It inhabits the northern parts of the New World. Most of the goat-suckers are nocturnal in habits, but the N., although active at night, is known to fly about also by day in pursuit of its prey. The mouth, as in all Fissirostres, is large, and the 'gape' is fringed with bristles, which appear to be serviceable in the capture of insects. The N. attains a length of 9 inches. It is generally of a dark brown colour. A greenish gloss adds lustre to the plumage of the upper parts, and a number of small yellow spots diversify the plumage of the head and neck. A white patch is conspicuous on the throat. The tail is forked, and the wings exceed the tail in length. The bill is small.

Night-Heron, a group of *Ardeidæ* or Herons (q. v.), so named from pursuing its prey during the night. The Common N.-H. is the *Nycticorax Europæus*, and another species, the Nankeen N.-H., named *N. Caledonicus* by naturalists, occurs in Australia. The Common N.-H. is found in both hemispheres, and is occasionally seen in Britain. Its average length is 2 feet, and its colour is ashen-grey, varied with black on the head and neck, and white below. The bill and legs are shorter than in the common heron. Three slender feathers form a crest which droops from the back of the head. The Nankeen N.-H. is a beautiful species, widely distributed over the Australian continent. It is of a rich brown colour; the head is black, the crest, eyebrows, and the whole of the under surface being white. The bill is black, and the legs and feet yellow.

Night'ingale (Old Eng. *nihtgale*, 'the night-singer;' *cf.* Ger. *nachtigall*), one of the most beautiful of songsters and least noticeable of birds. Its appearance is dull; but its lack of brilliant plumage is amply compensated for by the clearness, sweetness, and range of its notes. Both in ancient and modern times it has been celebrated in verse and prose. The N. belongs to the order of *Insessores* (q. v.) or that of the Perching birds. It is included in the *Dentirostral* section of this order, and appears as a member of the Warbler family (*Sylviadæ*), although some authorities have constructed a special family (*Luscinidæ*) for its genus and a few genera. The N. is scientifically designated *Philomela luscinia*.



Virginian Nightingale.

or *Luscinia philomela*. The characters of the N. genus are the short bill, destitute of bristles; the rounded opening of the nostrils, and the length of the third quill. The tarsi are covered in front by one long scale. The N. is a rare visitant in Scotland and Ireland, and in England appears to be local in its distribution, and to affect some localities during a period of years, disappearing thence for many successive seasons. Its colour is a dingy brown above; the under parts are a dull grey, the throat showing a lighter tint than the belly. The average length is 6 or 7 inches. The eggs, numbering four or five, are olive-brown. The nest is constructed near the ground. It is of slight make, and is usually securely concealed by foliage. The food of the bird consists of worms and insects, but it appears to devour berries and other fruits in autumn. When tamed, mealworms and a modicum of raw beef and hard-boiled eggs constitute its favourite dietary.

The N. is famed for its twilight and nocturnal song, but it sings through the day as well. The notes are clear, prolonged, and thrilling; at times apparently plaintive, and again,

> 'Tis the merry nightingale,
> That crowds and hurries and precipitates,
> With fast thick warble his delicious notes.'—(*Coleridge.*)

The young are hatched in June, at which time the song appears to become harsher. The N. is migratory in habits. It arrives in Britain in April, the male appearing before the female, and flies southwards (most probably to N. Africa) in September. The male is taken before pairing, as when captured after pairing, it usually pines and dies.

Nightingale, Florence, was born of wealthy English parents at Florence, in May 1823. She early showed an unusual interest in hospitals, and employed the opportunities afforded by frequent visits to the Continent with her parents to inquire into the state and management of these institutions. In 1851 she went to Kaiserwerth, on the Rhine, for practical instruction in the work to which she was to consecrate her life. After remaining there three months, she took the management of the Harley Street Hospital in London, and sacrificed a large part of her fortune in reorganising that establishment. During the Crimean War, when terrible tidings reached England as to the state of the military hospitals, Miss N., though herself suffering, hastened to the relief of the wounded soldiers. On the 27th October 1854 she sailed for Scutari, in the service of the War Department, with a band of trained nurses under her. She afterwards proceeded to Balaclava, where by her energy and skill she saved thousands from death. Though attacked by Crimean fever, she refused to quit the seat of war, and only returned to England in August 1856, when the war was ended and the hospitals almost closed. In recognition of her services the public raised £50,000 as a testimonial—the so-called 'N. Fund'—which, at her request, was chiefly devoted to the extension of St. Thomas' Hospital. Her principal writings are *Notes on Hospitals* (1859); *Notes on Nursing* (1860); *On the Sanitary State of the Army in India* (1863); *Notes on Lying-in Institutions* (1871).

Night'-jar. See GOAT-SUCKER.

Night'mare (*night*, and Old Eng. *mara*, 'a spectre'), or **In'cubus**, is a sensation experienced in sleep, resembling the pressure of a weight on the chest as if from some hideous monster, from which there is invariably an impossibility of escape. N. is simply a form of Dreaming (q. v.), the dreams being of a disagreeable and frightful nature, involving a sense of immediate and inextricable danger, and is usually attributed to plethora, posture during sleep, indigestion, or heavy suppers. Among savage and semi-civilised races, and among the insane, N. is usually ascribed to the influence of supernatural agencies, or to experiences actually undergone during slumber. N. is most frequently induced by errors in diet, or weakness of the digestive functions.

Night'shade, a name given to the British representatives of the genus *Solanum*. One species has already been described under Bittersweet. The other is an annual that occurs in waste places in England, and occasionally in Scotland. As a weed, it is also now found in most temperate and tropical regions of the world. It bears ovate wavy leaves, drooping flowers with a white corolla, succeeded, in the ordinary form, by black berries—hence its name of *S. nigrum*. Like most of its congeners it possesses narcotic properties—though only to a slight degree; and the leaves in Bourbon and Mauritius are eaten as spinach. See BELLADONNA for Deadly N. and CIRCÆA for Enchanter's N.

Ni'gra, Constanti'no, an Italian diplomatist, born 12th June 1827, at Ivrea in N. Italy, where he studied law and philosophy (1845–48), after which he became secretary, first to Azeglio and then (1852) to Cavour, whom he accompanied to Paris and London in November 1855, and at the Peace of Paris in 1856. N. was one of the Sardinian plenipotentiaries at the Peace of Zürich in 1859, and in 1860 was appointed Sardinian ambassador at Paris. In January 1861 he became the chief minister of Prince Carignan, who at that time went to Naples as governor-general; but in the same year N. was appointed Italian ambassador at Paris. Here he played a prominent part in the Franco-Italian Convention of September 15, 1864, and remained till June 1876, when he was sent to St. Petersburg as ambassador for Italy.

Nij'megen (Ger. *Nimwegen*, Fr. *Nimeguen*), a fortified town of the Netherlands, in the province of Gelderland, on the left bank of the Waal, 9½ miles S. of Arnhem. The church of St. Stephen (1272) is a fine specimen of the Gothic style. Of the old castle of the Karolings, the Walkenhof, in which the Burggrafs of N. afterwards resided, only some poor ruins remain. The oldest building in N. is the Baptistery, consecrated 799. N. has considerable trade in corn, and manufactures tin, iron, and wooden wares, and beer. Pop. (1874) 22,929. In the Middle Ages N. was an important member of the Hanseatic League. On the neighbouring Mooker Heath the Counts Ludwig and Heinrich of Nassau were (1574) defeated by the Spaniards, and in the town-house of N. were concluded the peace of 1698 between the Netherlands, France, and Spain, and of 1679 between France, Sweden, and the German Empire.

Nij'ni-Nov'gorod, a government in the E. of Russia, is bounded N. by Kostroma, S. by Pensa, E. by Kasan and Simbirsk, and W. by Vladimir. Area, 19,390 sq. miles; pop. (1870) 1,262,913. Watered by the Volga, Sura, Vetluga, and Oka, it is to the extent of one-half under forests, while some two-fifths are arable land, and the rest is under pasture. The inhabitants, especially along the banks of the Volga and Oka in the N., are largely engaged in industrial pursuits, and the products, chiefly iron, soap, tallow, candles, leather, gloves (300,000 pairs yearly at Bogorodsk), and the finest Russian ropes, amount annually to £428,000. Some 70,000 of the inhabitants are Mordwins, 37,000 Karafaks, and 7000 Cheremissians.

Nijni-Novgorod ('lower New Town'), capital of the Russian government of the same name, situated at the confluence of the Volga and Oka, 720 miles E. of Moscow by rail. One of the oldest towns of Russia (founded in 1221), it is in part girt by old walls, and has a kremlin (1523), a royal palace, two cathedrals, twenty-five other churches, many synagogues, mosques, theatres, hotels, &c. It is the seat of the greatest fair in the world, the Peter-Paul's Fair (Russ. *Yármarka*), which begins about the 27th July, and lasts for a month. Here the merchants of Europe meet those of Turkestan, Armenia, Persia, India, and China, and the representatives of the various nations occupy separate streets or bazaars. In 1874 the imports were valued at £25,743,000, and the sales amounted to £23,544,000. Among the chief articles were cottons (£5,399,000), woollens (£3,384,000), linens, hemp, and paper (£798,000), silk, and silk wares (£979,000), furs (£1,113,000), gold and silver wares (£2,265,000), iron, steel, and copper (£852,000), glass, porcelain, &c. (£336,000), grain (£336,000), wines and other liqueurs (£701,000), tea (50,000 chests), and China wares (£3,633,000), Persian wares (£1,331,000), and products of Khiva and Bokhara (£384,000). In addition to 2530 permanent stores, some 3400 wooden booths are erected yearly, to accommodate the influx of visitors, who are estimated at not less than 200,000. The most costly articles sold are furs, Cashmere shawls, and pearls. No tax whatever is imposed on the trade, by far the greatest quantity of which comes by the Volga and Oka. The rivers are here crossed by a pontoon bridge, and in the commercial part of the town a great exchange has been erected at a cost of £1,571,000. Pop. (1870) 40,472. As early as the 9th c. a great fair was held at Bolgary or Bachrinoff, the chief town of the Bulgarian king-

dom on the Volga and Kama. Subsequently this fair was transferred to Kasan, then to Makarief, and finally to N., on the partial destruction of Makarief by fire in 1817. Of late years there has been a marked falling off in the attendance of Orientals from Central and Eastern Asia, who are assigning instead of accompanying their wares. See *A Trip up the Volga to the Fair of N.*, by A. M. Butler-Johnstone, M.P. (Lond. 1875).

Nijni-Tagilsk', a town in the government of Perm, Russia, on the river Tagil, in a valley of the Urals, 150 miles E. of the town of Perm. It is the centre of one of the richest mining districts in the world, and near it is the great magnetic mountain of Blagodat, 1422 feet high. The works employ 17,000 men, and in 1864 produced 32,616,468 lbs. of iron, 1,652,128 of copper, 345,348 of steel, 1086 of gold, and 3600 of platina. Akinfij Demidoff set up the first foundry here in 1725. Pop. 30,000.

Nikolaef', a town of Kherson, Russia, at the confluence of the Bug and Ingul, and 25 miles from the entrance of the former into the Black Sea, 75 miles E.N.E. of Odessa. It is the chief station of the Russian fleet in the Black Sea, is strongly fortified, and has 18 churches, 2 synagogues, a handsome admiralty house, several barracks, an arsenal, an observatory, a fine naval hospital (erected in 1874), 3 libraries, &c. In 1875 the imports, chiefly coals, iron rails, machinery, armour plates, and cement, amounted to £234,088; the exports, wheat, rye, barley, oats, linseed, rapeseed, and timber, to £1,215,934. Of the 135 vessels that entered the port 83 were British of 60,511 tons. A line of Dutch steamers between N. and the west of Europe, in conjunction with the N.-Kharkoff Railway, began running 1875. The river is usually frozen over from December till the end of April. Pop. (1870) 67,972.

Nikolaevsk', a town of Siberia, on the left bank of the Amur, is one of the chief towns in the Amu territory, and has a considerable export trade in furs, skins, walrus teeth, &c. The river is frozen over for six months, and the mean annual temperature is 39° 42′ F. Pop. 5000.

Nik'olsburg (*Nikluov*), a town in the S. of Moravia, in a rich wine-growing district, 25 miles S. of Brünn, with which it is connected by rail. It has a beautiful church and a castle of the former princes of Dietrichstein, with fine gardens and art collections. There is some industry in cottons and silks, and a large trade in red wines. Pop. (1869) 7173, of whom 4000 are Jews.

Niko'pol, a town in the government of Ekaterinoslav, Russia, on the right bank of the Dnieper, 200 miles from its mouth, and 150 above Kherson. In 1873 its exports, chiefly grain, linseed, and timber, amounted to £754,373, and its imports to £35,487. Pop. 8758.

Nile (Gr. *Nilos*; Egyptian *Hafi Mu*, 'genius of the waters;' Heb. *Sihor*, 'the black'), one of the most celebrated rivers in the world, the longest in Africa, and an object equally of wonder and veneration to the ancients and of eager curiosity in modern times. Interesting no less on account of the singular and important part it plays in the economy of Egypt than of the mystery which, despite the keenest exploring enterprise, has so long veiled the problem of its source, it is a link between the seat of the most ancient civilisation and perhaps the most unknown and least civilised part of the habitable globe. Recent researches render it almost certain that the White N. has its origin in Lake Victoria Nyanza and the Shibiyu, a considerable river flowing into its S.E. corner. It leaves the lake at the Ripon Falls, which are 12 feet high, and in lat. 0° 20′ N. and long. 33° 30′ E., in a stream 150 yards broad, and flows in a direction N.W., passing through the head of the Lake Albert Nyanza. This part of the river is usually called the Victorian N., and the country, Uganda, Unyoro, and Madi, is singularly fertile, and in parts is overgrown with rank forest and grass. From Albert Nyanza its course is first N.N.E. and then due N. as far as Gondokoro, or Ismailia, as the station was named by Sir Samuel Baker in 1871. In this stretch the river passes through a rugged mountain country, partly covered with low open forests of scrubby trees, and receives from the right the waters of the Unyama, Ashua, and Attabi. Above Affudo, at the mouth of the Unyama, it is navigable to Lake Albert Nyanza, so that Affudo or 'Ibrahimeya' is likely to become the centre of commerce in the country. At Ismailia the N. during the rainy season does not rise gradually, but by a series of sudden flushes, and to a height of 4 feet in about twelve hours. The rise is caused by heavy rains in the S. sending down an immense volume of water from the high mountains which line the W. bank of the N., and by the Ashua, Unyama, and other streams. After the fall of the river, the marshes give off a horrible effluvium, which occasions much fever. Leaving the Bari country at Ismailia, the N. has a course to the Bahr-el-Gazal generally N.N.W. for nearly 400 miles, traversing the native territories of Schir, Bohr, Aliab, Kika, and Nuehr. Throughout this distance the bed is for the most part level and marshy, and the river frequently branches. The Bahr-el-Ghazal, the only great tributary of the N. on the left, was called by Speke in 1863 'an unimportant branch,' but has been shown by Schweinfurth to have a drainage area in the country of the Dinkas, Bongos, and Niam-Neams, of not less than 150,000 sq. miles. At this point the N. takes a sharp bend to the E., and here for a considerable distance its channel is choked with recent deposits of vegetable matter, covered with tall grass and clumps of papyrus. Traders avoid this part of the river, travelling by the Bahr Zaraffe or Giraffe River, an arm of the N., which leaves it in latitude 5° 20′ N. and joins it again in latitude 9° N., about 36 miles above the confluence of the Sobat. The Bahr Zaraffe has itself been obstructed since 1871, but in 1872–74 Ismail Pasha, governor of Khartum, with a large force was successful in clearing away great part of the N. stoppage. Some 110 miles E. of its junction with the Bahr-el-Ghazal, the N. is joined by the Sobat from the E., a grand navigable tributary, here 250 yards wide. Turning abruptly N. once more, the N., a stream varying in breadth from one to two miles, with the country of the Shilluks on the W., and further on separating Kordofan from Sennaar, is augmented at Khartum (q. v.) by the waters of the Blue N., formed by the junction of the Abai and Blue River. The Blue N., over 1000 miles long, descends from the region of Lake Dembea in Abyssinia. Below Khartum the N. is better known. At El Damer, 170 miles below, it receives its last great affluent, the Atbara or Bahr-el-Asward, after which it makes a great bend in the Nubian deserts, descending the terraces of Nubia by a series of cataracts, the last of which is at Assouan (q. v.) on the Egyptian boundary, in latitude 24° 10′ N. Hence it flows in a northward curve with a steady stream at the mean rate of 3 miles an hour, and an average fall of 2 inches to a mile. Although receiving no affluent from the Atbara to its mouth, a distance of 1500 miles, and though crossing an extensive stretch of sandy desert under a burning sun, it brings an enormous volume of water to fertilise the rainless Egyptian plains. The Atbara ('black river') receives its name on account of the mud which it brings down, and which, when deposited by the annual overflow of the N., is the true fertiliser in Egypt. Along its lower course as far as Cairo the N. is confined in a valley lined on both sides by high naked rocks. Its delta is 150 miles broad at the sea, and is intersected by a maze of streams of which the principal are the Rosetta and Damietta branches. The N. drains nearly a tenth of the whole area of Africa, and has a total length of 3500 miles. An account of its annual overflow, the most wonderful of all hydrographic phenomena, is given in the article on Egypt. The river is abundantly stocked with fish, and among the birds which swarm along its banks are vultures, cormorants, pelicans, geese, quails, and white ibis. As a drink, its water when filtered is among waters what champagne is among wines. The basin of the N., long notorious as a centre of the slave-trade, has been claimed by the Egyptian government as far S. as Uganda, and to within 35 miles of Victoria Nyanza, since the military expedition under Sir Samuel Baker, sent by the Khedive to suppress the iniquitous traffic in 1873. Among the travellers who in recent years have contributed most materially to our knowledge of the Upper N. are the brothers Poncet (1857), Petherick (1858 and 1862), Heuglin (1863–64), Captain Burton (1857–59), Captain Speke (1857 and 1863), Captain Grant (1861), H. M. Stanley (1871–77), and above all Sir Samuel Baker (1861 and 1870–73), Dr. G. Schweinfurth (1868–71), and Gordon (1874–76). Of the host of travellers who have made the attempt, only Baker, Schweinfurth, and Gordon have succeeded in penetrating from the N. to the equatorial N. regions. Livingstone, whose name is more widely identified than that of any other traveller with the problem of the Upper Nili, and who was virtually a martyr to its elucidation, carried his researches into a field lying beyond the actual basin of the river. And although his discoveries in the region of lakes

Island. In the former the highest summits are those of the isolated extinct volcanoes, Ruapehu (9100 feet), and Mount Egmont (8300 feet). The S. Island is traversed from N. to S. by the Southern Alps, a range many of whose summits are clad with perpetual snow, and whose culminating point is Mount Cook (13,200 feet). Several minor ranges of considerable altitude cross the island from the Southern Alps eastwards. There are nevertheless several fine plains, the principal in the N. Island being in the districts of Auckland and Hawke's Bay, and in the S. Island in those of Canterbury and Otago. The extensive mountain system gives rise to many large rivers, of which the chief are:—In the N. Island, the Waikato and Wanganui. In the S. Island, the Hurunui, Rangitata, Waitaki, Taieri, Clutha (q. v.), Mataura, Grey, and Buller (q. v.). Owing to the rapidity of their courses, the only rivers to any degree navigable are the Waikato, Clutha, Grey, and Buller. The lakes are numerous, and some of them are of large size. Lake Taupo, in the heart of the N. Island, has an area of 200 sq. miles, and in Otago are the three large lakes Te Anau, Wakatipu, and Wanaka, whose areas are 132, 112, and 75 sq. miles respectively. The coasts of N. Z. contain a number of fine harbours, the principal being those of Auckland, Port Nicholson, Queen Charlotte's Sound, Port Cooper, Akaroa, Otago, and the Bluff. The S.W. coast is indented by a series of sounds closely resembling the fjords of Norway, the mountains rising precipitously from a great depth of water to a height of several thousand feet, and being clad with forests and seamed by waterfalls, the whole forming scenery of the grandest description.

The climate of N. Z. necessarily varies much according to latitude and altitude above the sea level, but as a whole deservedly enjoys a high reputation for salubrity. At the sea-coast frost and snow never continue throughout the day. The mean annual temperature of the N. Island is 57°, and that of the S. Island 52°, that of London being 51°. The annual rainfall varies from the maximum of 119 inches on the W. coast of the S. Island to the minimum of 25 inches on the E. coast of the same island, the average for the entire colony being 54 inches. The healthiness of the climate is largely owing to the strong winds which are everywhere common.

N. Z. possesses magnificent forests, producing excellent timber, of which the best is that of the celebrated Kauri Pine (q. v.). The undergrowth is exceedingly dense. The hills are everywhere covered with abundance of long coarse grass, which affords pasture to immense flocks of sheep; and the Phormium (q. v.), formerly called N. Z. flax, grows wild up to 1500 feet above the sea-level. The indigenous fauna of N. Z. included no mammals save a small species of rat now extinct, and two kinds of bat, besides several species of seals and whales in the adjoining seas, which swarm with fish of fine quality. The avifauna of the country is extremely interesting, including many species not found elsewhere, as well as the singular forms of bird life represented by the Apteryx (q. v.), Dinornis (q. v.), and Notornis (q. v.). Snakes are wholly unknown, and the colony contains no creature more poisonous than the mosquito save a very rare species of spider (*Latrodectus katipo*) whose bite sometimes results fatally.

N. Z. is exceedingly rich in minerals. Gold is found in payable quantities in the districts of Otago, Westland, and Nelson in the S. island, and Auckland in the N. Island, but for some years gold-mining has been a declining industry. In 1876 the colony exported 318,367 oz. of gold, valued at £1,268,559, and the total quantity exported up to that date since gold was first discovered in 1857 was 8,277,311 oz., of the value of £32,278,114. Of this amount 3,584,179 oz., valued at £14,077,688, were exported from Otago. Silver, copper, lead, antimony, and manganese are also found in the colony, and are beginning to be worked. Iron is abundant, especially in the form of titaniferous iron sand on the sea-shore of Taranaki (N. Island), and in beds of haematite ore near the N.W. extremity of the S. Island, but as yet these riches are practically untouched. Coal is widely distributed, but in many parts is of an inferior brown description. On the W. coast of the S. island, however, in the basins of the Grey and Buller rivers, coal of the best quality is found in inexhaustible quantities.

Notwithstanding its mineral wealth, N. Z. is still in the main a pastoral and agricultural country. In 1875 there were in the colony 11,705,000 sheep, 495,000 cattle, 124,000 pigs, and 100,000 horses; and in 1876 the export of wool amounted to 54,01,5440 lbs., valued at £3,395,816. In February 1877 there were 2,682,758 acres of land under crop, of which, however, 2,202,644 acres were in sown grasses. The area under cereals was 352,470 acres. The cultivation of wheat for export is rapidly increasing with the spread of railways, and that of oats as rapidly decreasing. The exports of preserved meats and dressed phormium fibre are both much less than they were a few years ago. The total exports of all kinds from N. Z. in 1876 amounted to £5,626,333, and the total imports for the same year to £6,904,889. The revenue for the financial year ending 30th June 1877 was £3,061,594, and the public debt of the colony at the same date was £20,895,311. There were then 212½ miles of railway open for traffic in the N. Island, and 647½ in the S. Island, while 274 miles were in course of construction.

Auckland was the capital of N. Z. until 1865, when the seat of government was removed to Wellington on account of its central position; but Dunedin is much the largest and most important town in the colony. The pop. of N. Z. at the end of 1876 was estimated at 399,075, exclusive of the Maoris (q. v.), or native inhabitants, who numbered (1874) 45,470. N. Z. was discovered and named in 1642 by the Dutch navigator Tasman. It was next visited in 1769 by Captain Cook, who subsequently explored a great part of its shores. In 1814 the Church Missionary Society established a mission station at the Bay of Islands (q. v.), and soon afterwards trade with New South Wales commenced. The first regular settlement was made by the N. Z. Land Company in 1840, and the first governor was appointed in the same year. As settlement progressed, the colony was in course of time divided into a number of different provinces, as follows:—In the North Island—Wellington, founded in 1840 as already stated; Auckland, established by Governor Hobson in the same year; Taranaki, founded by the N. Z. Land Company in 1841; and Hawke's Bay, separated from Wellington in 1858. In the South Island—Nelson, founded by the N. Z. Land Company in 1841; Otago, founded by an association connected with the Free Church of Scotland in 1848; Canterbury, founded in 1850 by an association connected with the Church of England; Marlborough, separated from Nelson in 1860; and Westland, separated from Canterbury (in the first instance as a county) in 1866. Stewart's Island was included in the province of Otago. Each of the provinces had a lieutenant-governor, termed a superintendent, and a Provincial Council, besides sending representatives to the general legislature; but the provincial system was abolished in November 1876, and a system of counties established in its place. The colony is now governed by a governor appointed by the Crown, with a Ministry responsible to the General Assembly or Colonial Parliament, which consists of the Legislative Council and the House of Representatives. The members of the former are nominated, and those of the latter elected by the constituencies. See *The Official Handbook of N. Z.* (Lond. 1875), *The Australian Handbook* for 1877 (Lond. 1878), *Transactions of the N. Z. Institute*, vols. 1 to 9 (Well., N. Z., 1869–77), and works enumerated under MAORI.

New Zealand Flax. See PHORMIUM.

Next Friend is in English law the person through whom an infant—that is, a person under the age of 21—sues at law. The father is usually the N. F., but any one may be so whom the Court may consider able to be responsible for costs.

Next of Kin is a legal phrase, denoting those that are nearest to a person in relationship by blood. The wife of a testator is not included in the meaning expressed by this phrase, she not being a blood relation, *non affinis, sed causa affinitatis*.

Ney, Michael, a famous French marshal, was the son of a cooper, and was born at Sarlouis, January 10, 1769. He received a moderate education, acted for two years as a lawyer's clerk, and entered the army, December 6, 1788. By 1794 he had risen to the rank of captain, and had earned for himself the name *Indefatigable*, by his bold assaults upon the Austrians with a corps of 500 men out of the army of the Sambre and Meuse. N. distinguished himself at the siege of Maestricht (November 4, 1794), was severely wounded at Mainz (December 2), took a prominent part in the capture of Altenkirchen (December 16, 1795), and was raised to the position of General of Brigade after the battle of Forcheim (August 8, 1796). Next year he took part in several combats

of Konyunjik on the E. bank of the Tigris opposite Mosul. See Layard's *N. and its Remains* (Lond. 1851) and *N. and Babylon* (1867), and George Smith's *Assyrian Discoveries; an Account of Explorations and Discoveries on the Site of N. during* 1873 *and* 1874 (Lond. 1875).

Ningpo', a city of China, province of Chi-Kiang, on the confluence of two small rivers, 12 miles from the sea, and 100 S. of Shanghai. It lies in a fertile and populous plain, and is surrounded by walls 15 feet high and nearly 6 miles in circuit, and is intersected by numerous canals. There are many large and splendid temples, and a hexagonal tower of eleven stories, 160 feet high, mounted by a spiral flight of steps. The manufacture of silks, cottons, woollens, and salt is considerable, and the immediate vicinity yields a large quantity of green tea, rice, and the produce of the mulberry and tallow trees. In 1874 in the direct trade with foreign countries (including Hong Kong), the exports amounted to £2052, and imports to £534,576, while in the trade with the Treaty Ports the value of imports was £1,664,268, and of exports £2,151,825. As much as £2,541,077 of the latter trade (imports and exports) was carried on in native vessels. The direct imports from Great Britain amounted to £627,322, and the exports to Great Britain to £63,411. In 1873 there entered the port 253 foreign vessels of 174,977 tons (41 British of 17,571 tons), and cleared 253 of 175,444 tons (43 British of 17,813 tons). Pop. 500,000. N. was one of the five Treaty Ports opened 26th August 1842, and has both Protestant and Roman Catholic mission stations.

Nin'ian, St. (the *St. Ringan* of Lowland Scotch, and *Trinyon* or *Triman* of the North Country dialect) was born of royal parentage on the shores of the Solway Firth about the middle of the 4th c. Of studious and ascetic habits, he was fired by the Holy Spirit to make a pilgrimage to Rome, which he reached by way of the Gallican Alps, and where he was consecrated bishop by the Supreme Pontiff. On his homeward journey N. paid a visit to St. Martin at Tours, and after his arrival in Scotland founded the 'Candida Casa,' or church of Whithorn in Wigtonshire, dedicating it to St. Martin, who had just died (397). Later, N. laboured successfully for the evangelisation of the Southern Picts, and in 432 (according to the Bollandists) died, 'perfect in life and full of years,' and was buried in his cathedral church at Whithorn. His festival falls on the 16th September. Though the facts of his life, as well as independent testimonies, show that Christianity existed in Scotland prior to St. N., yet his apostolate is the first distinct fact in the history of the Scottish Church. And even of N. himself we can gather little that is definite from the Latin life by St. Ailred (born 1109, died 1166), which, while good in style, is almost worthless as an historical record. See Bishop Forbes' *Life of St. N.* in vol. v. of *The Historians of Scotland* (Edin. 1874).

Ninon de Lenclos. See LENCLOS.

Ninth, in Music, a dissonant interval one octave higher than the second, from which it differs in harmonial and contrapuntal treatment.

Ni'obe, daughter of Tantalus by the Pleiad Taygete or the Hyad Dione, was the wife of Amphion, King of Thebes, to whom she bore six sons and six daughters. Proud of the number of her children, she exulted over Leto, who had only two—Apollo and Diana. These, indignant at such presumption, slew all the children of N. Nine days they lay unburied, but on the tenth they were interred by the gods. N., who had gone to Mount Sipylus, mourning the loss of her offspring, was changed into stone, and even in that form continued to feel her sad bereavement, and to give tearful expression to her woe. The story of N. and her children was a favourite subject with ancient artists. Some of the figures in the celebrated group found at Rome in 1583 and now preserved in Florence, exhibit the highest phases of ancient art.

Nio'bium or **Colum'bium** (symbol Nb, atomic weight 94), a rare metal obtained from American columbite, and first discovered in 1801 by Hatchet, though for long, upon the authority of Wollaston, it was regarded as identical with *Tantalum* (q. v.), a metal with which it is ordinarily associated. The oxide (Nb_2O_5) is an acid, and forms niobates with strong bases. The chloride ($NbCl_5$) and oxychloride ($NbOCl_3$) are converted by water into the oxide.

Niort, a town of France, capital of the department of Deux-Sèvres, on the Sèvre-Niortaise, 49 miles S.W. of Poictiers by rail. It contains the churches of Nôtre-Dame and St. André (restored 1858–61), an Hôtel-de-Ville (formerly the palace of Eleanor, Henry II.'s queen), the remains of the castle in which Madame de Maintenon was born, a prefecture, theatre, public library of 30,000 volumes, museum, &c. Glove-making employs 1000 artificers, and other industries are market-gardening, tanning, dyeing, and manufactures of shoes, blouses, hosiery, cotton and woollen goods, oil, glue, &c. Pop. (1872) 17,470. Annexed to England from 1154 to 1224, N. was captured by the Black Prince (1356), but retaken by Duguesclin (1373).

Ni'pa, a genus confined to one species, *N. fruticans*, a palm-like plant, common in the seaside marsh lands of the E. Indies. The creeping stem bears tufts of leaves which often grow more than 20 feet in length, and are much used for thatching. The fruit consists of one-seeded drupes aggregated into large heads; their kernel is edible. From the spadix a toddy is obtained, convertible into a syrup, sugar, and an intoxicating spirit. Nipadites are the fossil representatives.

Nipon', or **Dài Nipon'** (*i.e.*, 'land of the rising sun'), the native name of Japan (q. v.).

Nipple, the name given to the prominence on which the excretory ducts of the milk-glands of *Mammalia* open. N. may be altogether wanting in some Mammals (*e.g.*, *Ornithorhynchus* (q. v.), and *Echidna*), while in the nearly allied *Marsupialia* (q. v.), represented by the kangaroos and their allies, the nipples are exceedingly long, and are adapted to attach the immature young securely to the parental body in the act of nutrition. The N. is never single, although an odd number may be found (as in some opossums). In the kangaroos four nipples exist. Eight N. arranged in a circle are developed in the Marsupial genus *Phascogale*. Each N. may be perforated by one canal or duct only—as in pigs, Ruminants, and whales. In horses and apes each teat is traversed by two canals; Rodents and Carnivorous animals have five or six ducts opening in each N.; while in elephants, Marsupialia, and Primates (Quadrumana and man), numerous milk-ducts open in each teat. For Diseases of the N. see MAMMARY GLAND, DISEASES OF.

Nirva'na (= 'blown out, extinguished,' derived from a Sanskrit root. In Pali, the classical language of Buddhism, it becomes *nibbâna*), the ideal state of consummation in which the purified soul of the good finds its destined deliverance, both in the Hindu and Buddhist systems of religious philosophy. In accordance with the pure theism of the early Hindu writings, N. consists in the absorption of the soul into Brahma, the self-existent cause of the universe, from which it originally emanated, and in which it finds an eternity of bliss. On the other hand, the orthodox doctrine of Gautama Buddha, as preserved most purely in Ceylon, necessarily leads to the logical conclusion that N. is absolute annihilation, the cessation of the long train of misery called life. According to Rhys Davids, however, N. is properly 'the extinction of that sinful condition of mind and heart, which would otherwise be the cause of renewed individual existence.' For a summary of the views contained in Buddhist literature, and of those held by modern European critics, see Professor Childers' *Pali Dictionary, sub voc. Nibbânam* (vol. i. Lond. 1875), and Rhys Davids in the *Contemporary Review* for January 1877.

Nisce'mi, a town of Sicily, province of Caltanisetta, finely situated in a fertile district, 11 miles from the Tyrrhenian Sea, has corn and oil mills, and some remains of ancient dwellings. Pop. (1874), 10,750.

Nisibis (the *Nasibina* of the cuneiform inscriptions, Arab. *Nisibin*), an ancient town of N.E. Mesopotamia, on the river Mygdonius (Aram. *Mygdan*), and in the province of Mygdonia, from which it was named by Seleucus Nicator 'Antiocheia Mygdoniæ.' Founded by the Armenians before the time of Alexander the Great, N. was during the last 150 years B.C. the residence of the Armenian kings, from whom it was taken 68 B.C. and held for a time by Lucullus. Deserted by the Armenians, it was seized in the 1st c. A.D. by the Parthians, after whose subjugation by Trajan it came under the Romans. It was the centre of the great Jewish insurrection about 130. Being equally important as the chief seat of Syrian learning, religion, and

theory. His views have been adopted by Müllenhoff (1855), Lmencron (1856), and Pasch (1863); and opposed by Holtzmann (1814), Zarncke (1855), and Fischer (1859). Of translations may be noticed Simrock's (1827), Scherr's (1860), and Bartsch's (1867), and the most recent editions are by Bartsch (Leips. 1875), and Edzardi (Hann. 1875). For a complete bibliography of the subject see H. Fischer's *Die Forschungen über das N. seit K. Lachmann* (Leips. 1874).

Nicæ'a, or **Nice**, an ancient city of Bithynia, at the E. point of Lake Ascania, built by Antigonus, son of Philip, in the 4th c. B.C., and named by Perdiccas, general of Alexander the Great, N. in honour of his wife. After the foundation of the Latin empire, N. was from 1206 to 1261 the seat of a Greek empire, founded by Theodore Lascaris. It fell to the Turks in 1330. Isnik, which marks its site, is little more than a heap of ruins. In Church history N. is celebrated as the seat of the *first* Œcumenical Council (A.D. 325) over which Constantine the Great presided, and in which the doctrines of Arius (q. v.) were condemned. The Seventh Œcumenical (?) Council was also held here, A.D. 787, under the auspices of the Empress Irene, and established image worship. See COUNCIL; ICONOCLASTS; IMAGE WORSHIP; and NICENE CREED.

Nicarag'ua, a republic of Central America, is bounded N. by Honduras, E. by the Caribbean Sea, S. by Costa Rica, and W. by the Pacific. Area, 58,167 sq. miles; estimated pop. 250,000, the great mass of whom are Indians and mestizoes. The eastern portion of N. forms the Mosquito Coast (q. v.); the western is traversed by a branch of the Cordilleras and by a volcanic range, running parallel with the Pacific at a distance of 10-20 miles, and rising in Cosequina to 3835 feet. Between these ranges are the Lakes N. and Managua. The chief rivers are the Estero Real, flowing into the Pacific, and the Coco, Escondido, and San Juan into the Caribbean Sea. With a soil of extreme fertility, vast forests of mahogany, rosewood, and dye-woods, magnificent pastures, and abundance of gold, silver, coal, and other minerals, N., under the influence of a bad climate and shameful misgovernment, has left these resources almost wholly undeveloped, and is now in a state of hopeless bankruptcy. In 1874 the revenue was $595,100 and the expenditure $758,500, while the public debt was estimated at $9,500,000. In 1875 there entered and cleared the port of Grey Town or San Juan del Norte, the only harbour of the republic, fourteen vessels of 3560 tons; and the value of the imports was $126,720, of the exports (india-rubber, specie, coffee, cocoa-nuts, &c.) $302,723. Managua (q. v.) is the capital. The religion is Roman Catholic; and the executive is vested in a president, elected for four years, the legislative in a Senate of ten, and a House of Representatives of eleven members. Discovered by Gil Gonzalez Davila in 1521, N. broke loose from Spain (1821), and has since been the scene of countless revolutions. In the early part of 1876, a conference that met at Guatemala to confer on a scheme for the union of the five Central American Republics broke up in confusion, and since then N. has been kept on a war footing, a state of siege proclaimed, and all supplies raised by forced loans.—*Lake N.*, in the republic of the same name, is separated from the Pacific by a volcanic range, 48 feet high at its lowest and 4 miles broad at its narrowest point. It stands 134 feet above the Pacific, and 128 feet above the Caribbean Sea, is 140 miles long by 40 broad, and has an average depth of 80 feet. Countless islets, on which idols of black basalt and other Indian antiquities have been discovered, stud the surface of the lake, which has but one outlet, the San Juan del Norte. This river enters the Caribbean Sea after a course of more than 100 miles, the average depth of its channel being 17 feet, and forms the basis of a projected ship-canal, to unite the Pacific and Atlantic Oceans, the length of which would be 181 miles, and the estimated cost $65,722,000.

Nicas'tro, a town of S. Italy, province of Catanzaro, 28 miles S. of Cosenza, is the seat of a bishop, and has numerous churches, an episcopal palace, and a ruined castle, in which Friedrich II. imprisoned his eldest son Heinrich (1235). N. is the trade-centre of all the smaller communes on the Gulf of St. Eufemia. Pop. (1874) 13,181.

Nicc'ola, Pisa'no, was born at Pisa (as his name indicates) about the beginning of the 13th c. All we know of him is derived from a couple of inscriptions, a few contracts, and a legendary *Life* by Vasari. A few ancient sarcophagi in his native town seem first to have led him to a study of the antique, the spirit of which he taught the Italian artist to blend with his own observations of nature. His first masterpiece was the 'Bologna Urn' (1231) ornamented in bas-relief of such dramatic force and noble proportions that he was called 'Niccola of the Urn.' In 1231 he visited Padua, where he designed the magnificent basilica of St. Antonio, only finished in 1407. Venice obtained from him the beautiful 'Church of the Frari' (1250), Florence that of 'Santa-Trinita;' and he designed 'San Lorenzo' at Naples. N. added to the triumphs of his 'Urn' by his 'Deposition from the Cross' (1235, some say 1237), a high-relief, placed over a door of St. Martino at Lucca. About 1260 he executed his 'Pisan Pulpit,' a hexagon of marble supported on nine columns, the sides covered with mingled bas-relief and detached statuary, the whole distinguished by the most marvellous freedom of design and masterliness of execution. It is not to be wondered at that N., struggling to embody Christian ideas in the forms of ancient art, while he gained breadth and force, should lose the subtle qualities of beauty. His heads are often disproportionate to the bodies, and his grouping is generally crowded and clumsy. His pulpit in the Baptistry of Pisa was followed by a similar one at Siena. The market-place fountain of Perugia, and the shrine of St. Dominic at Bologna are also specimens of his work. He died about 1273. N. was the Phidias of Italy—the father of Renaissance art. His son Giovanni, Andrea Pisano, and the numerous pupils who had worked for him wherever he went, extended his principles, seizing not only upon such assistance as the antique lent them, but welcoming eagerly the noble Gothic architecture which had just then accomplished its journey from the dim North. An exultant eclecticism soon sprang up in art; and almost ere the bones of the master were cold, such men as Orcagna, Donatello, Ghiberti, Brunelleschi, Michael-Angelo, had travelled far on the road he opened for them. See Lord Lyndsay's *Sketches of the History of Fine Arts*, vol. ii., Ruskin's *Val d'Arno* (1874), and Symonds' *Renaissance—The Fine Arts* (1877).

Niccoli'ni, Giovanni Battista, was born of noble family at San Giuliano, near Pisa, 31st October 1785. He became professor of history and mythology at the Florence Academy of Fine Arts, acting also as its librarian. In 1804 appeared his poem *La Pesti di Livorno*. N. subsequently wrote the frigidly classical *Polisseme, Medea, Ino e Temisto, Edipo, I sette a Tebe, Matilda* (1815), an effort in the direction of the Romantic school, *Antonio Foscarini* (1827), for inherently dramatic interest the best of his works, *Lodovico Sforza, Rosamonda d'Inghilterra, Beatrice Cenci, Agamemnone, Arnaldo da Brescia, Filippo Strozzi*. He died at Florence, 20th September 1861. His most successful drama, *Nabucco*, portrayed the story of Napoleon's downfall, with fictitious names. N., like his French contemporary Delavigne, gained the public ear mainly by the political sentiments freely expressed in all his pieces. His admirers hoped for a national poet in him, but nearly all he wrote is dead already. The best collection of his tragedies is that in 2 vols. (Capolago, 1835.) Professor Corrado Gargiolli of Milan began in 1862 a complete edition of N.'s *Opere*. See the *Cornhill* (vol. x. p. 683).

Nice (It. *Nizza*), capital of the department of Alpes-Maritimes, France, beautifully situated at the foot of the Alps, at the mouth and on both sides of the Paglione, 14 miles W.S.W. of the Italian frontier, and 100 E.N.E. of Marseille by rail. The broad stony bed of the Paglione or Paillon, a small stream frequently dried up, is lined by handsome quays and crossed by several bridges. To the N.E. of the town rises the Castle Hill, 320 feet high, crowned by the ruins of a castle destroyed by the Duke of Berwick in 1706. The hill is now laid out in beautiful grounds, where palms, oranges, cypresses, and aloes grow profusely. N. has a Gothic church of Notre Dame, a marble cross commemorating the meeting of Karl V. and François I. in 1538, a square formed by covering in the Paglione between the bridges Vieux and Neuf, and ornamented by bronze statues of Massena (1867), a town library of 40,000 vols., &c. The Promenade des Anglais, adjoining the Jardin Public on the W., was laid out by English residents in 1822–24, and greatly extended in 1862. N. is the winter rendezvous of invalids and others from all parts of Europe, especially from England, Germany, and Russia. The town is almost deserted in summer. The mean temperature in January and February is 47° F., in March 52°, in April 58°. Frost is

or of the United Kingdom. An Irish peer may sit in the House of Commons, but a Scotch peer cannot. If therefore a Scotch peer be not also either a peer of Great Britain, or of the United Kingdom, or one of the 16 representative peers, he cannot sit in Parliament; being the only British subject who is so disqualified. No Scotch peer can be created since the Union in 1707. A limited creation of Irish peers is allowed by the treaty of Union between Great Britain and Ireland in 1801. A peer cannot lose his nobility except by attainder; but in the reign of Edward IV. George Neville, Duke of Bedford, was degraded by Act of Parliament on account of his poverty. If accused of treason, felony, or misprision, a nobleman must be tried by his peers; but in misdemeanours a peer is tried by jury, like a commoner. Wives and widows of peers have the rank of their husbands; but a woman remarrying takes the rank of the husband of the remarriage, if her rank is dependent on marriage. Unmarried daughters of peers have the rank of their eldest brother during the life of his father.

Noce'ra dei Paga'ni, a town of Italy, in the province of Salerno, on the Sarno, 22½ miles S.E. of Naples by rail. The seat of a bishop, it contains a castle (in which Urban VI. was besieged by Carlo di Durazzo, 1385) and fine cavalry barracks, and has important cotton manufactures and a trade in cheese and cattle. Pop. (1874) 13,149. N. (Lat. *Nuceria Alfaterna*) first appears in history in B.C. 315, was captured by Hannibal (B.C. 216), and derives its modern affix from the establishment here of a body of Saracens (*pagani*) by Friedrich II.

Noctilu'ca, a peculiar genus of *Protozoa* (q. v.), finding its most appropriate place amongst the *Infusoria* (q. v.). It receives its name from being the cause of the *widely-diffused* or *general* luminosity of the sea. Existing in vast numbers on the surface of the ocean, these animalcules, by their phosphorescent light cause scintillations to shoot athwart the water. N. attains an average length of $\frac{1}{60}$th of an inch. Its body is somewhat kidney or peach shaped, and has a central groove, at the extremity of which is the mouth. A long filament or tentacle is situated above the mouth, and there is a single vibratile cilium by means of which the creature moves. The central protoplasm of the body is connected by thread-like processes with the outer portion, and there is a *nucleus* or *endoblast* in the former. The N. has amazing powers of reparation after injury. Reproduction is effected by *fission* or division of the body, by internal division or segmentation, and after conjugation. The only species is *N. miliaris*, which is abundant in most seas, and which emits its light by the outer layer of the protoplasmic body.

Noc'turn (Lat. 'by night') was a church service anciently celebrated during the night, the name being afterwards synonymous with Matins (see CANONICAL HOURS). The name is now applied in the Anglican Prayer Book to each of the portions containing nine psalms into which the Psalter is divided, and in the Roman Catholic Breviary to each of the three portions of the service of Matins on Sundays and festivals.

Nodd'y (*Anous stolidus*), a species of *Natatorial* or swimming birds, mostly inhabiting tropical regions, found plentifully in W. Australian coasts, but of rare occurrence in Britain. It attains a length of 14 or 15 inches, and is of a dark or dusky brown, the top of the head being buff-coloured, and the bill, legs, and feet black. The N. is a dull bird, settling on ships and allowing itself to be readily captured. It is, however, a skilful fisher. Its nest is rudely constructed, and is placed either on a rock overhanging the water or on a low bush. The eggs, which are dark orange, are three in number, and are said to be very palatable.

Nodes, in the theory of sounds, are the points of a vibrating system, at which the vibrations are insensible. The simplest example is found in the case of a stretched cord, which if gently plucked at the centre will vibrate as a whole to its fundamental note. If it be plucked at a fourth of its length from either end, and at the same time its middle point be kept steady by contact with a stationary object, the cord will vibrate in two segments, and will have three N., one at the centre and the others at the ends. The musical note emitted in this latter case will be an octave higher than in the former, and by varying the position of the node or N. the various harmonics of the fundamental note are obtained. Any arbitrary vibration of a stretched cord, such as in bowing a violin string, generally results in the production of the higher harmonics to the fundamental note, and thus altering the *quality* of the sound. In such a case there is, so to speak, a superposition of systems of N., each system being connected with a particular harmonic. In an organ pipe there are also N. or regions of rest, the positions of which depend upon the nature of the pipe. In an open pipe the principal node is at the centre, the regions of greatest agitation being the two ends. In the closed pipe the node is at the closed end. Hence in a closed pipe the distance from node to node is twice its own length, and therefore double the distance from node to node in an open pipe of the same dimensions, and therefore a closed pipe gives a note an octave lower than the note which an open pipe of the same length gives. In the case of vibrating plates or surfaces the N. are ordinarily lines curved or straight.

In astronomy the N. of a planet's, satellite's, or comet's orbit are the two points in which the orbit intersects the plane of the ecliptic. The node at which the planet passes from the S. to the N. side of the ecliptic is called the *ascending* node, the opposite one the *descending*. The longitude of the ascending node is one of the Elements (q. v.) of a planet's orbit, and is subject in all cases to a regular and continuous variation which is the result of the perturbing action of the other planets. See PRECESSION.

Nodes are swellings which occur on bones, and are formed of thickened and inflamed periosteum, separated from the surface of the bones by febrinous effusion. N. are usually the result of syphilis, struma, and rheumatism, and they are round and small like a half marble. The first symptoms are pain in the parts, aggravated by heat; swelling and apparent softening of the affected bone. The treatment consists in general constitutional remedies, appropriate to the cause, combined with counter irritation. Iodide of potassium combined with opium acts beneficially in both syphilitic and rheumatic N.

No'dier, Charles, a French author, was born at Besançon 29th April 1780, received a liberal education in classics and the older literature of his own country, and became a member of the *Amis de la Constitution* Society in 1792, before which he delivered a most precocious speech. His studies now took a wider direction, and after serving for a year or two as librarian in his native place he went to Paris, where he published some weak imitations of Goethe's *Werther*. In Paris he devoted himself to journalism, being in turns Republican and Royalist. His literary activity was immense, including works of archæology and grammar, but his historical accounts, even of contemporary events, were singularly mendacious. In 1823 he was appointed librarian of the Arsenal, where he gathered round him the most distinguished writers of the Romantic school. Between that period and his death at Paris, 27th January 1844, N. continued to pour forth history, romance, *Souvenirs*, and *Melanges* which, though written with elegance, are of no permanent value. See Sainte-Beuve, *Portraits Littéraires*, vol. ii.; Wey, *Vie de C. N.* (Par. 1844), and Mme. Ménessier-N., *C. N., Episodes et Souvenirs de sa Vie* (Par. 1867).

Nodosa'ria, a genus of *Foraminifera* (q. v.) having a long shell resembling a beaded rod in shape, but with the first formed chambers or segments larger than the last. *N. hispida*, a familiar species, derives its name from the small processes that project from the surface of the shell. N. is one of the *Polythalamous* or 'many-chambered' foraminifera, the new chambers being formed by a process of budding or gemmation.

Nogent-le-Rotrou, a town of France, in the department of Eure-et-Loire, on the Huisne, 39 miles N.E. of Le Mans by rail. It contains three churches, the Château de St. Jean (once the residence of Sully), and tanneries and candle factories. Pop. (1872) 5884.

Noils are the short fibres separated from the 'tops' or long fibres in the combing process in the alpaca, mohair, and worsted manufactures. They are used for felting, and are also woven up in inferior cloths.

No'la, a town of Italy, in the province of Caserta, lies in a valley between Vesuvius and the Apennines, 13 miles N.E. of Naples. The remains of an amphitheatre and a valuable collec-

de Genève, *Gazette de Lausanne*, and *Neue Züricher Zeitung* are among those most extensively read.

DENMARK.—About 200 papers are published in this little country. The oldest and most celebrated, *Berlingske Tidende* (founded in 1749), is a semi-official organ.

NORWAY AND SWEDEN.—Among the more prominent papers are *Morgenbladet*, *Aftenbladet*, *Christianiaposten*, *Bergens Tidende* (Bergen), and *Dagens Nyheter* and *Aftenbladet* of Stockholm.

TURKEY.—Such N. as are published in Turkey are mainly issued in Constantinople. *Le Courrier d'Orient*, *Bassiret*, *Stamboul*, and *Levant Herald* (English) may be mentioned.

GREECE.—The principal papers are the *Messager d'Athenes* and the *Hermopolis* of Syra.

ASIA.—In *China* the *King Chau* (Court Transcripts), known to Europeans as the *Pekin Gazette*, an official compilation of news, is circulated among the officers of state in different parts of the empire. A similar journal exists in Japan. The *Shanghai Herald*, *China Mail* (Hong Kong), and *Japan Herald* (Yokohama), are well-known English N. in that part of the world. *The Friend of India* (Serampore), *Times*, *Telegraph*, and *Gazette* (Bombay), and *Englishman* (Calcutta), are leaders in Anglo-Indian journalism. *Hicking's Gazette* (1781) was the first Anglo-Indian paper. Until 1835 the press in India was under a censorship, and the control of the E. India Company, but in that year all restrictions were removed.

AUSTRALIA has a rising and energetic press, including the *Argus*, *Age*, and *Herald* (Melbourne); the *Herald* and *Empire* (Sydney), &c. In *New Zealand* the *Southern Cross*, *New Zealand Gazette*, &c., are published.

SOUTH AMERICA has a large number of journals, though few are of cosmopolitan importance. Brazil has 60, and Peru 40 dailies.

NORTH AMERICA.—The United States has been more prolific of N. than any other country. The earliest American newspaper, *Publick Occurrences both Foreign and Domestick*, was published by B. Harris at Boston, September 25, 1690, but was immediately suppressed. It was followed by the *Boston News Letter*, a weekly paper, 1704–76. The *New York Gazette* (1725) was the first newspaper issued in that city. In 1776, 37 papers were in existence, all of which were weeklies, with the exception of the semi-weekly *Advertiser* of Philadelphia. The *Daily Advertiser*, started at Philadelphia in 1784, was the first daily paper in the U.S. The *Commercial Advertiser*, the oldest of present New York journals, was established in 1797. In the year 1800, the number of N. in the States was 200; in 1828 it had increased to 852. A table is given in Rowell's *American Newspaper Directory* (New York) for 1874, giving the number of N. then published in the States as 678 daily and 5554 weekly, and in British America, 46 daily and 315 weekly. The same work for 1875 gives a list of 506 journals in N. America, with an average circulation each of over 5000, of which 123 (17 daily) were published in the city of New York, 44 (11 daily) in Philadelphia, and 50 (7 daily) in Boston. The great variety of sects in America occasions a vast quantity of religious papers. 337 journals were printed in German, 27 French, 26 Scandinavian, 23 Spanish, 8 Dutch, 2 Italian, 5 Welsh, 4 Bohemian, 2 Polish, and 1 Portuguese in the year 1875. Foremost in popular favour and in circulation in America is the *New York Herald*, established in 1835 by the late J. G. Bennet, as a 2 cents paper. The price was afterwards raised to 4 cents. Under the management of J. G. Bennet, Jr., the present proprietor, the paper has attained a circulation of 65,000 (1875). It is the organ of no political party. No paper in the world surpasses it in enterprise or audacity. The successful mission of H. M. Stanley, at the expense of the *New York Herald*, to look for Dr. Livingstone deserves commemoration. The *New York Tribune* (edited by Horace Greeley 1841–72, circulation 44,000 in 1875) comes next in importance. Under Greeley it was always able, high-toned, and enthusiastic, but not always consistent. It is as vigorous as ever under Mr. Whitelaw Reid, but is no longer a vehicle of the most advanced and the most absurd crotchets. The *New York Times*, the organ of the extreme republicans (founded in 1850, circulation 42,000), *The Sun* (price 2 cents, circulation 119,792), and the *Evening News* (1 cent, circulation 127,360) are among the most popular journals. The *World* (Democratic, 1860) and *Evening Post* (1801) have more literary finish than most of their contemporaries. Mr. W. Cullen Bryant edited the latter paper for many years. The *New York Graphic* (1873) was the first attempt at a daily illustrated paper. Ten New York papers form the New York Associated Press, which collects news at an annual expense (1875) of about $1,000,000. *Harper's Weekly* and the *New York Ledger* have each an enormous weekly circulation. The *Nation* is an admirable critical journal, the *Saturday Review* of America. The leading paper of Philadelphia is the *Public Ledger*, started in 1836 at 1 cent. It was the first paper to use the Hoe machine (1844). Its present (1877) proprietor is G. W. Childs, its price 2 cents, and its daily circulation 90,000. Its printing-office is the finest in the U.S. The *Boston Herald* and *San Francisco Chronicle* are important and influential N. The type used in American journals is not so large or so clear as in British papers. In the Southern and Western States the press is still in a very primitive condition, but its progress is only a matter of time. At present the American press faithfully reflects the intellectual condition of the people, that is to say, it is the most energetic but not the most cultivated press in the world. If energy continue, culture will come. The most popular papers in Canada are the *Toronto Globe* and the *Montreal Witness*. 29 out of 75 newspapers published in the Province of Quebec are in the French language.

References.—Besides the works already mentioned see *The Fourth Estate*, by F. Knight Hunt (Lond. 1859), *History of British Journalism*, by A. Andrews (Lond. 1859), and *The Newspaper Press, its Origin, Progress, and Present Condition* (Lond. 1871).

Laws Regarding N. in Great Britain.—The provisions of the law of Copyright (q. v.) apply to articles published in N. They belong to the proprietors, who have paid for them. But if a contribution be gratuitous, probably it will be held to belong to the author. The *Goodwill* (q. v.) of a newspaper is property transmissible to heirs; and if on the dissolution of a partnership carrying on a newspaper, by the death of one of the partners, the surviving partners refuse to buy the deceased's share, then it must be otherwise sold on behoof of his representatives.

New Style. See CALENDAR.

Newt, a name given to various vertebrate animals belonging to the class *Amphibia* (q. v.). The newts are 'tailed' amphibians or *Urodela*—that is, the tail with which the young N. or *tadpole* is provided persists throughout life. In the frogs and toads, on the other hand, it becomes abortive. The newts, like all other amphibians, possess gills in early life. As adult life is attained, the gills are cast off, and these animals, even although inhabiting water, breathe exclusively by lungs. The newts are well-known inhabitants of ponds. The common N. (*Triton cristatus*) is a little lizard-like creature, having a blackish body marked with yellow spots. The male bears a crest along the back. The food consists of worms, the larvæ of insects, &c. Another species is the marbled N. (*Triton marmoratus*) of S. Europe, which has a body olive-brown above with whitish markings. The smooth N. (*Lissotriton punctatus*) is not so exclusively aquatic as the species previously mentioned. It may be found often far removed from water. It has a smooth, non-warty skin, and is smaller than the common N. The colour is brownish-grey above and a bright orange on the under parts, the belly being marked with round black spots. The average length is 3½ inches. The N. is (contrary to popular belief) quite innocuous. It is noted for an extraordinary facility in replacing or reproducing members that have been destroyed.

Newton, a city of Massachusetts, U.S., on the Charles River, 8 miles W. of Boston by rail, contains 27 churches, several libraries, and the large Baptist seminary known as the N. Theological Institution. It has 2 weekly newspapers, and numerous factories. Pop. (1870) 12,825.

Newton, Sir Isaac, was born at Woolsthorpe, 8 miles S. of Grantham, in Lincolnshire, England, December 25, 1642 (old style). He seems to have early displayed a mechanical turn of mind, and after being educated at Grantham school, he was sent to Cambridge, entering Trinity College in 1660. When he first applied himself seriously to the study of mathematics is not known, but there is no question that before the end of 1666 he had discovered the Binomial theorem, established the principles of his method of fluxions, and demonstrated from Kepler's laws the nature of the force which held the planets and sun together. He graduated M.A. in 1667, and succeeded Dr. Barrow as Lucasian Professor of Mathematics in 1669. Before this he had speculated upon the identity of the terrestrial force of gravity

Nonju'rors comprehended the Episcopalian party which declined to take the oath of allegiance to William and Mary at their coronation. Holding that passive obedience was due from subject to sovereign, they preserved their allegiance to James II. Sancroft the Primate, eight bishops, and 400 of the inferior clergy were among the original recalcitrants, and (February 1, 1691) being still obstinate, he and five of the bishops were deprived of their sees. See Macaulay's *History of England.*

Non-Res'idence, in English ecclesiastical law, is the offence committed by the incumbent of a benefice in unduly absenting himself from the place of it. 1 and 2 Vict. c. 106, regulates the penalties for N.-R. An incumbent absenting himself, without leave from his bishop, for more than three months, but for not more than six months, forfeits one-third of the annual income. An absence of from six to eight months causes a penalty of one-half of the income; of one year, three-fourths of the income. Certain officials are exempted by the Act 1 and 2 Vict. c. 107—heads of colleges at Oxford and Cambridge, the head masters of Eton, Westminster, &c.

Non-Suit, an English law term. When a plaintiff in a jury trial so chooses, he may allow a verdict and judgment to be entered for the defendant. He is then said to be *non-suited.* He may bring a new action under a N.-S., but he must first pay the costs of the previous one.

Noot'kas, or **Ahts**, the name of the Indians of Vancouver's Island, comprising the Ahts proper (3500) who inhabit the W. shores of the island, the Quakewith (3000), scattered along both sides of this island and on the mainland, and the Cowichans in the E. of the island, numbering 7000. The Cowichans have been partly civilised by Protestant and Roman Catholic missions. *Nootka Sound*, on the W. coast of Vancouver's Island, is 10 miles long, and has a breadth of 500 yards.

Nord, the most northerly department of France, extends between the Belgian frontier and the departments Pas-de-Calais and Aisne, and has a coast-line of 25 miles on the Straits of Dover. Area, 2193 miles; pop. (1870) 1,447,764. It is watered by the Scheldt, Sambre, Scarpe, &c. The surface is flat except in the S., where the chief height is Mont Cassel, 361 feet high. Along the coast the surface is in great part marshy, lying little if at all above the sea-level, but is maintained in an arable state by a system of drainage called *Watteringues.* Other parts of the country are regulated in drainage by a system of canals, windmills, and dykes, under government care. The chief products are wheat, hemp, beetroot, rye, hops, and garden fruits. A large amount of dairy produce, and of mutton, wool, &c., is sent to the Paris markets. N., part of the old province of French Flanders, is next to that of the Seine the most populous, the most advanced in education, and commercially the most prosperous among the departments of France. Lille is the capital, and other towns are Douai, Cambrai, Dunkerque, and Valenciennes.

Nord'cap, the most northerly cape of Europe, under 71° 11′ 40″ N. lat., situated on the Norwegian island of Magerö, is formed of three perpendicular cliffs rising 1020 feet above the sea. The mean temperature is at freezing point. To the S.E., on the Varangerfjord, is Nordkyn or Kynrodden, the farthest N. point on the Continent.

Nor'den, a town of Prussia, province of Hanover, on a canal 16 miles N. of Emden, and 2½ from the North Sea. It is a well-built town, and has considerable trade in horses and cattle. The industries are brewing, distilling, boat-building, and the manufacture of yarn and tobacco. In 1871, 1372 ships of 25,352 tons entered and cleared the port of N. Pop. (1875) 6199.

Nord'enskjöld, Nils Adolf Erik, a celebrated Swedish naturalist, born 18th November 1832 at Helsingfors, where his father was Professor of Mineralogy, was appointed professor of the same science at Stockholm in 1858. After accompanying (1858 and 1861) the two expeditions to Spitzbergen led by Otto Torell, he himself led two others (1864 and 1868), in the first of which he descried Gillisland, marked on the maps as King Carl's Land, and in the second reached 81° 42′ N. lat., the highest point hitherto gained by sea. During these voyages N. fixed astronomically the position of eighty places in the Spitzbergen Archipelago, and made valuable geological and other collections. In 1870 he visited Greenland, whose inland ice he traversed farther north than any previous explorer, and discovered in the S. of Disco Island the three largest meteoric stones yet found—5, 10, and 25 tons' weight respectively. See his *Redogörelse för en expedition till Grönland aar* 1870 (Stockh. 1871). In 1872 he led the fifth Swedish Arctic expedition. With Lindström, Stuxberg, and others, N. left Tromsö, 8th July 1875, made scientific researches on Novaia Zemlia from 23d June to 2d August, passed the Yugor Strait into the Kara Sea, reached the mouth of the Yenissei on the 15th August, sailed up that river for some distance, and then travelled overland to St. Petersburg, having opened the passage to the Siberian rivers, and proved that the Kara Sea was not a 'great ice-house.'

Nor'derney, one of the E. Frisian islands, included in the Prussian province of Hannover, lies in the North Sea, 4½ miles N.W. of the coast of E. Friesland, with which it is connected at low-water by passable sands. Length, 3 miles; breadth, 2½ miles; area, 5½ sq. miles; pop. (1875) 769. It is surrounded by rows of white sand-hills, some of which are 53 feet high, and between them are little valleys laid out in gardens. The inhabitants occupy a little village in the S.W. corner, and live by fishing and receiving visitors. N. is the oldest (since 1797) and most frequented sea-bathing place on the German coast of the North Sea. On the W. the island is protected by masonry and dykes against storms, which carried away considerable tracts in 1855 and 1858. During the bathing season (15th July—15th October) N. is in regular communication with Hamburg, Bremen, Emden, Geeste-münde, Wilhelmshaven, and Norden.

Nord'hausen, a town of Prussia, in the province of Saxony, lies among the S. offsets of the Harz, on the Zorge, a small affluent of the Helme, 50 miles W. of Halle by rail. It consists of an old or upper town, with a *Rathhaus* and three squares, a new or lower town, and several suburbs. N. has a Roman Catholic cathedral, 6 other churches, a gymnasium, and a *Real-Schule* of the first rank. The chief industries are the making of brandy (50 establishments), the manufacture of chicory, chemicals, oil, tobacco, cottons, woollens, and leather, iron-founding, and brewing. There is large trade in cattle. The Empress Adelheid here founded a monastery in 943. In 1220 N. became a city of the Empire, fell to Prussia in 1802, was joined to Westphalia in 1807, and in 1815 was restored to Prussia. Pop. (1875) 20,183. See Girschner, *N. und Umgegend* (Nordh. 1866).

Nördlingen, a town of S. Germany, in Bavaria, on the river Eger, 70 miles E. by N. of Stuttgart by rail. It is surrounded by old walls and towers, and has a fine *Rathhaus*, also a Catholic and two Protestant churches, one of which is a good specimen of the later Gothic style. N. manufactures machinery, linens, woollens, and carpets; tanning, brewing, and a trade in cattle, feathers, and corn are also carried on. Pop. (1875) 7079 (⅘ Protestants). Here Ferdinand of Austria defeated (6th and 7th September 1634) a Swedish army under Bernhard of Weimar. See Mayer, *Die Stadt N., ihr Leben und ihre Kunst im Lichte der Vorzeit* (Nördl. 1876).

Nore, a sandbank at the mouth of the Thames, 3 miles N.E. of Sheerness, is marked by a floating light 33 feet high, placed there in 1734. The mutiny that broke out in the fleet stationed at the N., May 27, 1797, blocked the trade of the Thames, and was only suppressed June 13, when several of the mutineers (including the ringleader, Richard Parker) were executed at Sheerness.

Nor'folk, a maritime county in the E. of England, bounded N. and E. by the North Sea, S. by Suffolk, and W. by Cambridge and Lincoln. Area, 2116 sq. miles; pop. (1871), 438,652. The coast-line (about 90 miles) is generally low, and subject to great encroachments by the sea, but by means of embankments upwards of 4000 acres have been reclaimed from the Wash (q. v.) since 1850. The surface is uniformly level, and the western portion of the county is included in the great Bedford Level (q. v.). N. is watered by the Yare (52 miles), with its affluents the Wensum (47), Waveney (49), and Bure (50), and by the Ouse (q. v.) and its tributaries. Improved farming has effected an immense change in this county, which a century ago was more than one-half barren heath. In 1876 there were 449,758 acres under corn crops, 206,445 under green crops, 169,311 in clover, sanfoin, and grasses in rotation, 234,200 in

permanent pasture, and 44,251 woods. There were also 60,020 horses, 103,699 cattle, 661,164 sheep, and 85,888 pigs. The chief crops are barley, wheat, turnips and swedes, mangold, oats, and beans. The N. breeds of cobs and cart-horses have long been famous. Six members are returned to Parliament. Norwich is the capital; other towns are Yarmouth, Lynn, Thetford, and East Dereham. See F. Blomefield's *History of N.* (11 vols. Lond. 1805–10).

Norfolk, a seaport of Virginia, U.S., is situated on the Elizabeth River (an arm of Chesapeake Bay), 7 miles N.E. of Portsmouth, with which it is connected by ferry. It has numerous churches and public buildings, two theatres, twelve banks, and ten newspapers; and, as the largest naval station in the Union, possesses a dry-dock (constructed at a cost of $974,536), four building-slips, and a navy-yard of 109 acres. The imports (returned with those of Portsmouth), amounted in 1875 to $18,929; the exports to $5,243,986; and there entered the two ports 24 vessels of 13,299 tons, and cleared 106 of 49,332 tons. The manufactures are unimportant. Pop. (1870) 19,229.

Norfolk Island is in the Pacific Ocean, in 29° 3′ S. lat., 167° 58′ E. long., 1050 miles N.E. of Sydney, and is a dependency of New South Wales. The island measures 5 miles in length by 2½ miles in breadth, and has an area of 8607 acres. The coasts are bold, and there is no safe anchorage. The island is hilly, well watered, and fertile, producing fruits and vegetables in profusion, but is not so well adapted for the growth of cereals. The magnificent N. I. pine (*Araucaria excelsa*) is a striking object in the landscape. N. I. was discovered by Captain Cook in 1774, and was a British penal settlement from 1788 to 1807, and again from 1825 to 1855. In 1856 the descendants of the mutineers of the *Bounty* were removed from Pitcairn Island (q. v.) to N. I., and still form about half of its population of 600. N. I. is the headquarters of the missionary Bishop of Melanesia (q. v.), and has a college for training Melanesian youths as teachers and missionaries.

Nor'ic Alps. See ALPS.

Nor'mal Schools. See TRAINING SCHOOLS AND COLLEGES.

Nor'man Ar'chitecture, otherwise known as Earlier or Round-Arched Gothic, is the name given to a variety of the Romanesque, which, introduced into England by the Normans at the time of the Conquest (1066), had a brief but vigorous existence in that country till the close of Henry II.'s reign (1189), or at latest till that of Stephen (1154). Previous to the Norman period there already existed in England that style of architecture known as the Saxon; but as this had merely been derived from the Continent by a rude imitation of the styles prevailing there, the difference between the Saxon and Norman is not generic, the latter being at once a grander and more elegant development of those principles which in the former found rude and incomplete expression. The characteristic of the Saxon is massive simplicity. The most common form of the early Saxon churches was that of the Basilica, a simple oblong, with a portico and ambulatory. The outer walls were of immense thickness and had no buttresses, the pillars were very short and massive. Already during the reign of Edward the Confessor, however, the intimate connection subsisting between the English and Norman courts, and the introduction of Normans into the highest stations of the English Church, produced an imitation of the Norman style, to be seen in the Abbey Church of Westminster and in that of St. Peter at Gloucester, both erected during this period, and prepared the way for its complete adoption. In N. A. the rounded arch and circular pillar are still preserved, and in both it and the Saxon there is a total absence of pediments and pinnacles, tabernacles, or niches with canopies; but the windows of the Norman edifices are somewhat enlarged, the columns are higher in proportion to their diameter, and a great variety of ornamental mouldings cover what in the Saxon style are plain surfaces. The principal change noticeable in N. A. is the loftiness of the interior, which now consists of a triple range of (1) pierarch, (2) triforium, and (3) clerestory. Though this complex arrangement of the arch marks an entire departure from the Grecian style, it was not till the Later or Pointed-Arched Gothic period that in its employment a true union and harmony of parts was attained. The principle of verticality, which the arch had introduced was as yet in the N. A. only displayed in the augmented height of the building. There is no subordination or connection of the parts. The string-courses which separate the pier-arches from the triforium and the latter from the clerestory are unbroken, while the arcades of the two latter frequently do not harmonise with the range of the pier-arches. The principal kind of exterior decoration on a large scale employed in N. A. is that called arcades, which consists merely in covering the surface with tiers of small columns and arches, these tiers often rising above one another to a considerable height. Good examples of this kind of work are to be seen in the two transept towers of Exeter Cathedral, the front of Castle Acre Priory, the Tower of Bury St. Edmunds, the S.W. wing of Ely Cathedral, and the front of Lincoln Cathedral. In the general plan of Norman churches there is no essential variation from the usual arrangement. (See CHURCH.) It is to be kept in mind, however, that although traces of N. A. are scattered all throughout the kingdom, there are few structures which retain this style throughout, and do not exhibit additions of later date. Besides the edifices above mentioned, the best specimens of N. A. are to be found in the older portions of Canterbury, Durham, Gloucester, Rochester, Chichester, Norwich, Winchester, Peterborough, and Oxford Cathedrals.

Nor'mandy, an old province of France, bounded N. and W. by the English Channel, E. by Picardy and Ile-de-France, and S. by Orléanais, Maine, and Bretagne, had an area of 11,397 sq. miles, and was subdivided (1790) into the departments of Seine-Inférieure, Eure, Orne, Calvados, and Manche. Rouen was the capital. The *Gallia Lugdunensis II.* of the Romans, and later a portion of Neustria, N. received its name from the Northmen (probably Danes), after Charles the Simple, by the Peace of St. Clair-sur-Epte (912), had ceded to Rolf the Ganger the land lying between the Seine, Epte, and sea. Though to their French neighbours the Northmen (now Normans) were still 'pirates and heathens' till the close of the 10th c., yet under Rolf's grandson, Richard the Fearless (942–996), they gradually adopted French Christianity and feudalism. The old Norse freedom became extinct; the Norse language survived only at Bayeux and in such local suffixes as *gard*, *tot*, and *buf* (by); and the Abbey of Bec was but one of the countless monasteries that arose throughout the land. William the Conqueror (q. v.), the seventh duke, united N. with England (1066); from him it was wrested by Robert, his eldest son (1077), to be reannexed by Henry I. (1105); and in the reign of John, Philippe Auguste laid claim to it as a fief of France, and conquered it (1203–4). After the battle of Agincourt N. was again held by England from 1417 till 1450, when the last foot of Norman ground was lost by the surrender of Cherbourg (August 12) to Charles VII. by the Duke of Gloucester. See Palgrave's *History of N. and England* (4 vols. 1851–64); Freeman's *History of the Norman Conquest* (5 vols. 1867–76); and Mrs. Macquoid, *Through N.* (1874).

Norns (Old Norse, *Nornir*). See NORTHERN MYTHOLOGY.

Norr'istown, a town of Pennsylvania, U.S., on the river Schuylkill, and in a rich farming and mining district 16 miles N.W. of Philadelphia by rail, has seven cotton and woollen mills, several large ironworks, three blast-furnaces and rolling-mills, &c. There are here published three daily and four weekly newspapers. Pop. (1870) 10,753.

Norr'köping, a town of Sweden in the län of Linköping, near the mouth of the river Motala (here crossed by four bridges) and the Baltic bay Braaviken, 89 miles S.W. of Stockholm by rail. It is regularly built and has wide streets, the finest of which contains a statue of Karl XIV., modelled by Schwanthaler. There are three churches, of which St. Olaf's is the most noteworthy. N. is, next to Stockholm, the most important manufacturing town in Sweden. The chief manufactures are cloth, cottons, hosiery, lucifer matches, tobacco, flour, leather, soap, and oil. There is an excellent harbour, and new docks are being constructed. Copper, iron, corn, and wood are the chief exports. To the N. are the large ironworks and cannon-foundry of Finspaang. In 1604 N. was the seat of a diet at which Karl IX. resigned the Swedish crown in favour of his son Gustaf Adolf. Pop. (1874) 26,365.

North, Frederic, Lord, was born April 12, 1732, educated at Eton and Oxford, travelled for three years in Germany, Italy,

and France, and on his return to England entered Parliament. In 1759 he became a Commissioner, and in 1763 a Lord of the Treasury, from which in 1769 he passed to the Chancellorship of the Exchequer and the Leadership of the House of Commons. On the resignation of the Duke of Grafton (1770), N. became Prime Minister, and his period of office was marked by a complete subjugation to the will of George III. The King gradually absorbed the entire patronage of Government, and attached to his cause a party bound by the ties of obligation. N. became 'the mere mouthpiece of the king.' He obeyed him in his blind and obstinate policy in connection with America until he was compelled in 1778 to drop the claim of colonial taxation, and in 1782, when the victory of Saratoga alarmed England, he resigned his office in despair. In the following year occurred 'the most unscrupulous coalition known in our history.' N. took office with Fox, but it was broken up in a few months. In 1789 N. made his last public appearance to combat the ministerial project of the regency. He died blind, 5th August 1792. N. was a cultivated, good-humoured man, who, if he had acted in politics according to his own prevision of things, would not have been associated with one of the most disgraceful episodes in English history. See Macaulay's *Chatham*, Lord Brougham's *Statesmen of the Time of George III.*, and *Correspondence of George III. with Lord N.* (2 vols. Lond. 1867).

Northall'erton, a market-town of England, capital of the North Riding of Yorkshire, stands near the left bank of the Wiske, 29 miles N.N.W. of York by rail. It contains four churches, a grammar school, mechanics' institute, and the ruins of the palace of the Bishops of Durham, an Austin priory (1341), and a Carmelite priory (1354). Handloom weaving, brewing, tanning, and brickmaking are the chief industries. N. returns one member to Parliament. Pop. (1871) 5249. At Cowton Moor, in this parish, was fought the 'Battle of the Standard,' August 22, 1138, in which David I. (q. v.) was defeated, with a loss of 10,000 followers, by an English army mustered by Archbishop Thorstan. The standard, from which the battle got its name, was a pole surmounted by the consecrated Host, decked with the banners of SS. Cuthbert of Durham, Peter of York, John of Beverley, and Wilfred of Ripon, and fixed in a four-wheeled car.

Northamp'ton, a town of England, capital of Northamptonshire, on the left bank of the Nen, 67½ miles N.N.W. of London by rail. Of its seven Anglican churches, the chief are the cruciform St. Giles, All Saint's (rebuilt by Wren, 1680), the round Templar church of St. Sepulchre (restored by Scott, 1865), and the fine Norman church of St. Peter's. Other buildings are the Roman Catholic Cathedral (designed by Pugin, 1864), the Gothic townhall (1864), Italian corn-exchange (1851), county hall, chapels, barracks, infirmary, &c. The principal manufactures (which have grown very much within the last seven years—1870–77) are boots and shoes (employing 8000 men), leather (450 men), and lace and hosiery (260 women), while breweries, malt-kilns, brass and iron foundries, flour and paper mills, also afford employment. N. returns two members to Parliament. Pop. of parliamentary borough (1871) 45,080. Burnt by the Danes in 1010, N. was the scene of the parliament that ratified the 'Treaty of N.,' acknowledging the independence of Scotland (1328), and of the defeat and capture of Henry VI. by the Earls of March and Warwick, July 10, 1460. In the 11th c. it had a strong castle and embattled walls, demolished in 1662.

Northampton, a town of Massachusetts, U.S., on the Connecticut River, 17 miles N. of Springfield by rail, contains eight churches, thirty-two schools, six banks, the State lunatic asylum (1855), and the Clarke Institution of Deaf Mutes (1867). It has two newspapers, and manufactures of sewing-machines, cutlery, baskets, woollen and cotton goods, paper, &c. Pop. (1870) 10,160.

Northamp'tonshire, a midland county of England, bounded N. by Leicester, Rutland, and Lincoln, E. by Huntingdon and Bedford, S. by Buckingham and Oxford, and W. by Warwick. Area, 984 sq. miles; pop. (1871) 243,891. The surface of N. is undulating, rising to 800 feet in Arbury Hill, near Daventry. The Nen and Welland, its principal rivers, have a respective length within the county of 60 and 50 miles. Near Naseby also spring the Upper Avon and one head of the Ise. N. is a great grazing and dairy district. In 1876 there were 177,773 acres under corn crops, 41,803 under green crops, 37,120 in clover, sanfoin, and grasses in rotation, 277,199 in permanent pasture, and 24,142 woods. There were also 21,503 horses, 110,188 cattle, 514,758 sheep, and 30,260 pigs. The chief crops are wheat, barley, turnips, swedes, oats, and beans. Boot and shoe making forms an important industry. Four members are returned by this county, the chief towns of which are Northampton and Peterborough. Among its antiquities are Fotheringay Castle and Burleigh House.

North Ber'wick. See BERWICK, NORTH.

North'brook, Thomas George Baring, Earl, an English and Indian statesman, was born in 1826, educated at Christ Church, Oxford, where he graduated in 1846, was private secretary to Sir Charles Wood at the India Board and at the Admiralty, entered Parliament for Penryn and Falmouth in the Liberal interest in 1859, was Under-Secretary of State for India from 1859 to 1861, and Under-Secretary for War from 1861 to 1866. In the latter year he succeeded his father as second Baron N. From 1872 to 1876 he filled the post of Governor-General of India, and was created earl on his return. His period of office was marked by the successful struggle with the famine in N. Bengal, the deposition of the Guicowar (q. v.), and the auspicious visit of the Prince of Wales. It was his merit to bestow special attention on questions of finance and internal administration. See BARING.

North'cote, Sir John, an English politician and patriot, was the eldest son of the Sheriff of Devon, and was born early in the 17th c. He was elected to the Long Parliament for the village of Ashburton in 1640, and from the first was one of the small party who sought a *via media* between the extremes of monarchic absolutism and Puritan despotism. When the Civil War broke out he sided with the Parliament, helped to organise the Devonshire Militia, was proclaimed a traitor by the King in 1642, took part in the defence of Plymouth, shared in the defeat at Modberry (27th Feb. 1643), was made prisoner by the Royalists in 1644, but was soon after exchanged. N. fell under the suspicion of the Cromwellian party in 1646, was 'secluded' before the trial of Charles, was passed over by Cromwell in the New Communion of Peace for Devon (1650), was re-elected to Parliament during the rule of Richard Cromwell, and was a member of the Convention that restored the monarchy. He died in 1676. During his attendance in Parliament he made notes of all the memorable debates—those on ship-money, the impeachment of Strafford, the levying of war against the King, the Scots articles, and the revision of the canons. N.'s valuable *Notebook* was published by Mr. Murray, under the editorship of Mr. A. Hamilton, in 1877.—**Sir Stafford Henry N.**, eighth baronet of the name, was born in London, 27th October 1818, and educated at Balliol College, Oxford, taking a first class in classics and a third in mathematics. He was called to the bar in 1847, entered Parliament in 1855 as a member for Dudley in the Conservative interest. N. was private secretary to Mr. Gladstone when the latter was President of the Board of Trade, and in finance is a faithful disciple of his great master. In 1859 he was appointed Financial Secretary to the Treasury, in 1866 President of the Board of Trade, in 1867–68 Secretary of State for India, and in 1874 Chancellor of the Exchequer, a post which he still (1878) holds. N. takes a deep interest in art and education, and is a prudent and sober legislator. As leader of the House of Commons he displays good sense, and is not deficient in spirit or courage, but he lacks the artful rhetoric and witty cynicism of his dextrous predecessor.

North-East and **North-West Passages** are the names given to the sea-routes which lead through the Arctic waters to the regions N. of the Asiatico-European and American continents respectively. It was hoped by the mercantile powers of western Europe that by discovering such routes, a shorter way to the Pacific and Indian Oceans might be laid open. The usurpation by the Spaniards and Portuguese of the exclusive right to the trade in these waters roused the energies of the northern nations to search for new passages. In the end of the 15th and the beginning of the 16th c., the voyages of Cabot, Gomez, Cartier, Frobisher, &c., though unsuccessful in finding a N.W. passage, resulted in important geographical discoveries along the N.E. coast of America. The English then turned their attention to the discovery of a N.E.

passage, and despatched three ships under Sir Hugh Willoughby and Richard Chancelor, who reached the S. end of Nova Zembla and were then forced to return. The former and the crews of two of the ships were frozen to death at the mouth of the Dwina; Chancelor made his way to Archangel. Other two expeditions, under Burroughs in 1556 and Pet and Jackson in 1580, were fitted out, but beyond extending our geographical knowledge, did nothing towards solving the problem. Towards the close of the c. the Dutch entered the field, and part of their small fleet managed to sail through the Sea of Kara to the Gulf of Obi. One of their ships, under Barentz, reached the N. end of Nova Zembla, but was then forced to return. In 1597 Barentz and Ryp made further attempts in this direction, discovering Bear Island and Spitzbergen, and sailing round the N.E. extremity of Nova Zembla. Soon after, however, Barentz' ship was hemmed in and crushed by the ice; and he and his companions wintered in a small hut erected on the island. In the succeeding spring, after a journey of incredible hardships, to which Barentz succumbed, the survivors made their way to Lapland. Later attempts to find an open passage have been as unsuccessful. The first to round Nova Zembla completely was Karlsen, a Swedish captain, who effected it in 1871, and who found the hut of Barentz with everything in it exactly as it had been left 274 years previous. In 1876 the locality was completely explored by Charles Gardiner, an English yachtsman, but the hut had disappeared. The idea of a N.E. passage is now abandoned; for even could a vessel manage to reach Behring's Strait, there would be no gain in time, especially since the opening of the Suez Canal. Polar research has been busy, however, in the latitudes N. of Spitzbergen during recent years; and certain eminent geographers regard this as the only feasible route to the N. Pole. The discovery of Franz-Josef Land by the Austrian expedition under Weyprecht and Payer, though not directly connected with the discovery of the N.E. passage, deserves a passing notice.

The failure of all attempts to reach the Pacific or the Pole by the North Cape revived the hope of discovering a N.W. passage. In 1585 some London merchants sent John Davis on an expedition up the W. coast of Greenland. He made in all three different voyages, discovered Davis Straits and Cumberland Island, and reached a latitude of 72°. The Muscovy Company despatched two expeditions in 1602 and 1606, but they failed to push as far north as Davis. In 1608 Hudson, in the employ of the Dutch, explored part of the North American coast, discovering Hudson River and New York Bay in his search for a western passage; but two years later he was sent out again by the English, and discovered Hudson Straits and Hudson Bay. Sir Thomas Button, Gibbons, Bylot, and Baffin opened up the intricate system of straits and sounds to the north of British America still more; and their efforts were well supplemented towards the middle of the 17th c. by Jens Munk, Fox, Middleton, Smith, Wood, &c. After 1650, no further attempt was made till the beginning of the present century. Meanwhile, however, the Russians had slowly been extending their power across Siberia, and had been gradually adding to our knowledge of its geography. Behring, Tchirikov, Krupischev, Kotzebue, Wrangle, Lutke, and others, are among the names of the Arctic navigators of the 18th c. In 1818, search for the N.W. passage was resumed under Sir John Ross. We cannot do more than name some of the host of navigators who followed:—Sir Edward Parry, Admiral Beechey, Back, Dease, Simpson, Rae, Sir John Franklin, Captain Kellet, Sir James Ross, Sir Robert M'Clure, Admiral Ommanney, Captain Kennedy, Sir L. M'Clintock, Sir Edward Belcher, Lieutenant Bellot, Admiral Inglefield, Drs. Kane and Hayes, and Captain Hall. By their discoveries the numerous islands with their separating straits which lie to the north of America are now with tolerable accuracy laid down on our maps. The N.W. passage discovered by M'Clure is between Banks and Prince Albert Lands, connected with Baffin's Bay through Prince of Wales Strait, Melville Sound, Barrow Strait, and Lancaster Sound. (For the details of his voyage see M'Clure.) Captain Hall of the United States pushed his way far up the west coast of Greenland in 1871, but succumbed, like Franklin, to the rigours of an Arctic winter. His grave, at a higher latitude than had ever been attained before, was visited and a monument erected over it by the Arctic Expedition fitted out by the English Government in 1875, and commanded by Captain Nares. See Polar Research.

Nor'thern Cir'cars (*Sarkár* = government, province, an administrative division of territory in India under the Mohammedans, now obsolete). The N. C. were five in number, lying along the coast of the Bay of Bengal, bounded W. by the Deccan, N. by Orissa, and S. by the Carnatic. They occupied an area of about 30,000 sq. miles, and having been ceded to the British in 1765 by the Mogul emperor, formed the nucleus of the Madras Presidency. The term Circar is in universal use among the natives of India to express in an impersonal and fatalistic way the supreme power of the British Government.

Northern Mythol'ogy. The Mythology (q. v.) of the North Teutonic peoples is chiefly known from the literature of the remote Norwegian colony of Iceland (q. v.). The main source of knowledge is the *Eddas* (q. v.). In these we are told that in the beginning of time there lay to the N. of the great abyss Ginnungagap a region named Niflheimr (q. v.), the land of mist and snow, and to the S. Muspellheimr, the burning world, guarded by the flaming sword of Surtr against all who had no heritage therein. The warm winds from Muspellheimr meeting the cold blasts of Niflheimr, there arose an immense giant, Ymir, and from the melting ice came forth the cow Audhumla, who produced Buri by licking the rimy rocks of Niflheimr. From Buri sprang the Æsir (q. v.) or good gods, Odin, Vili, and Ve, who slew Ymir and all his race but two. These were cast down to Utgard, and became the first parents of the evil race of the Jotuns or frost-giants. With Ymir's body Odin built the world, of his blood he made the ocean, of his flesh the earth, of his bones the mountains, of his hair the forests. His skull was raised aloft to be the firmament of heaven, in which were fixed the sun, moon, and stars, formed from the fires of Muspellheimr. Odin the *Allfödr* now created the first two human beings, Askr and Embla, giving them a mortal body and an immortal soul, and placing them in Midgard, made of the eyebrows of Ymir; while he with the other Æsir ascended to Asgard, to live in the glorious palace of Valhalla. The whole universe rested on the sacred ash tree Ygdrasil, at whose root sat the three Nornir or goddesses of fate, Urd ('what has passed'), Verdandi ('what is being born'), and Skuld ('what is to come'). While Odin was the All-father, he was also the God of Battle (*Valföðr*), requiring bloody sacrifices. The brave who fell on the battle-field were led by the Valkyrjur (q. v.) to Asgard, there to fight every day from dawn till meal-time, and after that to ride back to Valhalla, and sit down to drink. Those who died of disease or old age went to the abode of Hel (q. v.), but murderers and perjured men were consigned to Ná, a hell horrible with wattled adders, from whose heads poured streams of venom, in which these should for ever wade. After Odin, the chief Æsir were Frigga, his wife, who knew, but kept secret, all fate; Thor (q. v.), the Thunderer, his first-born son; Balder (q. v.), the Beautiful; Freyr (q. v.), Freya (q. v.), Bragi (q. v.), Tyr (q. v.), Heimdall, and Ægir, the god of the sea. The fair-faced Jotun Loki (q. v.), whom Odin had spared, grows up and renews the old quarrel between the Æsir and the frost-giants, or powers of evil. The latter cannot prevail while Balder lives, but Loki effects his death by treachery, and falls before the vengeance of Odin. Yet the foul deed has doomed the Æsir; and at length three winters with no summer in heaven bring on 'the twilight of the gods.' Sun, moon, and stars vanish, the heavens are riven, earth quakes, and Fenrir, wolf of ruin, rushes loose. Surtr, the primeval god, comes forth in flames, and battle stands on the plain of Vigridr. Freyr falls before Surtr, Thor slays the snake of Midgard, but dies of its venom, and Odin is devoured by Fenrir. All the Æsir fall, the fire of Surtr consumes the universe, and Ragnarök is complete. But at last there shall rise from the sea a new earth, ever green and fair, and the Æsir shall awake to new life and gather all the worthy dead to dwell with them for ever in the hall of Gimli, roofed with gold and fairer than the sun. N. M. bears the stamp of the scenery and the race among which it arose. The stern northern climate with its 'melancholy skies,' the short day and summer, the long night and winter, the Viking life, and death expected every moment on the shore or the ship's deck, were fit conditions for its fostering. Battle is its central idea; the gods are essentially war gods; the warrior's life is extended to Valhalla. It could not have the rich colour of the Greek mythology conceived under a milder and brighter heaven. This

breathes joy in life, that contempt of death; the gods fall in Ragnarök. The Greek could wish for no better world than that he had; the Northman, dissatisfied with the present, figured to himself a better and more glorious, into which he and his gods should be born again. Greek mythology is beautiful in detail. N. M. unfolds itself as a drama, full of action, with the most impressive catastrophe. See Grundtvig, *Nordens Mythologi* (Copenh. 1808 and 1832); Jakob Grimm, *Deutsche Mythologie* (2d ed. Gött. 1843–46); A. Munch, *Normændenes Gudelære i Hedenold* (Christiania, 1847); Keyser, *Normændenes Religionsforfatning i Hededommen* (*ib.*, 1847); Petersen, *Nordisk Mythologi* (Copenh. 1849); Thorpe, *N. M.* (Lond. 1851); Mannhardt, *Die Götterwelt der Deutschen und Nordischen Völker* (vol. i. 1860).

North'men, or **Norse'men**, in the Middle Ages, the general European name for the people of Denmark, Norway, and Sweden. Closely akin to the Jutes and Angles, they were a distinct branch of the Teutonic family of the Aryan race. Their early history is traced but dimly in the *Eddas* (q. v.), which describe society as divided into two classes—(1) the *unfree*, and (2) the *odal proprietors*, who had gained individual possession of the lands formerly held by 'village communities' on the 'Mark' system. Feudal aristocracy there was none; the 'things,' or village assemblies, administered the laws enacted at the greater 'things' of tribal states, and over these were constitutional kings, usually elected. The punishment of crime, left to the individual or to his kith and kin, was either by combat or fine assessed by the State. For the religion of the N. see NORTHERN MYTHOLOGY. About 800 A.D. a social convulsion took place, through the great chiefs seizing the lands of the lesser, and Europe suffered for the first time from the piratical inroads of the dreaded 'Vikings' (*vic*, 'a bay'). Before Harald Haarfager (q. v.) in Norway and Gorm the Old in Denmark forced under their strong rule the petty princes of those lands, promiscuous piracy was an honourable pursuit, but the new organisation, which enraged the chieftains by the transfer of their fines and taxes to the royal coffers, compelled the Vikings to confine their marauding expeditions to foreign shores. A general exodus of the N. began, and plundering incursions were succeeded by permanent settlements. In England the inroads, beginning in 787, assume this second phase about 855. Northumbria, Mercia, and part of East Anglia were seized by the Danes, and Ælfred was glad to gain respite for Wessex by the peace of Wedmore in 878. They embraced Christianity, and in another c. had become fused in the common mass of Englishmen under Eadgar the Peaceful (958), leaving traces in the names of many places, and in the local peculiarities of the *Danelagu* ('land of Dane law'). For the later conquest by the Danes, see ENGLAND. Orkney (q. v.) and Shetland, early a resort of the Vikings, from 875 to 1355 owned allegiance to the Norwegian kings. The latter part of the 8th c. saw the half-decked galleys of the N. among the western isles of Scotland. Keltic legends call them *Fingall* ('the white strangers'), from their complexion, and *Dugall* ('the black strangers'), from the iron mail of their leaders. Intermarriage produced a race called the 'Gall-Gael,' who joined the N. in their plunderings, and sacked Iona in 795. Before 900 a naval empire had been formed, comprising Argyllshire, Man, Anglesea, and the E. coast of Ireland, and held by rulers called the *Hy-Ivar* ('grandsons of Ivar'), who lived now in Dublin, now in Man. At the battles of Tara (980) and Clontarf (1014), the Irish at length broke the power of these *Ostmen* ('Eastmen') as they were called. After the defeat of Magnus of Norway in 1098, the Isles were divided into two parts, the 'Suderies' and the 'Norderies' (whence the name 'Sodor' in the phrase 'Sodor and Man'), S. and N. of Ardnamurchan Point. Argyll and the Isles appear in the 12th c. under a chief named Somarled, and in the 13th, after the battle of Largs (1263), were ceded to Scotland (1266). The N. colonised the Faröe Isles and Iceland (q. v.), and from thence Greenland (q. v.). Rurik, a Swede, called in 862 to settle the disputes of the Slavonic tribes, founded in Russia (q. v.) an empire ruled by his descendants till 1598. From the beginning of the 10th c. the Emperors of the East had a bodyguard of N. known as the Varangians (q. v.). In the weakness of the later Karolings, the N. became the scourge of North-West Germany and Northern France, and from 843 to 860 bands of rovers harassed even the coasts of Spain, S. France, and part of Italy. 'Take the map,' says Sir F. Palgrave, 'and mark with crossed swords the battles fought by the pirates, or where they pillaged, burned, or destroyed; and the valleys and banks of the Elbe, Rhine and Moselle, Scheldt, Meuse, Somme and Seine, Loire, Garonne, and Adour, and all the coasts and coast-lands between estuary and estuary, all the countries between river and streams will appear bristling as with *chevaux de frise*.' Their numerous settlements soon became merged in the people around them. That of Rolf at Rouen alone survived, and became the nucleus of the Dukedom of Normandy (q. v.). It is characteristic of the N. as a race that on adopting Christianity in their new homes they speedily lost their individuality. Yet their old character remained, and the strength of the North, impregnating the culture of the South, produced the chivalrous spirit that is the glory of the Middle Ages, and the enthusiasm for Holy Church, whose offspring was the Crusades. See Depping, *Histoire des Expeditions Maritimes des Normands* (2 vols. Par. 1826); Palgrave, *History of Normandy and England* (2 vols. Lond. 1832); Strinnholm, *Vikingetåge der Alten Skandinavier, aus dem Schwedischen von Frisch* (Hamb. 1839); Worsaae, *Normændene i England, Skotland og Irland* (Eng. transl. 1852); Ferguson, *The N. in Cumberland and Westmoreland* (Lond. 1856); G. W. Dasent, *The N. in Iceland* (in Oxford Essays for 1858); Johnson, *The Normans in Europe* (1877); and *A Collection of Sagas and other Historical Documents Relating to the Settlements and Descents of the N. on the British Isles*, edited for the series of *Chronicles and Memorials*, by Sir George W. Dasent and Gudbrand Vigfusson (in the press, 1877).

North Sea, or **German Ocean** (anc. *Mare Germanicum*), the part of the Atlantic that separates the British Islands from the continent of Europe. It is 700 miles in length from the Straits of Dover to the Shetland Isles, and 420 in greatest breadth from E. to W., covering an area of some 140,000 sq. miles. Its depth, which on an average is 31 fathoms, increases from S. to N., varying from 9 to 500 feet. By the Skagerrack and its extensions it communicates with the Baltic Sea. From the Continent it receives the waters of the Elbe, Weser, Rhine, and Scheldt, and from Great Britain those of the Thames, Ouse, Humber, Tees, Tyne, Tweed, Forth, Tay, Dee, and Spey. The bed of the sea is traversed by several extensive shoals, of which the chief, the Dogger Bank (q. v.), occupies the centre from lat. 54° 10′ to 57° 24′ N., and long. 1° to 6° 7′ E. The shores of Scandinavia and the N. of Scotland only are bold and rocky. Heligoland is the sole island which properly belongs to the N. S., the islands that fringe the shores of Norway, Denmark, and Holland being rather fragments of the crumbling coast-line. The fisheries of cod, mackerel, herring, &c., are very valuable. Though fraught with the dangers of fog, current, sandbank, and shelving coast, the N. S. is one of the most crowded of all ocean highways. It has been to the hardy northern nations the cradle of seacraft, as was the Mediterranean to the ancients.

Northum'berland, a county in the extreme N. of England, bounded N. by the Tweed, E. by the North Sea, S. by Durham, and W. by Cumberland, has an area of 1,290,312 statute acres, and a pop. (1871) of 386,646. The surface is rugged, rising gradually from the coast towards the Cheviot Hills on the Scotch Border; the hill slopes in the centre of the county being clothed with green turf, but those on the Borders with moss and heather. Along the coast lie the Fern, Coquet, and Holy Islands. The most prominent geological feature of N. is the immense coal formation, in some places 1600 feet thick, yielding 20,000,000 tons a year, which runs northward from the Tyne to the river Aln, and of which Newcastle is the centre. The rest of the county is mainly composed of various kinds of sandstone, except the Cheviots, which consist chiefly of porphyry, trap, and limestone. In the E. the soil is a clayey or gravelly loam, in the centre and S.E. the loam rests on a clay subsoil, while towards the Scotch Border there are about 450,000 acres of peat and moorland. The chief rivers are the Tweed, Aln, Coquet, Wansbeck, and Tyne. In 1876 there were 122,000 acres under corn crops, 60,936 under green crops, 95,256 under clover, sanfoin, and grasses in rotation, and 386,797 in permanent pasture; also 18,459 horses, 93,348 cattle, 902,616 sheep, and 13,688 pigs. Cheviot sheep and short-horned Durham cattle are extensively bred; and at Chillingham Castle, near Morpeth, are wild cattle, cream coloured with black muzzles. Coal and lead are the chief mineral products. The first coal-pit was worked at Newcastle in 1240. Along the Tyne there

are glass, iron, lead, and chemical works; manufactories of gloves at Hexham, potteries, brickfields, &c. The principal towns are Newcastle, the capital, Tynemouth, N. Shields, Morpeth, and Alnwick. N. is traversed by the North-Eastern, the Newcastle and Carlisle, and the Border Counties Railways. It returns four members to Parliament. Agricola was the first Roman general who penetrated as far north as N. In 80 A.D. he constructed a line of 18 forts, stretching from the Solway Firth to the mouth of the Tyne. Besides the wall and paved way connecting these forts, two Roman roads, the Maiden Way and Watling Street, traversed N., the former passing from Alstone to Cærvoran, the latter entering the county at Elchester, and leading over the Cheviots into Scotland. The first English settlement was made in 547 by Ida, who founded the kingdom of the *Northankymbre* ('the men north of the Humber'); but this included far more than the present N. (See NORTHUMBRIA.) Many battles have been fought in N., including the two before Alnwick in 1093 (when Malcolm Canmore was slain) and 1174 (when William the Lion was taken prisoner), that of Otterburn in 1388 (in which 'a dead Douglas victory won'), and that of Flodden, where the Earl of Surrey defeated and slew James IV. in 1513. N. has many antiquities, among which are ancient British remains at Ilderton and near Wooler; also numerous traces of Roman camps and ruins of Border castles.

Northumberland, John Dudley, Duke of, born in 1502, was the son of Henry VII.'s infamous minister, Edmund Dudley (beheaded 1510). Restored in blood (1511), and introduced at court (1523), he was knighted for gallantry in Brandon's French expedition (1522), attended Wolsey on his Paris embassy (1528), and next attached himself to Cromwell. Henry VIII. created him Viscount Lisle (1542), a knight of the garter, and lord high admiral for life, and appointed him by his will a member of the Council of Regency. Earl of Warwick (1547) and chamberlain of England, Dudley distinguished himself at Pinkie, suppressed Kett's rebellion with ruthless severity (1549), and, having wrought the fall of his rival Seymour (q. v.), became earl-marshal, lord-warden of the Northern marches, and Duke of Northumberland (1551), while carrying on the Protestant reign of terror with increased vigour. Edward's waning health suggested the 'plan' of alienating the succession to Lady Jane Grey (q. v.), who married N.'s fourth son two months before the king's death. After proclaiming her in London, N. marched against Mary's Suffolk forces. But his army melted away, and at Cambridge he too threw up his cap for Queen Mary, and the next day was arrested and brought to London. He died on the scaffold, August 22, 1553, after a shameful apostasy from the faith for which he had plunged England in bloodshed. See Froude's *History of England* (vols. v. and vi.).

Northumberland, Earls of. See PERCY.

Northum'bria, one of the Old English kingdoms, was founded in 547 A.D. by Ida the Angle. It extended from the Humber to the Forth, and from the North Sea inland to the eastern offsets of the Pennine Range. Its western limit in the country now called Scotland is more uncertain, but would probably be fairly represented by a line drawn from the Liddel through Selkirk or Peebles to the neighbourhood of Stirling. N. was sometimes divided into two kingdoms—*Deira* in the south, corresponding to the modern Yorkshire and Durham; and *Bernicia*, embracing the whole S.E. of Scotland and the modern Northumberland. In the reign of Eadwine (Edwin), who ascended the throne in 617, N. was converted to Christianity; and under him and his successors, it held the foremost place among the English states. It was the seat of the earliest English literature. Here Cædmon (q. v.) in the 7th century composed his sacred paraphrases; and here Bede (q. v.) in the 8th began the still unfinished work of translating the Scriptures into English. But for the destructive ravages of the Danes, who pillaged and burnt its monasteries, N. might perhaps have maintained its intellectual supremacy, and its dialect have become the classic tongue of the whole nation, instead of sinking into a rude though racy patois. Only in the poetry of the Scottish Lowlands—in Dunbar and Lyndsay and Burns—has the speech of Cædmon displayed in later times its ancient dignity and power. See Freeman's *Norman Conquest* (vol. i.).

North-Western Provinces, The, a part of British India, under a lieutenant-governor, and occupying roughly the ancient kingdom of Hindustan proper. It extends in a semi-circular strip from the mountains of Kumaon in the N.W. in a S.E. direction, including the Doab or tract between the Ganges and Jumna rivers, and then turns again N. to meet the *terai* of Nepaul at its S.E. limit, entirely surrounding on all sides but the N. the province of Oude. (Since the beginning of 1877 Oude has been placed under the lieutenant-governor of the N. W. P.) On the W. it is bounded by the Punjaub, S. by the native states of Central India, and E. by the Behar province of Bengal. The seat of government is at Allahabad (q. v.). Total area, 81,403 sq. miles; pop. (1872) 30,781,204. There are also in political connection certain feudatory states, of which the principal are Rampur and Tehri Gurhwal, with an additional area of 6311 sq. miles and a pop. of 1,091,810. In Kumaon there are peaks of the Himalayas reaching an elevation—*e.g.*, Nundi Debi—of 25,000 feet; and in the S. the land rises towards the central Vindhyan range. The rest is almost unbroken plain. The rivers are the Ganges and its tributaries—the Jumna, Ramgunga, Gumti, and Gogra. Except in the submontane *terai*, and the over-irrigated and malarious districts of Seharunpore and Muzufernuggur, the climate is healthy; the rainfall varies from 30 to 45 inches. The prevailing diseases are fever, bowel complaints, smallpox, and cholera. The staple crops are wheat, barley, rice, Indian-corn, and the millets *jowar* and *bajra*; oilseeds, cotton, sugar-cane, opium, tobacco, indigo, safflower, and potatoes are also largely cultivated. The mhowa and mango trees contribute to the food supply. In the districts of Kumaon and Dehra Dun, about 3000 acres are planted with tea, producing in 1875 about 1½ million lbs., mostly of the green sort, for the markets of Central Asia. The total cultivated area is 42,173 sq. miles, or 52 per cent. of the whole. The settlement of land revenue is a temporary one, fixed for a term of 30 years, and made, after measurement, with the owners of the several villages, whether they are the cultivators themselves or landlords. The rate of assessment is 3s. 6d. per acre. Irrigation is carried on from the rivers, wells, and the numerous large *jheels* and marshes. The chief Government works are the Ganges and E. Jumna Canals. Up to 1875, a total of £4,535,000 had been spent, and 1,142,000 acres were irrigated; the net returns were £227,000, or 6¼ per cent. on capital. There are good central communications, both by road, river, and railway. The East Indian Railway runs through from Ghazepur to Delhi, connecting at Allahabad with the Great Indian Peninsula line, at Ghazedabad with the Punjaub line, and at Agra with the new Rajputana line—all on the S. There are also three junctions on the N. with the Oude and Rohilcund Railway. The trade is confined to the export of agricultural produce, principally grain, and of lac dye and saltpetre; in exchange are imported metals, piece-goods, salt, spices, and European wares. In 1876–77 the exports to Bengal were valued at £5,034,000, chiefly sugar, indigo, wheat, oil-seeds, and raw cotton; the imports at £3,180,000, including piece-goods to the value of 2½ millions sterling. The only important manufactures are those of leather at Cawnpore, and kincobs, shawls, and gold embroidery at Benares. Weaving and pottery and the making of brass utensils are carried on everywhere. The towns of over 50,000 inhabitants, each with a considerable trade, are Benares, Agra, Allahabad, Cawnpore, Bareilly, Meerut, Furruckabad, Shahjehanpore, Mirzapore, Moradabad, Muttra, Allyghur, Goruckpore. Benares is the religious and educational, Cawnpore the commercial and military centre; while Agra was the political capital, both under some of the Mogul emperors and in the early days of British rule. Of the total population, the Hindus form as much as 86 per cent., and the Mohammedans only 13 per cent., being most numerous in the Divisions of Rohilcund and Meerut. Of the Hindus, 3,234,000 are Brahmins and 2,395,000 are Rajputs. The average density of the population is 378 per square mile. The condition of the poor is not favourable. Wages have hardly advanced since the beginning of this century. They are usually paid in kind, consisting of about 40 ounces daily of *behjur*, a compound of barley and peas. Salt is a luxury to be tasted only two or three times a week. Many live wholly on *khesaree*, a most unwholesome variety of pulse. The languages spoken are Hindi and Hindustani.

The N. W. Provinces are divided into 7 Divisions and 35 Districts. Two of these Divisions, Kumaon and Jhansi, are 'Non-Regulation.' In 1874–75 the revenue was £5,602,000, of which £4,259,000 came from the land; the local expenditure was

£2,007,000. The police force numbered 25,690 officers and men, maintained at a cost of £321,000. There were altogether 10,265 educational institutions, attended by 261,682 pupils, at a cost of £189,000. There are four Government colleges, of which that at Benares, founded in 1792, is attended by 600 pupils, of whom 280 are in the Sanskrit Department. The European troops in garrison are usually about 6000 strong, chiefly stationed at Agra, Cawnpore, Allahabad, Bareilly, and Meerut; the native sepoys number as many more.

The early history of the N. W. Provinces is that of Hindustan proper. In 1775 the S.E. portion was acquired by the British from the Nawaub Vizier of Oude. In 1801 a further tract was ceded by him; and in 1803 the conquests of Lord Lake extended the frontier as far as Delhi. The hill districts were taken from the Nepaulese in 1815, and the S. Division of Jhansi has been acquired by lapse or forfeiture since 1840. In 1833 the N.W.P. were erected into an independent presidency, called Agra, having previously been known as the Ceded and Conquered Provinces. Sir C. (Lord) Metcalfe was the first governor; but in 1835 the title was changed to that of lieutenant-governor, and the province was subordinated to the Governor-General of India. The revenue and education system was mainly founded by Mr. Thomason, lieutenant-governor from 1843 to 1853. There have been two severe famines—in 1837–38 and again in 1860–61. This tract formed the centre of the Sepoy Mutiny of 1857. The first outbreak was at Meerut; Cawnpore and Jhansi were the scenes of the cruellest massacres; and the native pop., chiefly in Rohilcund and Bundelcund, sided generally with the rebels. But Allahabad was firmly held, as also was Agra, though closely besieged; and, after the capture of Delhi, the British civil administration, after many months of dispossession, gradually reasserted itself throughout the country. As the result, the Central Provinces were formed into a separate government, partly out of the S. districts; Delhi with the surrounding country was permanently attached to the Punjaub; and Allahabad was substituted for Agra as the seat of government, as having the more important military and commercial position. See *Annual Blue Books on the Moral and Material Progress of India* (Lond.); *Annual Reports on the Administration of the North-Western Provinces* (Allahabad); Sir J. W. Kaye's *History of the Sepoy War* (2 vols. 1865–70).

Nor'ton, Andrews, an American theologian, was born at Hingham, Massachusetts, December 31, 1786, graduated at Harvard, where he became librarian and lecturer on Biblical Criticism in 1813, and was appointed Dexter Professor of Sacred Literature in 1819. His connection with Harvard terminated in 1830 on account of feeble health. N. died at Newport, Rhode Island, September 18, 1853. He published a *Statement of Reasons for not Believing in the Doctrines of Trinitarianism* (1837, new edition, with Memoir by Dr. Newell, 1856); *The Genuineness of the Gospels* (4 vols. 1837, &c., abridged edition 1867); *Translation of the Gospels* (posthumous, 1855). An opponent alike of John Calvin and Theodore Parker, his position has been thus happily defined, 'N. was radical as a critic and interpreter, and conservative as an expositor of Christian doctrine.'

Norton, The Hon. Caroline Elizabeth (Lady Stirling-Maxwell), daughter of Mr. Thomas Sheridan, and granddaughter of the brilliant author of the *School for Scandal*, was born about 1808. She married the Hon. G. C. Norton in 1827, but the union proving unfortunate, a separation took place in 1836. Mr. Norton died in February 1875. A few months before her death, which took place 15th June 1877, she married Sir William Stirling-Maxwell, Bart., M.P. Her vivid, eloquent, musical genius, in which tones of tender and loving sadness predominated, found expression in the *Sorrows of Rosalie* (1829), *The Undying One* (1831), *The Dream* (1840), *The Child of the Island* (1845), *Aunt Carry's Ballads* (1847), *The Lady of La Garaye* (1862). Her letter to the Queen on Lord Cranworth's Marriage and Divorce Bill (1858) was an impassioned exposition of the social anomalies of women. She also contributed largely to periodical literature, and was author of the following fine novels:—*Stuart of Dunleath* (1851), *Lost and Saved* (1863), and *Old Sir Douglas* (1867).

Norton, Thomas, was born at Sharpenhoe, Bedfordshire, 1532. In his youth he served the Protector Somerset, and in 1555 he entered the Inner Temple as a student. In 1561 he published a translation of Calvin's *Institutes*, which speedily went through five editions. In the same year he joined Sackville in the production of the first English tragedy, *Gorbodue*, first called *Ferrex and Porrex*, writing the first three acts. He also translated twenty-seven of the Psalms in the Sternhold and Hopkins version, and wrote some controversial tracts. N. died about 1584.

Nor'walk, a town of Connecticut, U.S., on Long Island Sound, 42 miles N.E. of New York by rail. Its harbour is good, and its iron-works and lock-works are among the most extensive in the country. It has an active oyster-trade, and supplies New York plentifully with winter flowers. It is besides a convenient summer abode for city merchants. Pop. (1870) 12,119.

Nor'way (Norw. and Dan. *Norge*, Swed. *Norrige*, 'north kingdom'), a kingdom of Northern Europe, occupying the W. part of the Scandinavian peninsula, is bounded N. by the Arctic Ocean, W. by the Arctic and Atlantic Oceans and the North Sea, S. by the Skagerak, and E. by Sweden and Russia. It is a long and comparatively narrow coast-land, its length in a straight line from Lindesnæs to Nordcap (q. v.) being 1100 miles, while its greatest breadth is 275 and its least 25 miles. In the following table are given the area and population of the twenty *amter*, or counties, into which N. is divided, according to the last census (31st December 1875):—

Amter.	Area in Eng. sq. miles.	Pop. in 1875.
Smaalenene	1,548	107,872
Akershus	1,986	116,117
Christiania (town)	2	76,327
Hedemarken	10,034	120,651
Christian	9,670	115,803
Buskerud	5,659	102,155
Jarlsberg and Laurvik	861	87,494
Bratsberg	5,707	83,186
Nedenæs	3,855	73,571
Lister and Mandal	2,423	75,110
Stavanger	3,421	111,017
Söndre Bergenhus	5,854	119,313
Bergen (town)	1	33,885
Nordre Bergenhus	7,045	86,205
Romsdal	5,650	117,234
Söndre Throndhjem	7,084	116,841
Nordre Throndhjem	8,794	82,493
Nordland	14,660	104,195
Tromsö	9,720	54,015
Finmark	28,306	24,071
Total	122,280	1,807,555

There is another division into six *stifter* ('dioceses'). N. is thus the most thinly peopled country of Europe, having only sixteen inhabitants to the square mile.

Natural Features.—Generally speaking, Norway is a part of the great Scandinavian Plateau, which not only includes the Scandinavian peninsula, but also the two adjacent peninsulas of Lapland and Finland. This extensive region is bounded on the E. by the White Sea, the great lakes of Onega and Ladoga, and the Gulf of Finland, and is everywhere furrowed in the interior with valleys, lakes, and streams, while on the coast it is split up by numberless branching *fjorde* ('firths'), through which the sea penetrates far inland, often to the very spurs of *fjelde* ('fells'). The chief inlets are Christiania Fjord, on the S. coast; Flekke, Bukke, Hardanger, Sogne, and Indvig Fjords, on the W.; Molde, Throndhjem, Folden, Ranen, Salten, Vest, Kyenanger, and Alten Fjords on the N.W., and on the N., Porsanger, Laxe, Tana, and Varanger Fjords. But as these clefts occupy only a minor portion of the surface, N. may be represented as a mass of rock-terraces and inclined planes placed at various heights above the sea. Geographers have divided this mass into three great sections:—Kjoien, Dovre, and Langfjeldene. The first includes all the N., has summits reaching 6000 ft. high, and comes as far S. as Röraas, where it is broken by a wide valley running from W. to E., 2000 feet above the sea. Westward from the Röraas district to the river Rauma stretches the Dovre Fjeld, a plateau 192 miles in extent, from which rise numerous peaks, the highest being Snehætta, 7333 feet. S. of the Rauma extend Langfjeldene ('the long fells'). Among these, between Valders, Sogn, and Gudbrandsdal, is the grandest region in N., called Jotunheimen ('the Jotuns' home') or Jotunfjelde, forming a plateau at an elevation of 4000 feet, from which rises

the loftiest summit in Scandinavia, Galdhöpiggen (8161 feet). Between Gudbrandsdal and Oesterdal is the Rundane range (highest peak 6730 feet), which, with the Romsdal Alps and the Tromsö Mountains, abounds in the sublimest mountain scenery. The numerous islands (*Skjærgaarden*, 'The Skerry land') surrounding the bold coasts of N. are larger and more rugged than those that skirt the shores of Sweden. Great tracts of N. are covered with perpetual snow and ice. The largest glacier in Europe is the Jostedalsbræ (590 sq. miles), in Sogn, Nordfjord, and Söndfjord, the lower edge of which is 4000–4500, and the upper 6495 feet above the sea. Its chief branches are the Boiumsbræ, the Suphellebræ, and the Negaardsbræ, whose lower edge is 1060 feet above the sea level. Beside the Hardanger Fjord lies the great Folgefon glacier (108 sq. miles), whose ridge is 5276 feet above the sea; and from Ranen Fjord up to Beier Fjord within the Arctic Circle stretches (42 miles) the great *névé* of Svartisen (440 sq. miles).

Hydrography.—The chief rivers ('Elve') in the S. of N. are the Glommen (302 miles), the largest stream in Scandinavia, whose tributaries are the Renelv and Vormen (the outlet of Mjösen); the Dramselv (163), with its affluents the Randselv, Bægna (85), and Hallingelv (112); the Skienselv (126); the Nisserelv (112); and Otteren (140), all in South N., and falling into the Skagerak; and in the North the Altenelv (98); Tanaelv (115), formed from the Anarjokka (63), and the Karasjokka (56); and the Pasvikelv (77), discharging Lake Enare. The two last partly separate N. from Russia. N. abounds in long, narrow lakes, which are mostly expansions of rivers. The largest are Mjösen (196 sq. miles), Rösvandet (110), Fæmundsjö, Randsfjord, and Tyrifjord.

Climate.—The entire W. coast of N. enjoys a temperature milder by 36° F. than any other country in the same latitude. A vast chain of banks occupies the space between the shore and the ocean bed, and over this, which presents an impassable barrier to the Polar Sea, flows the warm surface current of the Atlantic. During the greater part of the year the surface of the sea is warmer than the atmosphere. Finmark and the interior of South N. are, however, subject to great extremes of temperature, the difference of which is 45°–54° F. The prevailing winds are in winter land winds blowing from S. to N. or straight out of the fjords, and in summer sea winds from N. to S. The annual rainfall at Christiania averages 21, on Dovre 13, at Bergen 71, and at Lofoten 63 inches. On the island of Seiland in Finmark (70° 30′ N. lat.) the snow-line is 2880, in the Alpine region of the Dovrefjeld (62° 20′), 5200, and on the northern ridges of Jotunheimen 4610 feet high.

Geology and Mineralogy.—In South N. the 'bottom rock' lies exposed in wide tracts of Thelemarken, Hallingdal, Romsdal, and part of Bergen Stift, and next to this comes the great sparagmite formation, containing fossils, and interspersed with large masses of fragmentary rocks. Between Langesund Fjord and Mjösen are fine formations of Silurian, rich in fossils, above which is here and there sandstone, and last of all coarse conglomerate. In the North are remarkable systems of strata, chiefly known as yet by local names. These are the 'Gaisa System,' in the great mountain peaks ('Gaiser'), and the 'Raipas System,' in Finmark; and in Throndhjem, conglomerate, sandstone, 'Throndhjem schist,' and the more recent 'Gula' schists. In central N., round Jotunheimen, are argillaceous slates and the quartz group of the Alpine region. Mezozoic formations are represented by a deposit of Oxford clay, with Jura fossils, on the island of Andö. The minerals, the same though not so plentiful as those of Sweden, are silver, copper, nickel, iron, lead, and zinc.

Botany and Zoology.—The fauna and flora of N. display great richness and variety. The forest growth consists mainly of pine and fir, which most abound in the valleys of South N., where the extreme limit of the fir is 2200–3000 feet above the sea. In Throndhjem Stift it reaches 1600 to 2000 feet, but near the Alten Fjord it is not higher than 700 feet. Above the conifers extends a belt of birch (very narrow in the S.), and above this are found the dwarf-birch (*Betula nana*) and several species of willows. Between these and the snow-line are lichens. Yet the *Salix herbacea* or *polaris* is sometimes found up to the very edge of the *névé*, as also the snow ranunculus, Alpine heather, and other mountain plants. The Dovre is justly celebrated as containing within a narrow limit the greatest variety of Alpine flora. In the less elevated districts of N. grow the black and white alder, the aspen, mountain-ash, bird-cherry, ash, elm, lime, oak, and beech trees. The oak is abundant in the S.E. The forests of N. (24,500 sq. miles) shelter the largest European carnivora, the lynx, bear, and wolf. About 150 bears and 120 lynxes are killed annually. The elk is found in the interior, and on wooded islands and promontories the red deer, especially on the island of Hitteren, opposite Throndhjem Fjord. The desolate fells are the home of the glutton and the reindeer, the lemming and the polar fox. Hares are found everywhere, even up to the snow-line. Capercailzie, black-cock, hazel-grouse, and other feathered game abound in the forests. Ptarmigan ('rype') are most plentiful in the birch woods. In the marshy parts of the fells are the breeding grounds of many kinds of fen-fowl, of which the lapwing (*Charadrius apricarius*) and dottrel plover (*Charadrius morinellus*) are most numerous. The double snipe and the teal are abundant in the willow zone, and in the mountain tarns are found the black-banded loon, the *Fuligula marila*, *Fuligula clangula*, and other divers. Every species of seafowl occurring in Northern Europe is found along the coasts. The eider-duck is carefully preserved for its eggs and feathers all the year round N. of the Throndhjem Fjord, and on the so-called *Fuglebjerge* ('bird-mountains') the capture of the *Mormon fratercula* is the sole occupation of the inhabitants. See Barth, *Erfaringer paa Jagten paa det mindre Vildt i Norge* (1874). Of freshwater fish the Salmonidæ are the most important. In the deep lakes trout and red char are caught, and in the rivers, sea and mountain trout. After grayling and char, the perch, pike, bream, and eel, are most abundant. The Greenland shark is caught off the Finmark coast at 150–200 fathoms. But most important to N. are the great cod and herring fisheries (the former valued in 1871 at £640,000, the latter at £420,000), which are a main source of national wealth.

Agriculture, Industry, and Trade.—In 1870 there were 149,013 registered farms in N., and the total value of landed property was estimated at £33,000,000. Not more than 980 sq. miles of land are under the plough, while the pasturage is estimated at 3430 sq. miles. Oats, barley, and potatoes are the chief crops, but much butter and meat, and about 1,000,000 qrs. of corn are annually imported. The annual value of the farm produce is computed at £4,500,000. The other principal industries are mining, timber-dressing, shipbuilding, brewing, and the manufacture of machinery, cottons, ropes, glass, paper, tobacco, leather, and lucifer-matches. In 1875 the total imports of N. amounted to £9,951,356, and the total exports to £5,821,538. The trade is chiefly with Great Britain, Germany, Denmark, Russia, Sweden, and France. The imports from the United Kingdom in 1876 amounted to £2,681,782, and consisted chiefly of iron, coal, cottons, woollens, and provisions; while the exports to the United Kingdom were valued at £1,994,587, and consisted chiefly of timber, ice, fish, and material for paper. At the end of 1875, the shipping belonging to N. numbered 7814 vessels, of 1,394,363 tons, manned by 60,281 sailors. In proportion to population N. has the largest commercial navy in the world. In 1875, 11,662 vessels of 1,788,565 tons entered the ports of N.; cleared, 11,884 of 1,806,298. The total number of ships that entered at ports in the United Kingdom from N. in the year 1876 was 4176, of 874,544 tons (Norwegian, 3040, of 642,462 tons); cleared to N., at ports in the United Kingdom, 3353, of 827,215 tons (Norwegian, 2694, of 629,800 tons).

Finance.—The budget for the year ending June 30, 1877, showed a revenue and expenditure of £2,177,700. At the end of 1876 there was a debt of £2,683,755, contracted for the construction of public works. The metric system of weights and measures is to be introduced in 1878.

Communication.—There were 366 miles of railway open for traffic at the end of 1876, the gross receipts from which in 1875 were £210,778. In 1876, N. had 4438 miles of telegraph lines. A well-regulated system of boat and posting communication is maintained throughout the country.

Army and Navy.—According to the laws of 1866 and 1876, the military force is divided into troops of the line (comprising five brigades of infantry, one of cavalry, and five battalions of artillery), the Landværn, or militia, and the Landstorm, or final levy. On the peace footing, the army comprises 12,000 men, with 750 officers. The navy comprises (1878) 32 steamers with 160 guns, besides 86 gunboats, mounting 142 guns.

Race, Religion, and Education.—The Norwegians proper belong to the Scandinavian branch of the Teutonic family. Besides

these, there were in N., in 1865, 7637 Finns (called in N. 'Quains'); 15,601 settled, and 1577 nomadic Lapps (called in N. 'Finns'); and 3870 persons of mixed descent. Lutheranism is the form of religion established by the Constitution, and this must be professed by all regular public officials; but toleration is extended to persons of all creeds, Jesuits excepted. In 1865 there were in N. 1,696,651 Lutherans, 3662 persons of different Protestant sects, 331 Roman Catholics, 25 Jews, 1038 Mormons, and 49 persons whose religion was unknown. Education is compulsory for all children between the ages of seven and fourteen. Schoolmasters, paid partly by local rates, partly by State grants, are either permanently settled, or reside periodically in every parish. Secondary schools are in almost all the towns, and thirteen of the chief have *lærde skoler*, or colleges, partly maintained by government grants. The University of Christiania has 400 students.

Constitution.—By the fundamental law of the state, passed November 4, 1814, N. is a 'free, indivisible, inalienable kingdom,' united to Sweden under one sovereign. The United Kingdoms in their foreign relations are to be regarded as one state, but in all else are independent sovereignties, with two distinct forms of government. The executive is vested in the sovereign, but legislation and the power to tax belongs to the Parliament or 'Storthing.' This consists of 111 members, chosen indirectly by popular election, who appoint one-fourth of their number to constitute the Upper House ('Odelsthing'), the rest forming the Lower House ('Lagthing'). A bill passed by the Lagthing and twice rejected by the Odelsthing may become law if supported by two-thirds of the entire Storthing; also the royal veto on bills is merely suspensive, not absolute.

History.—The early history of N. describes the country as divided among a great number of tribes, living at constant feud with one another. Those on the coast took early to the seafaring life, and gradually became famous abroad as 'Vikings' (*vic*, 'a bay'). In the latter part of the 9th c., Halfdan, subduing several of the neighbouring petty kings, formed a great kingdom in the S., and by the beginning of the 10th c. his son and successor, Harald Haarfager (q. v.), had conquered the whole country. Many discontented chieftains emigrated to become pirates, or found settlements in foreign lands, as Iceland, the Faröes, and the Orkney and Shetland Isles. (See NORTHMEN.) On Harald's death N. was divided among his sons, the eldest, Erik Blodöxe, being over-king. But the endeavours of the latter to set aside the existing privileges of the subject kings produced a reaction; these called to N. Harald's youngest son, Hakon the Good, who was being brought up at the English court, and gave him Erik's crown. Hakon fell (951) in battle against Erik's sons. His son, Hakon the Good, could only gain the power (960) by acknowledging the over-lordship of Harald Blue-Tooth, King of the Danes, but on the latter submitting to Otto I. of Germany N. became again free. Under Olaf Tryggvesön and Olaf the Saint (q. v.) Christianity was introduced. Olaf fell (1030) in battle with Cnut the Great of Denmark, who now made his son Swegen regent of N. Swegen was expelled in 1035 by Magnus, a son of Olaf the Saint, and from this time till 1319 N. was in the hands of native chieftains. With Hakon VII. the male line died out and the crown fell to his grandson, Erik Erikssen of Sweden. His successor, Oluf Hakonsön, whose mother, Margrete, was the only daughter of the Danish Valdemar III. Atterdag, inherited N. in 1380, and in 1397 Margrete (q. v.) joined the three kingdoms by the Union of Kalmar. Sweden broke loose in 1524, but N. remained under Danish rule till the Peace of Kiel, 14th January 1814, when it was given up to Sweden by Denmark. Delegates from the people, however, had (May 1814) chosen as king Christian VIII. (q. v.), the former regent, and not till the defeat of a Dano-Norwegian army and the Convention of Moss (14th August) did the crown pass to Karl XIII., who was proclaimed by the Storthing, after having sworn to the constitution that had been adopted by Christian. The attempts of this king and his successor Karl XIV. Johan to extend the royal prerogative led to manifold parliamentary contests, which did not cease till Oscar I. (1844–59) and Karl XV. (1859–72) accepted the full constitutional programme. The latter was succeeded (18th September 1872) by his brother Oscar II. (q. v.).

Language, Literature, and Art.—The long connection with Denmark has led to the Danish tongue being inflexibly fixed as the book-language of N.; yet every *parish* has its peculiar words and idioms. The speech is most like Danish in the extreme south, *b*, *g*, and *d* being there distinctly sounded, whereas in the S.E., as in Sweden, there is a preference for *p*, *t*, and *k*. In the S.W. the vocabulary is chiefly Old Norse, diphthongs predominating, and in the N. the final vowels are frequently dropped, as in English and Scotch.—The *literature* of N. is scarcely distinguishable from that of Denmark till 1814, but since that date it has vigorously asserted its independence. The University of Christiania, established in 1811, was opened in 1813. Of her first trio of writers, K. N. Schwach (1793–1860), H. A. Bjerregaard (1792–1842), and M. K. Hansen, the latter alone exerted any great influence. But erelong the great literary contest between Wergeland (q. v.), the champion of imaginative freedom and revolutionary force, and Welhaven (q. v.), of harmony, beauty, and social order, enlisted every gifted pen in N. for one or other, as pointing out the true goal of national culture. Alongside of these, Rudolf Keyser (1803–64) and P. A. Munch (1810–63) founded the 'modern school of Norwegian history.' Science and literature took firm root, and rich stores of folklore were opened up by Asbjörnsen, Moe, Faye, Landstad, and Bugge. The chief names of the new and more realistic era of Norwegian literature are Björnson (q. v.) and Ibsen (q. v.), with their imitators Jonas Lie (born 1833) and Magdalene Thoresen (born 1819), and after these Andreas Munch (born 1811), a lyrical and dramatic poet, Jörgen Moe (born 1813), P. A. Jensen (1812–67), Theodore Kjerulf (born 1825), Fru Collett, and Fru Colban. Henrik Krohn, Christopher Janson, and O. A. Vinje (1818–71), with the philologist Ivar Aasen (born 1813), have striven to give special prominence to what is strictly national in thought and language.—The first two Norwegian *artists* of note after 1814 were the painter Dahl and sculptor Michelsen. More recently N. has produced a number of sculptors, Brynjulf Bergslien, Borch, Budal, Fladager (d. 1870), Hansen (d. 1858), Glosimodt, and Middelthun. Adolf Tidemand and Hans Gude are the greatest living Norwegian painters. The former resides at Düsseldorf, the latter is professor at Karlsruhe. In N. itself the work of Eckersberg (1822–70) is continued by Morten Müller and Knud Bergslien. See Professor Munch, *Det Norske Folks Historie* (Christiania, 8 vols. 1851–63); Nielsen, *Ein praktisches Handbuch für Reisende* (Hamburg, 1874); Christian Tönsberg, *Norway, an Illustrated Handbook for Travellers* (Christiania and London, 1875).

Norway Hadd'ock. See BERGYLT.

Nor'wich, a city of England, capital of Norfolk, and a county of itself, is situated on the Wensum, just above its junction with the Yare, 113½ miles N.E. of London by rail, and 20 W. of Yarmouth. Styled from its trees and gardens 'the city in an orchard,' N., next to Oxford and Chester, is the most picturesque of all the English towns. Its 58 churches have dwindled to 34, besides the cathedral, 2 Roman Catholic churches, a synagogue, and numerous dissenting chapels. The cathedral, Norman in plan, was founded in 1094 and completed in 1510. It is 415 feet long by 200 wide, and has a spire of 309 feet, a nave, and beautiful cloisters. Of the churches, the chief are St. Peter Mancroft (1430, restored 1864), St Andrew's (restored 1867), St. Giles (with a tower of 120 feet), and St. Lawrence (1472). The Norman castle, built by Roger Bigod, on a hill in the heart of the city, is a massive quadrangular edifice, now used as the county jail. The shire hall stands in what was anciently the moat of the castle. Other buildings are the bishop's palace (1318), the 15th c. guildhall, St. Andrew's Hall (originally the church of the Black Friars, 1415), in which is held the triennial musical festival, the corn exchange (1861), museum (1858), Edward VI.'s Grammar School (1547), where Parker, Coke, and Nelson were educated, the theatre (1826), hospitals, &c. N. has been famed for its woollen manufactures since 1336, and *worsted* derives its name from a neighbouring village. At present (1877) silk and wool weaving employs some 3000 hands, and bootmaking 6000 more. There are also manufactures of crapes, sailcloth, paper, brushes, ropes, mustard, starch, blueing, &c., and iron foundries, farm implement works, breweries, tanneries, dyeworks, and malt-kilns. N. returns two members to Parliament. Pop. (1871) 80,386. N. is the modern representative of the British *Caer Gwent* and the Roman *Venta*. Under Edward the Confessor it had 25 churches and 1320 free burgesses. The E. Anglian bishopric was transferred hither from Thetford in 1094. In 1122 it became a great Flemish settlement, and in the reign of Elizabeth the bombazine manufacture was introduced by 4000 Walloon refugees. N. was the scene of the rebellion of John the Dyer

(1381), and of Kett, the Wymondham tanner (1549). See Bayne's *N., its Political, Religious, and Municipal History* (Nor. 1877).

Norwich, a city of Connecticut, U.S., at the head of the Thames river, 52 miles S.S.W. of Worcester by rail, has 23 churches, 10 banks, 2 daily and 2 weekly newspapers, and manufactures of firearms, bar-iron, printing presses, and machinery. Its woollen, cotton, and paper mills, supplied with water-power by the Yantic, Shetucket, and Quinebaug, are among the largest in the Union. Pop. (1870) 16,653.

Nor'wich or Mammaliferous Crag. See CRAG.

Nor'wood, Upper, Lower, and **South,** form a favourite suburban district a few miles south of London, in the county of Surrey. Prettily situated in an undulating and finely-wooded country, it is covered with mansions and villas, and has a wealthy population. There are 7 churches, and a number of schools. The Crystal Palace Station on the L., C. and D. Railway is in Upper N., St. Saviour's Almshouses and the South Metropolitan Cemetery at Lower N. The pop. of the five ecclesiastical divisions of All Saints, St. Paul's, St. Mark's, St. Luke's, and Christchurch amounted to 30,135 in 1871.

Nose and the Sense of Smell. The nostrils form the true respiratory or breathing apertures of the higher animals, and also subserve the sense of smell, this sense being exercised through respiration. In other words, odorous substances have to be sniffed or drawn into the nostrils before their odours can be appreciated. The nose is the prominent portion of the face, in which the nostrils open externally. In fishes the nostrils are closed or pocket-like sacs, and do not open backwards into the mouth—save in two cases, the *Lepidosirens* or Mud-fishes, and the *Myxine* or Hag-fish. In the other vertebrate groups the nostrils open backwards into the mouth; their hinder openings being named the *posterior nares*. The nose may be prolonged to form a proboscis as in the pigs, tapirs, and elephants. In the latter case the organ subserves prehension, is provided with numerous and complicated muscles, and with a finger-like process at its tip. It becomes also subservient in the elephant for the conveyance of fluids to the mouth. In some animals (*e.g.*, bats) the nostrils have peculiar leafy appendages attached to them; and in the mole a special bone or ossicle is developed in the snout. The nostril may open externally by a single aperture, as in the porpoise, and in this animal a complicated arrangement of sacs connected with the respiration of the animal is also found. The *nasal fossæ* or nasal cavities in man are two cavities of irregular shape in the middle line of the head, and which lie between the roof of the mouth and the base of the skull. In front they open outwardly by the anterior nares or nostrils, and backwards into the mouth by the hinder nostrils. The nasal cavities are broadest below, and each opens into or communicates with four *sinuses* or cavities existing in the frontal region of the skull, and in the sphenoid, maxillary, and ethmoid bones. Each nasal fossa also opens into the *orbit* or eye-cavity of its side, into the cranium or skull-cavity, and usually communicates with its neighbour-fossa through an aperture in the *septum* or partition which separates them. Fourteen bones in all enter into the formation of the nasal cavities—all the bones of the face except the *malar bone* and *lower jaw* aiding in the formation of the cavity. Into the formation of the nose, not only bony, but muscular skin, cartilaginous, and other structures enter. By its root the organ is directly attached to the forehead, while the nostrils are separated by a partition or *columna*. Around the margin of the nostrils a number of *vibrissæ* or stiff hairs exist. The *cartilages* of the nose consist of five pieces, two upper and two lower lateral pieces, and the cartilaginous *septum* or partition. These cartilages are united to each other by a tough fibrous membrane, the *perichondrium*. The *muscles* of the nose number seven on each side. The *skin* covering the organ is soft and thin, and contains sebaceous follicles of large size. The *nerves* are derived from the facial, ophthalmic, infra-orbital, and infra-trochlear sources.

Lining the nostrils is formed the *pituitary* or *Schneiderian* membrane, a specialised form of Mucous Membrane (q. v.), which is very closely attached to the perichondrium, covered with epithelial cells, and having large and branched mucous glands. The sense of smell is subserved by the filaments of the *olfactory nerves*, which form the first pair of *cranial nerves*, or those issuing from the brain. The olfactory nerves are distributed in the mucous membrane of the nostrils in minute branches. At the termination of these nerves, we find peculiar bodies known as *olfactory cells*—spindle-shaped cells with delicate processes. The essential *conditions* under which the sense of smell is exercised appear to consist (1), in the presence of a special (*olfactory*) nerve; (2), in the capability of having certain changes induced in the nerve through contact with odorous substances; and (3) in the *moist* condition of the Schneiderian or mucous membrane, since, when this structure is dry, the sense of smell is either impaired, or may be lost altogether. The odorous matters must apparently be dissolved in the secretion of the mucous membrane, before their particles can be brought in contact with the olfactory nerves. It follows from this that the causes of odour exist in the presence of exceedingly fine particles given off by odorous substances. Thus the sense of smell becomes analogous to the sense of touch from the fact that contact of the odorous substance with the olfactory nerves is necessary for the exercise of the sense. Regarding the extreme fineness of the particles given off from odorous bodies, it may be mentioned that a grain of musk will scent a room perceptibly for years, without sensibly diminishing in weight. Notwithstanding the apparent sameness of bulk, there can be no doubt that the musk has been giving off infinitesimal particles of its substance, these particles giving rise to the sensation of smell. The olfactory nerves present exceptions to the ordinary structure of nerves in that, like the *Sympathetic Nerves* (q. v.), they exhibit no white outer substance. Their branches are further distributed to the N. in dense flexuses. The N. is supplied with *common sensibility* by branches of the first and second divisions of the fifth nerve. When sensations such as heat, pain, itching, &c., are felt in the nostrils, these are the means through which the sensations are appreciated. But being nerves of common sensation they are entirely unconnected with the exercise of smell. This sense appears further to be confined to the parts of the nostrils in which the olfactory nerves ramify. Nor does it appear that the frontal *sinuses* or spaces existing in the frontal bone, and which communicate with the nostrils, bear any part in the appreciation of the sensations of smell. When air impregnated with the vapour of camphor was injected into these sinuses through a fistulous opening, no odour was perceived by the patient.

It would appear that all animals do not appreciate odour in a similar degree, and some odours perceptible to certain groups of animals may be unperceived altogether, or may be perceived less perfectly by other groups. Thus in man there may occasionally exist the inability to appreciate odours of a certain kind, and carnivorous animals are able to detect the presence of other animals by smell more accurately than herbivorous animals can; while the latter are specially susceptible of the odours of plants. Man himself appears to be vastly inferior to many lower animals in respect of his sensitiveness to certain odours, but he has a greater uniform range of appreciation of odours than his lower neighbours. The sense of smell, like that of taste, touch, sight, and hearing, is susceptible of being specially cultivated; and one of the most interesting points in the history of this sense relates to the permanence of ideas which may be represented in connection with this sense. Thus a person may be able to entertain a vivid recollection of a particular odour, a fact which proves that the true seat of smell is in the brain. This conclusion is borne out in the converse fashion by the fact that persons who have been habitually conscious of a bad odour during life, have been found, on *post-mortem* examination, to have been suffering from brain-disease.

Diseases of the N.—D. of the N. are divided into those of the external parts—the skin and cellular tissue; and those of the interior—the bones, cartilages, and mucous membrane. The most common affection of the external parts is *Acne* (q. v.), an affection of the sebaceous follicles, which is sometimes followed by enormous hypertrophy, producing pendulous masses called *lipoma*. The N. is peculiarly liable to certain forms of ulceration, as *lupous* and rodent ulcers; and epithelioma or Cancer (q. v.) is not uncommon at the angle of the N. Foreign bodies in the nostrils sometimes attract inspissated mucus and purulent secretions, and thus form the nuclei of rhinolithes or N.-stones. *Epistaxis* (q. v.), or bleeding from the N., is a very common affection, both in youth and old age; and in young women is sometimes vicarious when the menstrual discharge is suppressed. It is liable to occur in fevers and scurvy. *Coryza*, or nasal

catarrh, is a troublesome complaint characterised by catarrhal discharge, and frequently the loss of the sense of smell; and, occasionally, the mucous membrane becomes chronically thickened, especially over the end of the inferior turbinated bone. *Ozæna*, or fœtid discharge from the nostrils, is one of the commonest and most distressing of maladies. The odour is horrible, and those affected are usually young children. The causes are various, but hereditary syphilis and struma are the chief. The mucous membrane is inflamed, possibly ulcerated, and covered with crusts of inspissated discharge, and the syphilitic variety tends to spread to the bones and cartilages, causing external openings and frequently resulting in destruction of the N. The cure of *syphilitic* ozæna can only be effected by antisyphilitic remedies, and by the application of mercurial vapours and lotions. In *strumous* ozæna, cod-liver oil with arsenic or iodide of iron should be given, and in this and the idiopathic form, the nasal douche should be employed. Nasal *Polypus* is a very frequent, and sometimes a very formidable disease. *Gelatinous* or mucous *polypi*, by far the most common form, originate generally from the mucous membrane which covers one or other of the turbinated bones, chiefly the middle; and they rarely spring from the septum, or from the roof of the N. They are often multiple. The symptoms are a mixture of catarrh and obstruction. The patient cannot sleep unless the mouth be open; the voice is affected and acquires a nasal tone, and the obstruction as well as the catarrh increase in damp weather, when the tumour increases in bulk, and may be seen in the nostril. Polypi may be removed either with the wire snare or the forceps, the main point being to get at the root and remove them from their attachment. *Fibrous polypi* are much more formidable than gelatinous, and they spring generally from the roof of the nasal fossæ, or from the base of the skull behind the posterior nares. Occasionally, though rarely, the tumour may be twisted off from the nostril or from the pharynx; but in most instances a surgical operation through the tissues of the face is necessary. This may be effected from below, through the hard and soft palate; from above, through the N.; or from the front, through the upper jaw. *Malignant polypus* or Cancer (q. v.) rapidly fungates out of the nostril, and is apt to infiltrate the skin of the face.

No'sing, in Architecture, the prominent edge of a moulding, especially the projecting moulding of the tread-board of a stair.

Nosol'ogy (Gr. *nosos*, 'disease,' and *logia*, a 'discourse'), as a department of the science of medicine embraces three objects of consideration, viz., (1) the definition of the genera and species of diseases; (2) the nomenclature of diseases; and (3) the arrangement or classification of diseases. Many systems of N. have at different times been adopted; but that of Dr. Farr, one of the most distinguished medical statists, is the one upon which the returns of the Registrar-General were based until 1869. Dr. Farr's system of N. is arranged in four primary classes, each of which includes various orders.

Class I.—Zymotic Diseases (Gr. *zymē*, 'a ferment'), diseases that are either epidemic, endemic, communicable, inoculable, capable of propagation from existing foci, or of generation; induced by a specific material, which may be named a *poison*, or by want of food, or by its bad quality. Class II.—Constitutional or Cachectic Diseases (Gr. *cachexia*, 'ill-health, bad habit of body'). Sporadic diseases affecting several organs in which new morbid products are often deposited or grow. These diseases are sometimes hereditary, and develop in the course of nutrition and processes of life; but they are not capable of direct propagation, communication, or inoculation. Class III.—Diseases in the course of which lesions tend to be localised. Monorganic (Gr. *monos*, 'alone,' and *organon*, 'organ'), sporadic diseases in which the functions of particular organs or systems are disturbed or obliterated, with or without inflammation; sometimes hereditary. Class IV.—Developmental Diseases. Metamorphici, special diseases, the incidental result of the formative, reproductive, and nutritive processes. A fifth Class may be specified: Lesions from violence tending to sudden death. These lesions are the evident and direct results of physical or chemical forces, acting either by the will of the sufferer, or of other persons, or accidentally.

In 1869, the committee appointed by the Royal College of Physicians of London issued a nomenclature of disease suitable to England, and to all countries where the English language is used. For each name they supplied the corresponding Latin term, and also the equivalent term in French, German, and Italian. After much consideration the committee resolved 'that the proposed classification of diseases should be based upon anatomical considerations.' In subservience to this anatomical distribution, diseases may be grouped as being general or local. General diseases are such as affect the whole frame rather than any special part of it. Local diseases are such as affect any part of the body. The labours of the committee commenced in 1865 and terminated in 1869, their 'nomenclature' being subject to decennial revision.

Diseases might be classified according to their symptoms, their causes, their intimate nature, the tissues or the systems of the body that are affected; but medical science is not yet sufficiently advanced as to admit of a strictly scientific nosological system. The anatomical basis of arrangement, adopted by the committee, necessarily implies cross-divisions; but it is convenient for practical purposes, in our present state of knowledge. See *The Nomenclature of Diseases* by a joint committee of the Royal College of Physicians (Lond. 1869).

Nossi-Bé ('great island'), an island on the N.W. coast of Madagascar, in 13° 14′ S. lat., 48° 15′ E. long.; area 74 sq. miles. It is volcanic, and has a number of extinct craters. The soil is rich, and the staple products are rice, sugar, and maize. The island also produces valuable timber, and among other exports are beeswax and tortoise-shell. It has been a French possession since 1843, and is subject to the Governor of Mayotta (q. v.). The chief settlement, Helleville, has a fine harbour. Pop. of the island, about 15,000.

Nossi-Ibrahim or **Sainte Marie**, an island on the E. coast of Madagascar, situated in 17° S. lat., 49° 52′ E. long. It measures 33 miles in length, by an average breadth of 2 miles, and is separated from Madagascar by a channel 5 miles in width. The climate is exceedingly humid, in spite of which the island, on account of its sandy soil, is arid and barren. It has been a French possession since 1750, and the chief settlement, St. Louis, is fortified. Pop. about 6000.

Nostal'gia is a form of *melancholia*, manifested by an inordinate desire to return to one's native country, and to which is added the apprehension that he may never be able to return. Army surgeons often witness cases of N. According to Baron Larrey, the mental faculties are the first to be affected. Ninety-seven soldiers in the French army fell a sacrifice to this disease between 1820–26. In such cases, general paralysis is common; but death is the result of a gradual exhaustion of the vital powers. The Dutch, the Swiss troops, the Highlanders, and the Irish, are the most liable to this form of insanity. N. is a common affection among slaves who have been abducted from their native country; and the disease is evidently referred to by Dr. Livingstone, in his 'Last Journal,' when he states that many of the slaves abducted from Manyuema-land died from what he described as a new disease, 'Broken-heartedness.'

Nos'toc, a genus of green-spored *Algæ*, consisting of gelatinous masses of various configuration. They occur either on moist ground, rocks, &c., or in fresh or brackish water. A common species in Britain (*N. commune*) suddenly making its appearance after rain, on gravel walks and pasture grounds, has given rise to various fancies—the name 'falling stars' denoting one of these. *N. edule*, which occurs abundantly in running streams in China, is dried and used as an ingredient for soups, and an allied alga (*Hormosiphon arcticus*), abounding in the Arctic regions, is also a wholesome food. It is said that N. may become the *host* of a parasitic fungus, and by it be transformed into a *Collema*, that is, into a Lichen (q. v.) of the existing classification.

Nostrada'mus, properly **Michel de Nostredame**, a physician and famous astrologer, was born at St. Remi, in Provence, December 14, 1503. He studied philosophy at Avignon, and physic at Montpellier, where he took his doctor's degree in 1529. He practised at Salon, his skill and assiduity in arresting the plague procuring him no little fame, but he soon gave up his legitimate profession for the *rôle* of astrologer and prophet. In 1550 he published an almanac containing weather and political predictions—the first of its kind; and five years later appeared his famous *Prophéties*, enigmatical quatrains, arranged into seven centuries, and in 1558 extended to ten. These

gained him the favour of powerful patrons, and Catherine de' Médicis in particular loaded him with honours. When her son Henri II. was killed in a tournament, search proved the event to be predicted in the 35th quatrain of the first century in N.'s book. This established his fame. During his later years he lived a life of luxurious quackery as physician to Charles IX., dying at Salon, July 2, 1566. Of his two or three other unimportant books, mention will be found in Bareste's *Nostradamus* (Par. 1842), or in Adelung's *Histoire de la Folie Humaine*. The best edition of the *Prophéties* is that of Amsterdam (1668).

Nos'trils. See NOSE.

Notables were a class of persons in France whom it was convenient for the kings to consider as popular representatives, and who in emergencies sat in place of the States-General. In 1558 Henry II. summoned such an Assembly in order to assist him in raising a loan. It was composed of some priests 'deputed for the generality,' a slight sprinkling of the nobility, the chief magistrates of the good towns, some lawyers, and the presidents of the Parliaments. It was a mere mockery of a representative institution. A greater freedom of debate was introduced into the Assembly called at Fontainebleau two years later by Catherine. In 1596 Henry of Navarre summoned one at Rouen consisting of ten ecclesiastics, eighteen nobles, and fifty civic magistrates, who divided the revenue of the state into two parts, one for the king and war, another for the public services. They were merely the nominees of royalty, and the same may be said of the Assembly which, at the dictation of Richelieu, met in 1625. The state of the finances were put before an Assembly of N. in 1787, and Calonne, for proposing the abolition of privileged exemption, was treated as a traitor. His suggestion was afterwards adopted, and the N. gave place to the popular demand for a convocation of the States-General. See Kitchin's *History of France*, vols. ii. iii.

No'tary Pub'lic is a legal officer whose business it is to attest acts of legal import, so as to make them authentic in foreign countries. The chief business of a N. P. is in noting and protesting bills of exchange. Any unqualified person acting as N. P. incurs a penalty of £50; and any qualified notary conniving in the act of an unqualified person, will be struck off the roll, on application to the Court of Faculties. See 3 and 4 W. c. 70, and 6 and 7 V. c. 90.

Nota'tion, in Mathematics, is the method for symbolising numbers, quantities, or operations. The various systems of numerical N., which have been or are now extant, are best considered under NUMERALS; here it will be sufficient to indicate briefly the history of the development of the notations which characterise different branches of mathematical science. In pure geometry there is strictly speaking no true N., unless the distinguishing of the intersections of lines by letters of the alphabet can be so regarded. Algebra, on the contrary, owes its existence to the invention of a convenient notation, which embraces not only the quantity symbols (a, b, c, &c.), but also the operation symbols ($+$, $-$, $\times$, $\div$, $\sqrt{\ }$, &c.). These symbols were sufficient until, in the hands of Newton, Leibniz, and the Bernoullis, algebra developed into analysis. Newton devised his fluxional, and Leibniz his differential N. Both are identical in signification, but the latter, being much more convenient, has been universally adopted, and has, indeed, never been improved upon. In the higher analysis the importance of a simple but at the same time suggestive N. is more clearly evident; but the peculiar power which a good N. possesses is best shown in the mathematical discoveries of the last quarter of a century. These few years have seen developed two great branches of mathematics—the higher algebra of Cayley and Sylvester and the quaternions of Hamilton—which are remarkable for their wealth of new names and symbols. Upon these their potency as methods of analysis is greatly dependent. See ALGEBRA, CALCULUS, GEOMETRY, QUATERNIONS, &c.

Nota'tion, Mu'sical. Besides the ordinary system of M. N. (for which see article on MUSIC, and which is in most general use), a literal form of notation for use in vocal music, known as the tonic sol-fa system, said to have originated with the Misses Glover, two ladies of Norwich, has been introduced by Mr. James Curwen, in which the various notes are designated by the initial consonants of do, re, mi, fa, sol, la, ti, do (d, r, m, &c.); an accent above the note (d^1) representing its higher octave below the note (d_1) its lower octave.

Note, an expression often used as a synonym for a musical sound, as in speaking of a high or loud note for example. The term is also applied to a printed character designed to represent the duration of such a sound, while its position on the musical staff indicates its pitch. The seven forms of notes in ordinary use are the breve , semibreve , minim , crotchet  , quaver  , semiquaver  , demisemiquaver  and semidemisemiquaver  ; the breve, which is only used in church music, being the longest, and each of the others half the length of that preceding. See MUSIC.

Not Guilty. See GUILTY.

Nothosau'rus, an extinct genus of *Reptilia*, belonging to the order *Sauropterygia*, which also includes the *Plesiosauri* and other well-known fossil genera. In N. the neck, like that of the *Plesiosaurus*, was long, and was composed of at least 20 vertebræ. The vertebræ of the back were 'amphicœlous' (*i.e.* hollow at each end), and were thus modelled on the type of those of the fish; a conformation indicating that the animal possessed a flexible spine, and was probably an active swimmer. The teeth were conical in shape, and numerous; and proceeded from distinct alveoli or sockets. The limbs were in the form of swimming-paddles. All the species of N. are found in the Triassic rocks, and are especially plentiful in the Muschelkalk.

Notice to Quit is the formal notice between Landlord and Tenant (q. v.) of an intention to end the tenancy on a day named.

No'to, a town of Sicily, 16 miles S.W. of Syracuse, near the sea-coast. It has beautiful palaces of the aristocracy, and the *Academia dei Trasformati* has a library and a museum of antiquities. Pop. 14,362. The present town, which dates from 1703, is 5 miles from the site of the old N., which was strongly fortified by the Saracens, and long held out against the Normans, but was destroyed by an earthquake in 1693.

No'tochord or **Chor'da Dorsa'lis,** the cellular body which is developed in the dorsal or back region of every *vertebrate* animal in the earlier stages of its development. After the egg or ovum of the vertebrate has undergone the process of segmentation (see DEVELOPMENT) the *blastoderm* or *germinal membrane* is formed. This upper part of the egg next exhibits a groove or depression—the *primitive groove* of embryologists. The edges of this groove grow together, and convert it into a canal, within which the spinal cord and brain are produced. In the floor of or below this groove, the N. appears as a cellular rod, forming the basis round which the *spine* or *vertebral column* is developed. Thus, the N. is replaced in all vertebrates (save certain fishes) by the spine; but as it is invariably present in the early life of every vertebrate without exception, it forms one of the most distinctive characters of this, the highest group of animals. The N. persists throughout life in its early or embryonic state in such fishes as the Lancelet (q. v.), lampreys, &c., whilst some of the highest members of the fish-class (*e. g.*, sharks, skates, ray, sturgeon, lepidosiren, &c.) have either a rudimentary spine or a N. as its representative. Kowalevsky, a Russian *savant*, has discovered in the tail of the 'sea-squirt' or *Ascidian* larva a rod-like cellular body, which is regarded by evolutionists as the representative of the vertebrate spine. The sea-squirt larva in this view is the progenitor of the vertebrates.

Notor'nis, a genus of New Zealand birds belonging to the family *Rallidæ*, and of which only one species, *N. mantelli*, is known. It was first established by Owen from fossil remains, but in 1850 a specimen was captured alive on Resolution Island, near the S.W. extremity of the colony. The N. is about 2 feet high, with a dark purple neck and body, and the wings, which are too feeble for flight, are shot with green and gold. The legs and short strong beak are of a bright scarlet. The flesh is said to be very delicate. The bird is extremely rare, if not now extinct.

Notothe'rium, an extinct genus of Mammalia belonging to the order of *Marsupials* (q. v.). Of all marsupial fossils N. is

probably the most nearly related to the existing kangaroos. It was of smaller size than the well-known *Diprotodon*, of which the skull measures in some specimens 3 feet in length. The remains of N. occur in the recent deposits in Australian bone-caves.

Not Proven is a verdict in Scotch criminal procedure. It indicates that the jury think the evidence against the prisoner insufficient to prove him guilty, but too strong for the jury to declare him innocent. Whatever evidence may come to light after a verdict of N. P., the accused cannot be again indicted for the crime of which he has been acquitted.

Nott, General Sir William, G.C.B., one of the heroes of the disastrous British expedition to Afghanistan of 1839–42, was born at Carmarthen in S. Wales in 1782, and joined the Bengal Infantry in 1800. During the winter of 1841, when the Cabul army was exterminated, he held the town of Candahar. In the following spring he joined the avenging army of Pollock at Cabul; and on his way captured for the second time and destroyed the citadel of Ghuzni, and carried away the famous gates of Somnauth. He received a pension of £1000, and was appointed President at Lucknow. He died in 1845.

Nott'ingham, the chief town of Nottinghamshire, England, on the Leen, near its junction with the Trent, is 125 miles N.N.W. of London by the Midland Railway. Standing at the base and on the slope of a rocky elevation, it has many handsome buildings, public walks, and recreation grounds. By an Act of Parliament passed in 1877 the boundaries of the town were extended, and now include the former populous suburbs of Lenton, Radford, Basford, Sneinton and Bulwell. Pop. (1877) of extended borough estimated at over 160,000. Area, 9960 acres; rateable value, £600,000. Besides a town and county hall, an exchange, and a church of St. Mary, N. has a Free Grammar School (rebuilt in 1868), a Free Library, a Natural History Museum, School of Art, an Arboretum, a new theatre, and a Gothic fountain erected as a memorial of Mr. J. Walter, of the *Times*, for a short time an M.P. for the town. The laying of the foundation-stone of a new college in September 1877 was marked by addresses on the value of University teaching by Mr. Gladstone and Lord Carnarvon. The old Trent bridge of seventeen arches has been superseded by an iron-girder bridge with stone piers. N. is the chief seat of the industries in lace and hosiery, and has large silk and cotton mills, iron-foundries, dyeing and bleaching works, shoe manufactories, breweries, collieries, iron-foundries, and tanneries. Here is produced nearly all the British machine-made lace. The material used in the lace industry yearly amounts to £1,725,000; the net returns to £5,130,000. In the hosiery trade there are used, besides a great number of hand-machines, some 400 power warp, 1000 wide power rotary frames, and 1200 circular 'round about' frames; and there are employed 15,000 men, and 22,000 women and girls. For making machines for the lace trade there are in N. about 180 shops and 130 large factories, employing over 12,000 men and boys. The markets for corn and cattle are among the largest held in the midland counties. Several fairs take place annually, the most important being the 'Goose Fair' in October. Celebrated annual races are run in March on a fine course to the N.E. of the town. N. publishes three daily newspapers, and returns two members to Parliament. A strong castle was built at N. by William the Conqueror, and the town was repeatedly taken and in part destroyed in the reign of Stephen, and during the war of the Barons. Charles I., resisting the demands of the Parliament, marched hither from York in 1642, and N. was besieged and taken by Colonel Hutchinson in the following year. The castle was fired by rioters, October 8, 1831, on the rejection of the Reform Bill by the House of Lords, and remained a ruin till 1877, when the property was leased to the corporation of N. for 500 years, and is now (1878) in process of restoration at a cost of £20,000, for the purposes of a fine arts museum. N. has been the scene of many political and trade riots, the principal of which were in 1811–12, 1814, 1831, and 1865.

Nott'inghamshire, an inland county of England, bounded N. by Yorkshire, N.E. and E. by Lincolnshire, S. by Leicestershire, and W. by Derbyshire, has an area of 526,176 statute acres, and a pop. (1871) of 319,758. The surface is chiefly undulating, but the vales of Belvoir and Trent are quite flat, while a range of low hills gives the western part a somewhat rugged appearance. The western part of the county is formed of magnesian limestone and Old Red Sandstone, overlying coal, which is worked at Eastwood, Bilborough, and Radford; the rest of N. is chiefly composed of marl, New Red Sandstone, lias, quartz, and gravel. The principal river is the Trent, which, flowing N.E. through N., is navigable for vessels of 200 tons as far as Gainsborough, and for river vessels throughout the county. In 1875 there were 156,043 acres under corn crops, 53,339 under green crops, 58,276 under clover, sainfoin, and grasses in rotation, and 157,073 in permanent pasture; also 19,977 horses, 73,799 cattle, 274,613 sheep, and 27,973 pigs. The principal manufactures of N. are cotton and silk laces, hosiery, and various woollen textile fabrics. There are also extensive iron foundries in the county town. There are cotton mills at Nottingham, Buston, Mansfield, Plensley, and Southwell. The manufacture of lace curtains has been largely developed during the last ten years. N. is traversed by the N. Midland, the Great Northern, and the Sheffield and Lincoln Railways. Four members of Parliament are returned by the county. N. was included by the Romans in the province called *Flavia Cæsariensis*; and among the remains are those of a Roman villa at Winnyhill. It belonged afterwards successively to Northumbria and Mercia. William the Conqueror granted the district to his nephew, William Peverell. Sherwood Forest in the W. is the legendary haunt of Robin Hood (q. v.), and 6 miles S. of Mansfield is Newstead Abbey, once the property and residence of Lord Byron.

Nouredd'in Mahmoud, Malek-al-Adel, the most distinguished of the Moslem rulers of Syria, succeeded his famous father Zenghi as Emir of Aleppo in 1145. No sooner was his reign begun than he proceeded to grapple with the Christians under Joscelin de Courtenay, Count of Edessa. He inflicted a most disastrous defeat on the Christian soldiery under the walls of Edessa, stormed the city, and massacred many of the citizens. The fall of this place occasioned the Second Crusade. After its failure N. determined to expel all Christians from Palestine, and to centre the government of Syria and of the surrounding provinces in himself. Raymond, Prince of Antioch, was slain in 1149. Joscelin, Count of Edessa, was taken prisoner immediately after. The inhabitants of Damascus, threatened by Baldwin III., king of Jerusalem, surrendered in preference to the Emir of Aleppo. After a long and dubious war Egypt was wrested from the corrupt administration of Shawir, the vizier, and restored to the Abbasside Calif of Bagdad, and that potentate rewarded N. with the title of Sultan, investing him with the governorship of Egypt and Syria. The last years of N. were embittered by the intrigues of Salah-ed-Din, lieutenant of Egypt; and as he was about to set out from Damascus to crush the rebel, he was seized with quinsey, which ended fatally, 15th May 1174. N. is one of the best of the Moslem warriors and princes. Brave, chivalrous, tolerant, and cultivated, he favourably compares with the finest soldiers that Christendom then sent to the East.

Noun (Fr. *nom*, Lat. *nomen*), in grammar, is the term used to denote that class of words which may be the subject or object of a sentence. The customary definitions are unsatisfactory. For example, when it is said that a N. is 'the name of any person, place, or thing,' we have here an unsuccessful attempt to exhaust the subjects of human knowledge. 'Thing' is made to include whatever is not a 'person' or 'place.' Yet who would call 'freshness,' 'summer,' 'conscience,' *things*? The right method therefore of defining the N. is to consider its office or function in a sentence, not its meaning or application. The classification of nouns has been made in various ways, and with various degrees of precision. Probably the simplest general distribution is into nouns *substantive* or *concrete*, and nouns *abstract*. All nouns fall under one or other of these divisions. Thus 'house,' 'regiment,' 'gold,' 'soul,' 'Milton,' are substantive nouns, *i.e.*, they are names of substances; of things that really exist in themselves, or are believed to exist; while 'sweetness,' 'virtue,' 'courage,' are abstract nouns, *i.e.*, they are the names of qualities that do not exist apart from the substances in which they inhere. But if we look more closely into these various kinds of nouns, we notice important differences between them. They do not all name in the same way. Thus the word 'house' describes to a certain extent the thing which it names. It tells us what kind of thing is meant, and it *connotes* or carries with it the knowledge of the properties peculiar to this kind of structure. It is therefore a *significant*

name, or a name with a meaning. But the name 'Milton,' on the other hand, gives us no information concerning the person to whom it is applied. It *denotes* him, but it possesses no *connotative* property. It is therefore said to be *non-significant* or meaningless. All nouns are capable of this twofold distribution. They are either significant or not. Thus 'regiment,' 'gold,' 'soul,' 'sweetness,' 'virtue,' 'courage,' express a meaning as well as give a name. It is of course possible to use such a word as 'Milton' *connotatively; e.g.*, 'Some mute inglorious Milton here may rest;' but in this case there is a departure from the ordinary usage; it is not a person called Milton that is here referred to; it is any one having a genius like Milton.

We have noticed the classification of nouns into *substantive* and *abstract*. When we proceed to examine the former, we observe subordinate differences among them. 'House,' and 'Milton' are both substantives, but while there are many 'houses' there is only one 'Milton.' The former is therefore said to be a *common* the latter a *proper* N. Again 'house' and 'regiment' are both common nouns, but while house denotes only one of a class, 'regiment' implies number, and is therefore defined as a N. substantive, common, *collective*. So also 'gold,' though a N. substantive, is neither common nor collective. It denotes neither one nor several, but *material* or *stuff*. Grammarians have not yet agreed on a definitive phrase for this class of nouns, but probably the German 'stuff-nouns' is as good as can be had. Nouns abstract are also capable of subdivision. Some are formed from adjectives, as 'sweetness' from sweet; some from verbs, as 'belief' from believe, 'death' from die. The verbal or participial N. is a form of the N. abstract. 'Dancing' no more exists apart from persons engaged in the act, than 'sweetness' exists apart from things that are sweet. See Professor Bain's *Companion to the Higher English Grammar* (Lond. 1874).

Novai'a Zemlai'a (Russ. 'New Land'), an uninhabited archipelago in the Arctic Ocean, belonging to the Russian Government of Archangel. Separated from Vaigatz Island by the Kara Strait, N. Z. extends first N.W., then N.N.E., and finally E.N.E. from Black Cape (70° 30') to Cape Nassau or Great Ice Cape (77° 8' N. lat.), a length of 550 miles. Average breadth, 70 miles; area, 35,450 sq. miles, chiefly made up by two large islands separated by Matotchkin-Shar, a winding strait from 1 to 2½ miles wide. The coasts are much indented, especially in the W., and rise rapidly to the plateau of the interior, which, as far as yet explored, has here and there between the rocky tracts green patches supporting reindeer, which are hunted by Samoieds from N. Russia. The highest mountains (3280 feet) are near the W. coast. The E. coast was little known till the Norwegian captain, Johanneson, sailed round N. Z. in 1870. The average temperature of South N. Z. is 35° F. in summer and 30° 2' F. in winter. Lemmings, polar foxes, wolves, and bears are met with in large numbers, the coasts abound with sea-birds, and the neighbouring seas with whales. Whale fishers occasionally winter in sheltered spots. N. Z., probably discovered by Hugh Willoughby in 1553, is known to us through Lütke's four expeditions from 1821 to 1824, Johanneson's circumnavigation, and Rosenthal's expedition in 1871. See J. Spörer, *N. Z. in Geographischer, Natur-historischer und Volkwirthschaftlicher Beziehung* (Gotha, 1867).

Nova'lis. See HARDENBERG.

Nova'ra, capital of the province of that name in Northern Italy, stands on a rising ground between the Agogna and the Terdopio, some 25 miles W. of Milan by rail. It is surrounded with walls and bastions, and contains the ruins of an old castle, a cathedral dating from the end of the 11th c., fourteen other churches, a beautiful theatre, a monument of Cavour by Dini, a colossal marble statue of Carlo Emmanuele III., and a monument of Carlo Alberto, who abdicated at N. in 1849, in consequence of the defeat sustained by the Sardinian forces in the battle fought here with the Austrians under Radetzky on the 23d March of that year. Pop. (1874) 29,516.

No'va Sco'tia, a province of the Dominion of Canada, bounded N. by Northumberland Strait, which separates it from Prince Edward Island, E. and S. by the Atlantic, W. by the Bay of Fundy and New Brunswick, includes the peninsula of that name, the island of Cape Breton, lying to the N.W., and other small islands near the mainland. N. S. proper, extending 280 miles from N.E. to S.W., or, including Cape Breton Island, 350 miles, and from 50 to 120 miles wide, is connected with New Brunswick by Chignecto Isthmus, which at its western end is low, and only 13 miles broad. The area of the peninsula is 15,627 sq. miles, that of the whole province, 21,731. Pop. (1871) 387,800. The coast-line measures fully 1200 miles, and is everywhere indented with inlets from 3 to 15 miles long. The principal of these are Sheet Harbour, Margaret's Bay, Mahone Bay, containing more than 200 islands, St. Mary's Bay, Annapolis Basin, the Bay of St. George, and Chedabucto Bay. The surface is broken by ranges of low hills, which are often rocky and barren; the valleys, however, are very fertile, and lakes everywhere abound, about 3000 sq. miles of the country being in water. In summer the climate is cool and delightful; but in winter the atmosphere is very moist, and, owing to the influence of the Gulf Stream, the coasts are frequently wrapped in heavy fogs. The chief geological formations are New Red Sandstone and Carboniferous, resting on and interrupted by granite and metamorphic rocks. The coalfields of Cumberland, Pictou, and Cape Breton, interesting geologically, are neither so large nor so valuable as was formerly supposed. The coal is bituminous, that of Glace Bay being much prized as a gas coal. In 1875 coal to the value of £11,541 was exported from N. S. The mineral products also include oilshales, iron, gold, gypsum, and fine sandstone. The gold field covers one-third of the area of the province. Between 1861 and 1871 more than £800,000 worth of gold was mined. Extensive tracts of the country are covered with forest, the timber of which is largely exported to Great Britain. Immense quantities of fish are also cured and exported (in 1875 to the value of £762,788). Shipbuilding is carried on to a considerable extent; and the manufactures include fish and seal oils, lumber, leather, and castings. In 1874 the total tonnage of vessels which entered and cleared the ports of N., S. exclusive of home trade, was £1,840,377; the imports amounted to £2,336,694, and the exports to £1,595,114. There were (1875) 341 miles of railway, a large part of which is owned by the Dominion Government. Besides the Anglican and Roman Catholic, the principal Churches are the Kirk of Scotland, the Presbyterian Church of the Lower Provinces, the Methodist, Methodist Episcopal, African Methodist, Baptist, and Congregational Churches. Education is conducted on an effective public system. The Anglicans have a university, and the Roman Catholics, Methodists, and Baptists each a college. The present inhabitants of N. S. are descended partly from the old Acadians, or French colonists, partly from English, Scotch, and Irish immigrants, the two latter being chiefly found in the northern half of the province. In 1874 there were 1837 Indians.

N. S. was discovered in 1498 by Sebastian Cabot, and some years afterwards Cape Breton received its name from some French fishermen, natives of Bretagne, who arrived there. Up to the year 1784, N. S. included the province now called New Brunswick, and previously also part of the State of Maine, the whole territory being named Acadie. This was the term used in the original commission of the King of France, and it is found in public documents as early as 1604. The first attempt at colonisation was made by Baron de Clery, a Frenchman, in 1518, but the expedition proved a failure. No further effort was made till 1604, when the French effected a temporary settlement under M. De Monts, a Huguenot, only to be driven out by the Virginian colonists in 1610. The Virginians, however, did not remain long in Acadie, and in 1621 it was granted by James I. to Sir William Alexander, under the name of N. S. But the settlers sent out by him had to return, having found the French in possession of the whole district. In 1654 an expedition sent out by Cromwell, forced the French occupants to surrender, but the colony was ceded to France by the Treaty of Breda in 1667. After many vicissitudes of fortune it finally came into British possession in 1711. On the conclusion of the Treaty of Aix-la-Chapelle in 1748, disputes having arisen as to the boundaries of the French and British possessions in America, the advantage was perceived by the British Government of having N. S. properly colonised, and on the 21st June 1849 about 4000 disbanded soldiers and their families, attracted by the liberal grant of free land, with tools, arms, and provisions for a year, arrived at Chebucto Harbour, and founded the town of Halifax. During the war between England and France, about 7000 Acadians were expelled from N. S. on account of intrigues with the Indians against the British colonists. After peace was

restored in 1763, the colony made rapid progress. The island of Cape Breton was at this time annexed to N. S., and in 1765 that of St. John (Prince Edward Island) became a separate province. In 1784 New Brunswick was likewise formed into a province, and a separate government was given to Cape Breton, with Sydney as its chief town. In 1867 N. S. was incorporated in the Dominion of Canada, and is represented in the Canadian Parliament by 12 senators and 19 members of the Lower House.

Nova'tians were a sect which arose in the Church in the third c., founded by Novatian, a presbyter at Rome, who was actively supported by Novatus, a presbyter at Carthage, and who denied the power of the Church to grant absolution to and readmit to communion those who had abjured the faith in time of persecution. Novatian was elected by his party Bishop of Rome (251) in opposition to Cornelius, who had just been elected by the majority of the clergy; whereupon a council was immediately assembled at Rome (251), by which the N. were declared to be separated from the Church. The sect continued to exist for about two centuries. After the consecration of their bishop, the N. professed great sanctity and rigour of discipline, and took the name of Cathari (q. v.). Besides the Lapsed they now refused absolution to all who committed gross sins after baptism, and this was regulated by their ascetic notions; *e.g.*, in Phrygia, where they joined the remnant of the Montanists (q. v.), a second marriage was reckoned such a sin.

Novell'o, Vincent, an organist and musical writer, was born in London of an Italian family, in 1781. He became organist to the Portuguese embassy, and published a *Selection of Sacred Music* (2 vols.), *Collection of Motets for the Offertory, &c., Gregorian Hymns for the Evening Service* (in 12 books), *Biographical Sketch of Henry Purcell*, &c. He died at Nice, 9th August 1861. His life has been written by his eldest daughter, Mrs. Cowden Clarke.—Another daughter, **Clara Anastasia**, born in 1818, studied music at Paris, in Italy, and Germany, and for seven years from 1840 made triumphant concert tours in England, Germany, Russia, and Italy. In 1843 she appeared in Pacini's opera of Sappho at Drury Lane, and sang at the Birmingham Festival. After her marriage with Count Gigliucci in November of the same year, she withdrew into private life, but in 1850 reappeared to delight for ten years more the lovers of music in Italy, Germany, and England. In this country she was considered the queen of oratorio. She was the leading soprano at the first two Handel Festivals at the Crystal Palace in 1857 and 1859, and made her final appearance in London, November 26, 1860, at St. James's Hall.

Novell'æ, an institute of the Roman law, compiled under the direction of Justinian; the subsequent constitutions of that emperor, and of some of his successors, were called the *N.*

Nov'els (Fr. *nouvelles*, Lat. *novellæ*, dim. of *novus*, 'new'). The name novel is applied to a form of prose fiction which is now vaguely distinguished from the romance by its incidents being drawn from modern society, and the comparative exclusion of the ideal colour and marvellous element associated with the latter. The distinction, however, between these two varieties of prose fiction cannot always be sharply observed, as the one form of narrative frequently invades the other's peculiar province; and in tracing the history of N. it is necessary to review various phases of fiction that seem widely apart from what are now recognised under that term. A novel at first meant simply a new tale—a tale of new interest—while a romance was the name given to any prose or verse composition in the Romance languages. But many fictitious tales which we might now be led to class as romances are more properly designated N., as they mirror the manners of the times in which they were woven, while various modern tales known as N. display occasionally an ideality entitling them to be classed as romances. With the exception of the *Cyropædia* of Xenophon (q. v.), the earliest prose fictions produced by the Greeks with which we are acquainted were the *Milesiaca* or *Tales of Miletus*, a collection of brief love stories, said to have been written at Miletus in Asia Minor by one Aristides, and which were translated into Latin by the historian Sisenna, but are now lost. It is probable that the Greek love for prose fiction was quickened, if not kindled, by their intercourse with the Persians and other Oriental nations, as prose tales began to be produced among them after the Asiatic conquests of Alexander the Great. An author named Clearchus, a disciple of Aristotle, won celebrity as a writer of prose tales, and some years afterwards Antonius Diogenes produced a wild story 'Of the Incredible Things beyond Thule,' telling of the wanderings of two lovers in fabled northern regions, which is chiefly noteworthy for having supplied themes to Achilles Tatius and others. In the reign of Marcus Aurelius tales of magic were written by Lucian and Lucius Patrensis, and about the same time Iamblichus produced *Babylonica*, a story of the flight and final escape of two lovers from the emissaries of the King of Babylon. The first prose fiction of high merit composed by a Greek was the *Æthiopica* or *Theagenes and Chariclea* of Heliodorus (q. v.), Bishop of Tricca. This work, which far surpassed its predecessors, and at once gained popularity, is a fanciful tale of love, magic, and piracy, related in a flowery poetic style, and abounding in romantic incidents. The story is rife in improbabilities, and many of its incidents have a sameness which fatigues the reader, but there is a lingering charm in its picturesque descriptions, and the character of the heroine is naturally and gracefully delineated. The story marks a great advance in the art of fiction. It was at once imitated by other writers, among whom Achilles Tatius (see ACHILLES) is perhaps the foremost. His *Cleitophon and Leucippe* resembles the story of Heliodorus in the nature of its incidents, and is considered by some to be superior in its style. It is, however, weak in the presentation of character, and is stained by indecency. A new form of prose fiction owes its origin to Longus (q. v.), whose *Daphnis and Chloe* is the earliest example of the prose pastoral. It is a beautiful idyllic tale of the loves of Daphnis and Chloe, a shepherd and shepherdess of the island of Lesbos, and though at times slightly insipid and languid, is free from the affectation that so often disfigures pastoral tales. The descriptions of the Lesbian scenery are vivid, simple, and refreshingly natural, and the story is imbued with a genuine air of rusticity, notwithstanding its graceful and antithetic style. In the Latin language prose fictions were produced by Appuleius (q. v.) and Petronius (q. v.). The work of the latter, who probably belonged to the 1st c. A.D., is entitled *Petronii Arbitri Satyricon*, and consists of fragments of a kind of comic novel relating the adventures of one Encolpius and his rascally associates in the South of Italy. The work is vigorously written, but is steeped in the grossest indecency. The most interesting portion is the account of the banquet of Trimalchio, where the coarse gluttony of the wealthy Romans is exposed with much fantastic humour. The *Golden Ass* of Appuleius is a wild story of a man being transformed into an ass by a Thessalian sorceress, and finally regaining his human form by eating roses. The story reveals a state of appalling and almost incredible immorality, but bears occasionally the undoubted marks of genius. It contains various episodes, of which the finest is the lovely symbolic tale of Cupid and Psyche. After the fall of the Roman Empire, from the 6th to the 12th centuries, prose fiction was confined almost solely to Eastern Europe, where several stories to which the term N. might be applied were written in the Greek language. Of these, the most noteworthy is that entitled *The Lives of Barlaam and Josaphat*, a religious romance erroneously ascribed to Joannes Damascenus, recounting the adventures of an Indian prince named Josaphat, who, despite his father's opposition, is won over to Christianity by a holy man styled Barlaam, and ends his days as a hermit. The main purpose of the work is under the form of fiction to inculcate the creed of the Greek Church and the advantages of a monkish life. Up to the 12th c. almost the only forms in which the literature of fiction was cultivated in Western Europe were the countless lives of the saints, narratives of miracle-working, temptations by fiends, and perils among the heathen; these, however, were not set forth as fictions, but as genuine historic records. During this period, however, the world-famous stories of the *Thousand and One Nights* were cast into an Arabic form. (See ARABIAN NIGHTS.) When the vernacular speeches of Europe began to supersede Latin as the language of popular literature, prose fiction reappeared. The literary awakening of the 12th and 13th centuries was distinguished by an immense productivity in fiction, but the chivalric and even the comic stories which were so eagerly craved for were at first related in verse. The *Fabliaux* (q. v.), or, brief facetious metrical stories, were the kind of fiction most apt to assume a prose form; and the earliest prose fictions of enduring merit composed in the vernacular languages of modern Europe, the stories of Boccaccio (q. v.), in many important respects recall these less finished types of story-telling. Boccaccio's *Decameron* is the true ancestor of the modern novel.

Its short, polished tales of love and intrigue, gathered together from many sources, but retold with classic beauty of style, supplied a type of prose fiction which Italian writers have made peculiarly their own. Boccaccio was imitated by Sacchetti, Ser Giovanni, Masuccio, Sabadino, Giraldi Cinthio, Straparola, Bandello, Malespini, and others; this peculiar school of Italian fiction being distinguished by ingenious plots, which were often sombre and tragic, often exceedingly licentious, and by great refinement of style. In the 16th c. a new form of prose narrative was introduced into Italy in the *Arcadia* of Sannazzaro. The earliest prose fictions in France were tales of chivalry drawn from the long epics of the Trouveres on the deeds of Charlemagne and his paladins. In the 15th c. a fresh direction was given to story writing in France by the appearance of the *Cent Nouvelles Nouvelles*, a collection of humorous, and often witty and interesting tales, many of which were derived from the *Fabliaux* of the Trouveres. The great work of François *Rabelais* (q. v.), though immeasurably transcending in merit all preceding French fiction, did not give rise to a new school of story-tellers in France. In 1558 *Les Cent Nouvelles de la Reine de Navarre* were published. These stories, which have not yet lost their wide popularity, deal mostly with the comic mishaps of intriguing lovers, and mainly owe their origin to the *Fabliaux*, the Italian novels, and the *Cent Nouvelles Nouvelles*. They are supposed to be told by a party of ladies and gentlemen, who being detained by a flood at a monastery in the Pyrenees, resolve to beguile the time by relating stories in turn in a fair meadow beside the river Gave. Novellettes of gallantry continued to be highly popular in France until in 1610 the *Astrée* of D'Urfé (q. v.) supplanted the brief licentious novels by the pastoral romance.

Spain has been singularly rich in the number of her early writers of prose fiction. The Moorish wars afforded many themes for prose narratives as well as for songs and ballads, but the most famous of the chivalric romances produced in the Spanish Peninsula is the *Amadis de Gaul*—'the Iliad of the prose romances of knight errantry'—written by Vasco Lobeyra, a Portuguese who flourished towards the close of the 14th c. *Amadis de Gaul* was followed by numerous romances similar in incident and style, the favourite heroes of these stories of knight-errantry being Amadis and Palmerin, and the most famous of these works being that entitled *Palmerin of England*, the first edition of which, issued at Lyons in 1553, dedicated to the celebrated Diana of Poictiers, is said to have been translated from the Castilian. The names of many romances of the same type as *Amadis de Gaul* are mentioned in the well-known account of the destruction of Don Quixote's library. But in the 16th c. these prose fictions were superseded by the pastoral romances, a form of narrative supposed to be of Portuguese origin, transferred into Spanish literature by Montemayor (q. v.), a writer of Portuguese birth, whose *Diana* at once gained vast popularity, and was imitated by a shoal of authors. A third variety of Spanish fiction is what is termed the Picaresque novel, which recounts the rogueries of clever vagabonds, and to which the short stories of George Peele supply a close resemblance, though the best examples of the class in English literature are Defoe's *Colonel Jack* and *Captain Singleton*. The first specimen of the picaresque novel is the *Life of Lazarillo de Tormes* by Diego Mendoza, a politician of the reign of the Emperor Karl V.; and the most successful imitation of Mendoza's story is the *Don Guzman de Alfarache*, published in 1599. Shortly after the appearance of the last-named work, the crowning masterpiece of Spanish literature, *Don Quixote*, was published, the first part being published in 1605 and the last in 1615 (see CERVANTES). During the 17th c. *heroic romances* were popular throughout Western Europe. These fictions, which owed their origin to the *Astrée* of D'Urfé, were interminable narratives in which the leading characters of Greek and Roman history figured as knight-errants going through fabulous adventures, and delivering prolix high-flown speeches, the works being permeated with anachronisms, and abounding in diffuse and stilted descriptions of scenery. The best known of these fictions were the *Polexandre* of Gomberville (q. v.), the *Cleopatra* and *Cassandra* of Calprenede (q. v.), and the *Artamenes* and *Clelie* of Madeine Scudéri (q. v.).

For several centuries after the Norman Conquest the imaginative literature produced in England consisted chiefly of metrical tales of chivalry, cast at first in French, and afterwards in English verse. In 1485 the *Mort d'Arthur* was published by Caxton, a work which is the most notable example of early prose fiction in England. It was written by Sir Thomas Malory (q. v.), and consisted of a collection of Arthurian romances (see ARTHUR and ARTHURIAN ROMANCE), which various *trouvères* had amplified and linked together after Geoffrey of Monmouth (q. v.) made the tales of Arthur and Merlin known to Western Europe. The *Mort d'Arthur* is written in a quaint poetic style, and abounds in passages of deep feeling and strange allegoric significance, while the knights whose deeds it recounts are endowed with a kind of vague epical grandeur. The book was a popular favourite during the Tudor times, and after sinking almost into oblivion, has of late years re-attracted attention as the source of the themes of Tennyson's *Idylls of the King*. About the same time that Malory's book was issued, Caxton translated and printed stories of the siege of Troy, and of various ancient heroes; and during the reign of Henry VIII. Lord Berners produced English versions of the French stories *Artus de la Bretagne* and *Huon of Bordeaux*. During the 16th c. an impetus was given to the development of English prose fiction by the translations of foreign romances, while at the same time short and often facetious stories of English life became generally popular. Among these tales of purely English origin may be mentioned the *History of Thomas of Reading, or the Six Worthy Yeomen of the West*, which gives pictures of social life in England in the time of Henry I.; a version of the old favourite tale of *Robin Hood; George-a-Green, the Pinner of Wakefield; The Pleasant History of Tom-a-Lincoln, the Red Rose Knight*, which recounts how an English adventurer won the hand of the daughter of Prester John, 'the monarch of the world;' the *History of Helyas, Knight of the Sun*; the *Life and Death of Dr. John Faustus*; the *Life of Virgilius*, an adaptation of the medieval legends in which the poet Virgil figures as a necromancer; and the story of *Robert the Devil*, which tells how a prince, after rioting in sin through Satanic agency, is saved by a miracle from eternal perdition, and after doing penance by living among dogs, is married to an emperor's daughter. During the latter half of the 16th c. and the first half of the 17th c. various foreign and ancient tales of standing reputation were first made known to the English people by translations, and contributed greatly to mould the several forms which English fiction afterwards assumed. Among the earliest and most notable of the works thus rendered into English were part of Boccaccio's *Decameron* (1566), the *Golden Ass* of Appuleius (1571), the *Æthiopica* of Heliodorus (1587), Mendoza's *Lazarillo de Tormes* (1586), and Montemayor's *Diana* (1598). The first English version of *Don Quixote* was issued in 1620, and Urquhart published his felicitous rendering of Rabelais in 1653. Thus the types of fiction which may be styled the novel of gallantry, the pastoral romance, and the picaresque novel were introduced into England at the beginning of the 17th c. In the reign of Elizabeth, the voluminous Spanish romances relating the deeds of Amadis de Gaul and Palmerin were also 'done into English,' and several English imitations of the long chivalrous tales were produced, of which the most popular was perhaps Emanuel Ford's *Famous Hystorie of the Renowned Parismus, Prince of Bohemia*, published in 1598, and modelled to a great extent after the Spanish work *Palmerin d'Oliva*. But the fantastic and long-winded tales of chivalry could not satisfy the Elizabethan age, with its keen interest in human character, its frank enjoyment of humour, its positive practical tendency, its vigorous curiosity in regard to the incidents of actual life; and accordingly the old romances gave place to translations and imitations of Italian love-intrigues, such as Paynter's *Palace of Pleasure* and Grimstone's *Admirable Histories*. A form of fiction which seems to have been borrowed from no foreign work was introduced into English literature in 1516, when Sir Thomas More (q. v.) published his *Utopia*, a political allegory, in which the author's opinions in regard to the constitution of a state, marriage, education, &c., are set forth in the conversation of an imaginary seaman named Raphael Hythloday. Other examples of the prose political allegory are Bacon's *Atlantis*, Bishop Hall's *Mundus Alter et Idem*, and the *Argenis* of John Barclay. John Lyly's story entitled *Euphues*, and its sequel *Euphues and his England*, are mainly remarkable for having affected Elizabethan writers with a fondness for antithetic constructions and startling conceits. (See LYLY and EUPHUISM.) *Euphues* relates how a witty Athenian travelled to Naples and fell in love with a fair Neapolitan, with whom he engaged in long affected discussions, but who finally abandoned him for

his friend Philantus. In the sequel Euphues and Philanthus visit England, and though the narrative is of slight interest as a fiction, it affords us much valuable insight into the social life of the 16th c. Among Lyly's imitators were Lodge, author of *Rosalynd, or Euphues' Golden Legacy*, which supplied Shakespeare with the plot of *As You Like It*, and the dramatist Robert Greene (q. v.), whose prose tales show facility and grace of diction, and considerable skill in the management of the plot. Among the finest of his stories are *The Historie of Dorastus and Fawnia*, on which Shakespeare founded his *Winter's Tale*, and *Philomela*, a work of singular beauty of style and moral purity. In 1593 Sir Philip Sidney's prose-romance *Arcadia* was published. This is the most important contribution made to English prose fiction by any Elizabethan author. It is a pastoral and heroic romance, kings and queens and knights as well as shepherds and shepherdesses being among its chief characters. The scene of the story is laid in Arcadia and in other parts of the Peloponnesus. The style is elaborately quaint, flowery, and musical, and the characters are represented as endowed with ideal virtues. The moral reflections and minute descriptions of scenery are apt soon to become fatiguing, but the reader is repaid by the genuine tenderness of many passages and the heroic enthusiasm of others. (See SIDNEY.) The popularity of Sidney's *Arcadia* endured to the 18th c., and encouraged a taste for long romances resembling those of D'Urfé and Scuderi, of which the most noteworthy is the *Parthenissa* of Roger Boyle, Earl of Orrery.

None of the works above mentioned have retained their popularity to modern times, but in 1672, Bunyan (q. v.) published the *Pilgrim's Progress*, which went through ten editions before 1685, and was followed by the less successful allegoric tale of the *Holy War*. Several brief novels were written by Mrs. Aphra Behn, and were widely read in polite society at the close of the 17th c. Up to this time no prose fiction had been produced in Britain dealing at any length with the incidents of contemporary life, but in the early part of the 18th c., when English prose literature began to assume unwonted importance, a new development was given to fiction by Swift (q. v.) and Defoe (q. v.). The former gave a new direction to prose fiction, rendering it comic, homely, and outspoken, and stripping it of the flowery phrases and high-flown sentiments which marked alike the novels of gallantry and the Arcadian, or pastoral-heroic romances. Daniel Defoe (q. v.), without Swift's gift of humour, excelled him in the art of giving versimilitude to fictions, and produced a series of imaginary stories, any of which is almost indistinguishable from a veritable narrative. Defoe may be regarded as the writer who divorced British prose fiction from allegory and fanciful invention, and wedded it for a time to realism. Steele and Addison deserve to be numbered among writers of prose fictions, on account of several of the slight but exquisite sketches which they contributed to the *Spectator*. The *Memoirs of Martinus Scriblerus*, by Arbuthnot, Pope, and others, is a satire conveyed under a transparent veil of fiction, and Arbuthnot's *History of John Bull* is an allegorical and political satire. In 1740 appeared *Pamela, or Virtue Rewarded*, the earliest of the once popular N. of Richardson (q. v.). Richardson's N. are cast in the form of letters, the characters are artificial, and the story is in every case drearily spun out, but for pathos and minute accurate delineation of certain states of feeling, he has scarcely been excelled. His style of fiction was original, for, unlike Defoe and Swift, he had no foreign precedents for his tales. A more lasting popularity than Richardson's was gained by his contemporary Fielding (q. v.), whose great novel *Tom Jones* stands in many respects unsurpassed in British prose fiction, and combines the interest of a tale of adventure, of humorous pictures of everyday life, and of vivid delineation of character. The novels of Fielding and Smollett (q. v.), with their abundance of farcical incident, their variety of scenes, many of them laid in country inns, show the influence of *Don Furioso* and of Le Sage's *Gil Blas*, a French imitation of the Spanish picaresque novel. Charming prose tales were written by Sterne (q. v.) and Goldsmith (q. v.). The revival of naturalism in literature first began to show itself in the second half of the 18th c. It is distinctly traceable even earlier in the poetry of Thomson, Collins, and Gray. In prose, however, it is from the first merged in a picturesque medievalism. Percy's *Reliques* and Warton's *History of English Poetry* show the general direction of the current; but Walpole's *Castle of Otranto* (1769) is the earliest example of what may be called the *Gothic* romance. It was imitated in the wild stories of banditti, haunted castles, and fantastic melodramatic characters written by Mrs. Radcliffe (q. v.) and M. G. Lewis (q. v.), and it survived until the appearance of the *Waverley N.* Meanwhile the influence of the French Revolution began to show itself in Godwin (q. v.), who wrote powerful stories to expose the wrongs of the present state of society; while Mrs. Inchbald (q. v.), Mrs Opie (q. v.), Miss C. Smith, Miss Austen, and Miss Edgeworth (q. v.) foreshadow the future crowd of female novelists. Miss Austen and Miss Edgeworth finely illustrate the power of keen and critical observation possessed by their sex. Scott (q. v.) founded the modern historical novel, which, unlike the 17th c. heroic romances, endeavours to revive the manners of the past, and deals especially with medieval times. Since Scott's death N. have been produced in unprecedented numbers and variety, until they now hold the position in modern literature which the drama occupied in the Elizabethan period. From about 1830 to about 1835 N. of English life were written by Disraeli (q. v.), Bulwer-Lytton (q. v.), Douglas Jerrold (q. v.), Warren, Theodore Hook, Miss Martineau (q. v.), Charlotte Brontë (q. v.), and Ellen Brontë. Fashionable N., which aimed, generally without success, at representing aristocratic scenes and persons, were produced by Mrs. Trollope, Lady Blessington, Disraeli, Lytton, Mrs. Gore, Hook, &c.; military and naval N. by Marryat (q. v.), Hannay, Lever (q. v.), Cupples, &c.; historical N. by Lytton, James (q. v.), Ainsworth (q. v.), &c.; N. of Scottish life by Galt (q. v.), Hogg (q. v.), Cunningham (q. v.), Lockhart (q. v.), Wilson (q. v.), &c.; and Irish stories by Banim (q. v.), Lever, Lover, Griffin (q. v.), Carleton (q. v.), &c. The great masters of English prose fiction since Scott are Thackeray (q. v.)—probably the chief of all writers of N.—Dickens (q. v.), and 'George Eliot' (q. v.). Thackeray's excel all former English N. in combined beauty of literary workmanship, depth and keenness, wealth of thought, knowledge of character, and exquisite philosophic humour. Dickens founded a school of novelists that deal greatly in melodramatic incident and in comic pictures of London life. 'George Eliot' began her career by issuing tales of English rural scenes and provincial middle-class life, and has of late sought to make the novel deal with wider issues than are involved in the career of an individual. Among recent English novelists ranking more or less near to the three great authors mentioned above are Reade (q. v.), Collins (q. v.), Kingsley (q. v.), Mrs. Oliphant (q. v.), Macdonald (q. v.), Black (q. v.), Blackmore, M'Carthy (q. v.), Yates, and Whyte-Melville. The 'sensational' school of fiction, cultivated chiefly by women, neither needs nor merits special notice.

During the 18th and 19th centuries the literature of fiction has flourished among the other cultivated nations of Europe no less than in England. In France the fairy tales of Perrault (q. v.), Comtesse d'Aunoy (q. v.), Madame Villeneuve (q. v.), charmed and solaced for a couple of generations the jaded fancy of a society at once luxurious and superstitious. In the N. of Marivaux (q. v.), the Abbe Prevot (q. v.), and Crebillon (q. v.) we see a foreshadowing of the wild and impure licence that marks the latest developments of French fiction. Le Sage (q. v.), in his *Gil Blas*, *Diable Boiteux*, and *Le Bachelier de Salamanque*, reproduces the inexhaustible fertility of the Spanish picaresque romance; Rousseau (q. v.) and Voltaire (q. v.) represent the two grand phases of the intellectual movement that precipitated the Revolution—the extravagant enthusiasm for 'nature' and the profound contempt for 'superstition.' The reign of the first Napoleon was fatal to all imaginative literature; but the restoration of the Bourbons and the Revolution of 1830 witnessed more than a revival of the splendour of French fiction. The names of Balzac (q. v.), Paul de Kock (q. v.), the elder Dumas (q. v.), George Sand (q. v.), Lamartine (q. v.), Eugene Sue (q. v.), are the most famous of the past generation; of the present, none equals Hugo (q. v.) in grandeur of genius, or surpasses Dumas *fils* in subtlety of vice. All varieties of style are illustrated by the names of Merimée (q. v.), Murger (q. v.), Gautier (q. v.), Alphonse Karr (q. v.), and Messieurs Erckmann-Chatrian (q. v.).—German fiction first reaches excellence in the N. of Wieland (q. v.), which breathe a classic epicureanism. Before the end of the 18th c. a crowd of obscure writers appeared—the crude precursors of that Romantic school which is adorned with the exquisite art of Tieck (q. v.), Musæus (q. v.), and Fouqué (q. v.). Goethe (q. v.) is too universal, and Richter (q. v.) too unique a genius to be classified. Chamisso (q. v.), Steffens (q. v.), Brentano (q. v.), Zschokke (q. v.),

Auerbach (q. v.), Hoffmann (q. v.), Freytag (q. v.), Heyse (q. v.), and scores of others prove the fecundity and variety of German fiction, which faithfully reflects the national peculiarities in its depth and dreaminess of sentiment, its quiet lovable humour, its slow and somewhat heavy movements, and its patient development of character. Italy can boast of the world-famous *Promessi Sposi* of Manzoni (q. v.), who has founded a school of historical fiction in which the foremost names are Rosmini, Grossi, Cantu, D'Azeglio (q. v.), and Guerrazzi (q. v.); Spain has a brilliant list, Saavedra, Mora, Romero y Larranâga, and above all Fernan Caballero (q. v.) being known far beyond the Pyrenees; Belgium is proud of its Flemish genius Hendrick Conscience (q. v.); Holland is rich in writers, some of whom at least have more than a national reputation, Lennep (q. v.), Bogaers, Meyer, Ter Haar, Oltman, Tonsainnt (q. v.), Cremer, Schimneel, Brouwer, Linde, and Dekker. For some notice of Danish, Norwegian, Swedish, Russian, and Hungarian novelists, our limits compel us to refer to the articles on the literatures of these countries. American fiction may be regarded as part of English fiction. It will always find expression through the English tongue, and it will always continue to be affected by the literary associations of that tongue. But more and more distinctly, as years pass on, will the differences of social and political life come to be reflected in this infallible mirror. From the first a certain idiosyncrasy was visible. Even Washington Irving (q. v.) and Brockden Brown (q. v.) are not destitute of a New World aroma, which is stronger in Poe (q. v.) and Holmes (q. v.), intense in Fenimore Cooper (q. v.), Hawthorne (q. v.), and Mrs. Beecher Stowe (q. v.), and in Bret Harte (q. v.) seems at times to pass into a fresh and original perfume. See Dunlop's *History of Fiction* (Lond. 1814), Wolff's *Allgemeine Geschichte des Romans* (Jena, 1841), Chassang's *Histoire du Roman dans l'Antiquité Grecque et Latine* (Par. 1862).

Novem'ber (from Lat. *novem*, 'nine;' old High German *Harbistmânôth*, 'harvest month'), the ninth month of the early Roman calendar, after the addition of January and February, became the 11th. It has thirty days, and is the first of the three winter months. On the 21st or 22d N. the sun enters Sagittarius.

Novgorod, or Veliki-Novgorod ('great new-town'), the capital of a government of the same name, Russia, on the Volkhov, near its issue from Lake Ilmen, 125 miles S. by E. of St. Petersburg by rail. It is divided by the river into the *Sophia*-town and the *Trade*-town; and these are connected by a beautiful bridge built on granite piles. The Sophia or old portion of the town is still girt with walls, and includes the Kremlin with its old cathedral, containing the shrine of St. Ivan of N., which attracts great numbers of pilgrims. The celebrated *Chersonese* gates of the cathedral appear to be of old German workmanship in imitation of Byzantine art. N. has thirty-four other churches and an imperial palace, and outside the walls are several convents—St. George's at the outflow of the Volkhov especially possessing immense treasures. Pop. (1870) 17,093. Founded by Prince Rurik in 864, N. in the 12th c. formed a free state, and extended its power to the Arctic Ocean and to the Obi. In the time of the Hansa it was one of the most important trading towns in Russia. It excited the jealousy of the Muscovite princes towards the close of the 15th c., was almost destroyed in 1478 by Ivan III., and declined rapidly thereafter. The opening of Archangel and the foundation of St. Petersburg greatly damaged its foreign trade.—**N.**, the *government*, lies E. of that of St. Petersburg, and encloses the whole Valdai plateau. The Valdai hills in the S. form the common watershed of the Baltic, Caspian, and White Seas. The surface is undulating, and lakes are numerous; but the soil is poor, only one-seventh of the whole area being under grain, hemp, and flax. Forests and pasture lands, however, are extensive; and timber floated down the rivers and canals is an important article of trade. Area, 47,213 sq. miles. Pop. (1870) 1,016,414.

Novgrad-Volynsk, a town of W. Russia, in the province of Volhynia, 50 miles N.W. of Zitomierz. It has important manufactures in cloth, leather, &c. Pop. (1870) 9341.

Novibasar', a town of European Turkey, in the vilayet of Bosnia, 140 miles S.W. of Widdin, on the Rashka, a mountain stream which ultimately mingles its waters with the Danube. It has celebrated fairs and an important trade, and in its vicinity are warm springs. Pop. 9000.

Nov'ice (from Lat. *novus*, 'new') was the name given in the early Church to a newly baptized person (see 1 Tim. iii. 6), and was afterwards applied like Neophyte (q. v.) to a Catechumen (q. v.). Nowadays it is applied to one who is undergoing a period of probation (called a novitiate) and a system of discipline preparatory to becoming a monk or a nun. At the end of the novitiate, which varies in length in different orders, the N., if still inclined, is 'professed' or receives the vows of the order.

No'vi Ligu're, a town of Italy, in the province of Alexandria, 33 miles N.N.W. of Genoa by rail, contains twelve churches, a museum, picture gallery, and public library, and has important silk manufactures. Pop. (1874) 12,162. Here the French were defeated by a Russo-Austrian army under Suvaroff, and lost Joubert, their general, and 16,000 men, August 15, 1799.

No'vomoskovsk' ('New Moscow'), a town of S. Russia, in the province of Ekaterinoslav, on the Samara, an affluent of the Dnieper, 17 miles N.E. of the town of Ekaterinoslav. It has three extensive annual fairs for the sale of cattle and horses, also manufactures of leather, tallow, &c. Pop. (1870) 10,515.

No'votcherkask' ('New Tcherkash'), the chief town in the territory of the Cossacks of the Don, S. Russia, on the Aksai, an arm of the Don. It was founded in 1805, is the residence of an archbishop, and has a large cathedral, seven churches, the courts of justice, and a large annual fair. Pop. (1870) 18,611.

Nowanuggur (*Ndwanagar*, 'new town'), the chief town of the native state of the same name, in the peninsula of Kattywar, India, on the S. shore of the Gulf of Cutch, 160 miles S.W. of Ahmedabad; pop. (1872) 34,744. It is a flourishing place, with a special manufacture of dyed cotton cloth, large quantities of which are exported to the Arabian and African markets. The state of N. comprises 633 villages; pop. (1872) 290,847; revenue, £150,000; tribute to the Guicowar and the British, £12,000. It has a great extent of sea-coast; and it is said that Poshetra and Seria, though not now used, are the two best natural harbours in India. The chief, whose title is Jam, is of the Jareja caste of Rajputs, and the family are said to have immigrated from Cutch about 1422. He is the second chief in Kattywar.

Nowgon' (*Ndugdon*, 'new village'), the chief town of the district of the same name, Assam, British India, on the left bank of the Brahmaputra; pop. (1872) 2883.—The *district* of N., which lies between the river and the Naga Hills, has an area of 3415 sq. miles; pop. (1872) 256,390. In 1874 there were 2878 acres under tea cultivation, yielding 387,085 lbs.; 5 Europeans were employed, and 2600 natives. In 1876–77 the exports by river were £184,000 worth of tea, and £9000 of caoutchouc; the imports included piece-goods (£18,000), salt (£6000), and liquor (£4000).—There is another town of the same name in Central India, which is the headquarters of the Bundelcund Agency, and a station for a battery of European artillery.

Noyades were a series of 'drownages' executed by Carrier, deputy of the Convention, at Nantes during the French Revolution. Priests, women, and children were packed into flat-bottomed craft, which were scuttled in the middle of the Loire. There were twenty-five of these 'sentences of deportation executed vertically.' See *Procès de Carrier* (4 vols. Par. 1795).

Noyau, or Crême de Noyau, a favourite liqueur, the characteristic flavour of which is due to the presence of a minute proportion of the essential oil of bitter almonds, derived either from bruised almonds or from peach or apricot kernels. Other flavouring ingredients are in some cases added, and, as with all true liqueurs, the drink is sweetened with fine sugar.

Noy'on, a town of France, in the department of Oise, on the Verse, 77½ miles N.N.E. of Paris by rail, has a cathedral (founded by Pippin the Short, and rebuilt 1180), an hôtel-de-ville (1485–1523), the house where Calvin was born, and other historical buildings. There are manufactures of cotton, hosiery, and vinegar, and a trade in corn, wine, leather, and wood. Pop. (1872) 5236. The *Noviomagus* of the Romans, N. was the scene of the consecration of Karl the Great (768), and of the election of Hugues Capet (987).

much sacred music by Haydn, Mozart, Purcell, &c. He died at Nice in 1861.—**Clara Anastasia N., Countess Gigliucci,** fourth daughter of the preceding, was born in London 15th June 1818. She studied singing at the Conservatoire Musique Sacrée at Paris, and subsequently in London under Moscheles and Costa. In 1835 she was elected an associate of the Philharmonic Society.

Nu'bia, the *Cush* of the Bible, and the *Æthiopia* of the Romans, is the middle part of the territory subject to the Khedive of Egypt, being bounded N. by Egypt, E. by the Red Sea, S. by Abyssinia, and W. by Darfoor and the desert of Sahara. On account of its ill-defined boundary towards the W. and partly towards the S., the area is variously estimated at 300,000 and 500,000 sq. miles. The pop. is about one million. The surface consists of a series of extensive plateaus, that of Sennar 1377 feet above the level of the sea, and that of Kartoom 1263 feet, through which the Nile descends from Abyssinia, and which are bounded E. and W. by ranges of low hills separating N. from the Red Sea and the Sahara. The climate is extremely hot, though, owing to its dryness, not unhealthy. With the exception of a few oases of small extent, the ground is cultivable only in the Nile valley, which is here a ravine from five to nine miles broad, with steep banks, and can be overflowed by the river only in a few places. Hence the people are forced to draw up most of the water for irrigation by means of various mechanical contrivances. The Nubian desert to the E. of the Nile consists of rocky mountains, separated by deep wadies or ravines. On the W. side, in the great bend of the Nile, lies the desert of Bahjuda, a sandy steppe offering extensive pasture for camels. The chief exports are gums, dates, and senna leaves; though durra, tobacco, and the sugar-cane are also grown to some extent. The slave traffic can now be carried on only in secret, and in obscure places. The chief towns are Massana, Berber, Dongola, Abu Hammed, and Korosko. The first is the principal port of the province on the Red Sea. The population consists of Nubians, who to the E. of the Nile are much mixed with the Arab element, and, in the S.W., of negroes, who belong to the stem of the Fundi. The Nubians call themselves Berâbra, and live chiefly between the two last cataracts. They are of medium height, of reddish-brown colour, with slightly curling hair, a pleasing expression, and often almost European features; the head is small, the forehead high, the nose straight and well formed, the eye large and black, and the muscular development slight. They are industrious, temperate, truthful, and honest, and are in much request among the Egyptians as servants. Until their eighth or tenth year both sexes go quite naked; then the boys put on a linen shirt, or merely a girdle, while the girls wear until their marriage a *rachat*, consisting of a girdle with a long fringe. The women dress themselves in loose trousers and mantles of blue cloth, with which they also cover their heads. The men shave the head with the exception of a tuft on the crown, the females letting their hair, which they soak in ricinus oil, fall over their neck and shoulders in numerous thin braids. The Berâbra marry early, the girls in their eleventh or twelfth year; and the richer men generally have several wives. The dwellings consist of small square houses with flat roofs, built of sun-dried clay or mud bricks. The furnishing is very simple; the water is kept in large bomb-shaped vessels, and mats of palm-leaf serve as doors, carpets, and mattresses. The principal article of food is millet, flesh being little eaten. Agriculture and cattle-rearing are almost the only occupations. In religion the Nubians are all Mohammedans. Besides the Berâbra, there belong in a wider sense to the Nubians those races included under the name Bedshah, viz., the Shâîkieh, S. of Dongola, the Besharîn, S. of the 23° in the desert, with the related tribe of the Shukurîah, who occupy the valley of the Atbara, and the inhabitants of the Bahjuda desert, the Hasânîeh and the Kababîsh, whose territory reaches to Kordofan. About the middle of the 5th c. the Nubians had founded a great kingdom which reached to the highlands of Abyssinia, and of which Dongola was the capital. In the 6th c. Christianity penetrated N. and gained over the majority of the population. It flourished for eight centuries, during which period were erected those numerous monasteries the ruins of which are still to be seen in the Nile valley. But in the 14th c. N. was conquered by the Arabs, under whose rule Islamism became the national faith. In 1820 N. was subdued by Ismail-Pasha and united to Egypt. Besides the works of Burckhardt, Rüppell, and Russegger, see Kremer's *Ægypten* (2 vols. Leips. 1863), and Hartmann's *Naturgeschichtlich-Medic. Skizze der Nilländer* (Berl. 1865).

Nu'cha, a fortified town in the Russian government of Baku (Transcaucasia), on the Kish-Tchai, which falls into the Alazan, a tributary of the Kur, 125 miles E.S.E. of Tiflis. N. consists of a Tartar town, with 2 large and more than 20 small mosques, and an Armenian town, the seat of an archbishop, with 3 churches. It has large manufactures of silk, and the surrounding district is covered with mulberry woods. Pop. (1870) 23,371, chiefly Mohammedans of the Shiite sect.

Nu'cleobranchia'ta or **Heterop'oda,** the highest order of the class Gasteropoda (q. v.), including those molluscs which have a univalve shell, while the 'foot' is converted into a vertically-flattened fin. Sometimes the shell is wanting. They are found chiefly in warm seas. The flattened fin or foot may be provided with a sucker, by means of which the N. can attach itself to seaweed and other objects. Two families (*Atlantidæ* and *Firolidæ*) are included in this group. The *Atlantids* are numerously represented as fossils in the Palæozoic rocks; the *Firolidæ* are represented by a single fossil species in the Miocene formations (Tertiary).

Nu'cleus, the name applied to the solid particle found in the interior of *Cells* (see CELLS), and also named the *endoblast*. The N. may contain and have attached to it another and smaller particle, the *nucleolus*. There can be little doubt that wherever occurring in cells or cellular organisms, both N. and nucleolus are concerned in the work of *reproduction*. The N. may in fact be named the 'reproductive centre' of the cell. In the lowest animals or *Protozoa* (q. v.) a *nucleus* is almost invariably found. It occurs in such *Protozoa* as *Amœba, Foraminifera, Infusoria, Gregarinidæ*, &c. That the N. is concerned with development and reproduction becomes apparent when its relations to the *germinal vesicle* of the *ovum* or egg are considered. After fertilisation both N. and nucleolus disappear or become so modified as to be unrecognisable, and hence the importance of these structures as the essential parts of the egg may be readily proved. The N. found in *seeds* or *ovules* of plants is a different structure from the N. of cells. See SEED.

Nudd'ea (*Nadiyá* or *Nabadwip*, 'new island'), a town, though not the chief town, in the district of the same name, Bengal, British India, on the right bank of the Bhagirutti, the most direct mouth of the Ganges, 60 miles N. from Calcutta. Pop. (1872) 8863. It was the capital of the last independent king of Bengal, and is a holy place for bathing pilgrimages. It is still a centre of Sanskrit learning, where the pundits lecture, especially on logic, in poor mud huts. Former sites of the town have repeatedly been swept away by changes in the river course.—The *district* of N., which lies at the head of the Gangetic delta, has an area of 3421 sq. miles. Pop. (1872) 1,812,795. It is very fertile, and is traversed by many navigable rivers, and also by the railway. It exports indigo, silk, pulses, wheat, jute, oil seeds, sugar, chillies, and other vegetables, but requires to import rice. The manufactures are brass-ware, cotton cloth, and clay figures. In 1876–77 the value of the registered traffic was upwards of £2,000,000. The chief towns are Krishnuggur, Santipore, and Kushtea. N. was the chief scene of the indigo riots of 1860, but the European cultivation of that dye is now reviving, the export in 1876–77 being valued at £240,000.

Nudibran'chiate (Gr. 'naked-gilled'), a section of *Gasteropodous* molluscs, in which the *branchiæ* or gills are exposed on the back of the animal or on the sides of the body; a shell being absent in the adult state. Examples are the *Doris* or 'Sea Lemon,' the *Æolis, Glaucus, Elysia*, &c.

Nu'dum Pac'tum is in law an agreement without Earnest (q. v.) or Consideration (q. v.). *Nuda Pacta* are void in law.

Nue'ces, a river of Texas, U.S., rises near the country of the Comanches, flows in a south-easterly direction, and falls into Corpus Christi Bay, in the Gulf of Mexico, after a course of 300 miles.

Nugg'et (a corruption of *Ingot*), a miner's term for a lump of native gold of any size. The largest masses, usually of very great purity and containing very little disseminated quartz, are found in the alluvium of auriferous districts. The names

places, and year of discovery, and weights of several of the largest known nuggets are given below.

	Gross Weight. oz.	dwts.
'Welcome Stranger,' Dunolly, Victoria, 1869	2280	
'Welcome,' Ballarat, Victoria, 1858	2217	16
'Blanche Barkly,' Kingower, Victoria, 1857	1743	13
'Precious,' Berlin Diggings, Victoria, 1872	1621	
A N., Ballarat, Victoria, 1853	1619	
A N., Burrangdoeg, New South Wales, 1858	1286	
A N., near Bathurst, New South Wales, 1851	1272	
A mass found at Miask, Ural Mountains, 1842	1158	2
'Lady Hotham,' Ballarat, Victoria, 1854	1177	17
'Viscount Canterbury,' Berlin Diggings, Victoria, 1870	1105	
'Viscountess Canterbury,' Berlin Diggings, Victoria, 1870	884	10
'Kum Tow,' Berlin Diggings, Victoria, 1871	718	5

Nugg'ur (*Nágar*), sometimes also spelt Nagore, a term of Sanskrit origin meaning town, commonly used throughout India either as a suffix or by itself. According to Hindu authorities the name should be reserved for cities with 100,000 houses. The most noted towns of this name are: (1) in the district of Tanjore on the sea coast, 160 miles S. of Madras, conspicuous to mariners by its five white pagodas; (2) in the district of Beerbhum, Bengal, 134 miles N.W. of Calcutta. This was the capital of a long line of Hindu and Mohammedan princes, whose descendant still lives there in poverty, and it contains many ruins of palaces, mosques, and tanks; (4) in the native state of Bickanir in Rajputana, with an estimated pop. of 20,000; (5) in the district of Shimoga, Mysore, a former capital of that state; pop. (1871) 1295. When Hyder Ali sacked this town, he is said to have obtained a booty of £12,000,000.

Nui'sance. In England nuisances at law are *public* or *private*. A public N. is an offence against the state punishable by fine. The remedy for a private N. is a civil action at the instance of the person aggrieved. Procedure for prevention or removal of N. is by Injunction (q. v.), or in Scotch law, by *Interdict* (q. v.). To obstruct a highway, or a public river, or to keep a gaming house is a public N. To conduct an offensive business, that of a tallow-melter, for instance, may be a private N. In the case of the Duke of Northumberland *v.* Clowes, when the defendant employed in his business a steam-engine which caused noise and vibration in the plaintiff's house adjoining the premises of the defendant, it was held to be a N. The common law of N. has been materially altered by the Public Health and Nuisances Removal Act 11 & 12 V. c. 63, 18 & 19 V. c. 116, and 35 & 36 V. c. 79. The general scheme of these Acts is to enable districts to appoint local boards with ample powers regarding sanitary measures, such as the providing efficient drainage and introducing sufficient water-supply, and for the levying of rates to carry out and maintain the same. The absolute right which a man has to the use of his property is not limited merely because the use he makes of it causes inconvenience to his neighbour. Circumstances have always great weight in determining whether an operation is a N. or not. It makes a great difference when works are established, whether or not they are so in a populous neighbourhood or in a place thinly or not inhabited, whether or not in a part of a town where similar works already exist. One coming to a N. has no legal right to complain of it.

Nulchitt'y (*Nalchiti*) a town in the district of Backergunge, Bengal, British India, on the Burrisal river, 130 miles E. of Calcutta. Pop. about 4000. It is a mart of some standing, and a great centre of collection and distribution; exports rice and betel nuts to the value of £186,000; imports cotton goods, sugar, tobacco, oil, and salt, valued at £358,000. In 1875 the bill transactions of native bankers were ascertained to amount to £638,000.

Nullifica'tion, a doctrine formerly held by that section of the United States politicians which insisted on the sovereign right of States to reject any law of Congress which it considered unconstitutional, and to secede from the Union if its enforcement were attempted. The leader of this party in the memorable controversy of 1832 was John C. Calhoun. The result of the Civil War (1861–65) has been to annihilate the doctrine, which now possesses only a historical interest.

Numan'tia, the capital of the Arevaci in Hispania Tarraconensis, and the most celebrated city of the Celtiberi, was situated on a steep eminence skirted by the Durius (*Douro*). The destruction by Scipio Africanus of N., B.C. 134, after a siege of fifteen months, during which the Celtiberi displayed heroic endurance, has furnished a not unworthy theme for the pens of Appian, Eutropius, Cicero, and Strabo. It was not a walled city, but was defended simply by ditches and entrenchments. The ruins of N. may still be seen at Puente de Don Guarray. See Aldrete, *Ant. Hisp.* i. 6; D'Anville, *Mém. de l'Acad. des Inscript.*, vol. xl. p. 770, cited by Ukert, vol. ii. pt. i. p. 455.

Nu'ma Pompil'ius, successor of Romulus, according to Roman legend, was a Sabine of Cures. Romulus, as his birth betokened, was the representative of the war element; N. succeeded him to inaugurate the arts of peace and the reverence for religion and law. By the aid of the nymph Egeria he elaborated his scheme of culture and discipline; and during his long and peaceful reign he founded and established the Roman religious orders, viz., Pontiffs, Augurs, Flamens, Vestal Virgins, and Salii. In his time the temple of Janus was always shut, and at last, after a reign of thirty-nine years, N., like the beloved of the gods, fell asleep, and Egeria disappeared like the gentle rain. The story is one of the most beautiful of the early Roman legends. The connection of N.'s name with Gr. *nomos* ('law') belongs to the realm of pure fancy. The sole germ of truth in the tradition regarding him seems to lie in the fact that at an early period the religious system of the Sabines took root in Rome. In N.'s time the Etruscan element was quite undeveloped.

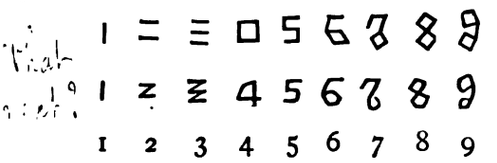
Numbers, Book of, the fourth book of the Pentateuch (q. v.), is so called from its giving an account of the numbering of the Israelites before they left Sinai (i.) and again in the plains of Moab (xxvi.). The contents may be divided into four principal sections:—1. Ch. i.–iv., the numbering of the Israelites, forming them into a camp, and the appointment of the Levites; 2. v.–x. 10, the institution of various ceremonies, civil and religious; 3. x. 11.–xxi., the journeyings from their leaving Mount Sinai in the second month of the second year after the Exodus, till their arrival in the land of Moab in the fortieth year; 4. xxii.–xxxvi., a history of the transactions on the plains of Moab.

The traditional view is that the B. of N., like the rest of the Pentateuch, was written by Moses; the following real or apparent chronological and other historical discrepancies have been pointed out by critics as proving that, in its present extent and form, it cannot have been composed by Moses:—1. the quotation xxi. 14; 2. the way in which the narrative of xv. 32–36 begins; 3. the unsuitable position of ix. 15–23, *cf.* Ex. xl. 34–38; 4. the chronological discrepancy between i. 1 and ix. 1; 5. the great gap in the history of about thirty-eight years (*cf.* xx. 1–23, 29, xxxiii. 38); 6. the discrepancies between viii. 23 and iv.; 7. chap iii. as compared with i., ii., and iv.; 8. the relation of xxxiii. 1–49 to the last of the book; 9. certain repetitions, *e.g.* in xiv. 5–10, 26–38, *cf.* xiii. 1–xiv. 4, 10–25, 39–45. See Bleek's *Einleitung in d. Alte Test.* (Eng. trans. 1869).

Num'bers, The'ory of, is a branch of pure mathematics, which seems to have very little connection with other branches of the science, except perhaps the solution of equations. Consequently it is very little studied by the majority of mathematicians, and cannot be expected to be otherwise until it has developed more in its applications. To give an idea of its scope would be out of place here; but under the article PRIME some details will be given. To the mathematician who turns his attention to it the subject seems to have peculiar charms. The theorems established by Fermat were extended and classified by Gauss and Legendre independently, whose treatises *Disquisitiones Arithmeticæ* (1801) and *Théorie des Nombres* (1830) are the classical works in the whole literature of the subject. Memoirs by Euler, Jacobi, Dirichlet, Lagrange, Eisenstein, Poinsot and others are to be found in the leading scientific journals and transactions; but no beginning seems yet to have been made in the direction applicative of the principles of the T. of N. to physical questions. A full and critical history of the subject will be found in Professor W. J. O. Smith's *Reports on the T. of N.*, the first of which appeared in the Transactions of the British Association for 1859.

Nu'merals are the symbols by means of which numbers are expressed. Our present common system of N., which is capable of expressing any number by the combination of symbols, of which there are but ten distinct forms, is traceable through the

Arabs to the Hindus. They are ordinarily called the Arabic numerals, and are probably the corrupted forms of an older set of representative symbols, whose numerical significations were more evident. There is no doubt that the first instruments of calculation were the fingers; and, as these number when normal ten, numbers were naturally grouped in tens. Had the generality of mankind possessed twelve fingers, we should have as naturally grouped our numbers in dozens. Sixteen would have then corresponded *in name* to fourteen, and might have been called four-twelve. Of course twelve distinct symbols would have then been necessary. The following development of our ordinary N. is ingenious, and, from its resemblance to the undoubted development of the Roman N. (I., II., III., IIII., &c.), plausible. The origin of 1 is obvious; 2 may be brought from = through Z, which would result easily through rapid writing, and so on with the others. The following table gives in this theory the possible original forms compared with the ordinary symbols :—



1 2 3 4 5 6 7 8 9

The first row consists of combinations of *straight* lines only.
The second row is what the first might become in consequence of rapid writing.
The third comprises our ordinary numerals.

The Roman N, though unsuited for calculation, are conveniently used for numbering successive sections, chapters, divisions, &c. Of the two forms of four, IV. is obviously modern, and must be read as equivalent to one before V., so VI. is one after five, VII. two after five, &c., IX. one before ten or X. and so on. The origin of V. and X. is explained in two very distinct ways. By some V. is regarded as a symbol for the hand with fingers and thumb displayed, and X. similarly the symbol for both hands together. By others X. is looked upon as an abbreviation for the crossing out by a diagonal line of each group of originally ten successive strokes; and similarly C. or one hundred is explained as the final form of a similar operation effected by two longitudinal lines upon each group of originally ten tens. V. is then explained as half of X., and L. or fifty as half of C.

The ancient Greek system of N. deserves a passing word, though it is a purely artificial system. They divided their twenty-four letters of the alphabet into three groups, and by adding a new symbol to each, obtained symbols for units, tens, hundreds, with intermediate numbers expressed exactly as we express them. Thousands, tens of thousands, &c., were represented by repeating the old symbols distinguished by a prefixed tick. This system was far superior to the Roman for calculating purposes, and if they had had a cipher might have easily developed into as effective a method as our modern one.

Numera'tion is the system of naming numbers. The necessity for some systematic method is evident when it is considered that the number of possible numbers is infinite while the number of words in use must be finite. The denary scale, which is universally employed among civilised nations, is perhaps as convenient a scale as we could get. The nine units of the first order receive particular names. The unit of the second order is ten, and by combining this word with the other units all numbers up to ninety-nine are named. With a hundred a new unit is required, and so with a thousand. These, however, suffice till we reach a thousand thousands or a million, and so on up to billions and trillions. These latter names are rarely used, and indeed there is no definite universal meaning attached to them. The French call a billion a thousand millions; in this country we regard it as equivalent to a million millions. See NOTATION, NUMERALS.

Numid'ia (Gr. *Nomadia*, 'the land of nomads'), anciently the name given to that part of the N. coast of Africa corresponding partly to the modern Algeria (q. v.). It was bounded N. by the Mediterranean; E. by the river Tusca (now Wadi-el-Berber) which separated it from the territory of Carthage, afterwards the *Africa propria* of the Romans; W. by the Mulucha (mod. Muluya), the limit of Mauretania; and S. by the ranges of the Atlas, which shut it off from Getulia and Libya. The inhabitants, like the Mauretanians, belonged to the Berber race (see BERBERS). They were strong, warlike, fond of a free life, and splendid horsemen. Among the numerous peoples into which they were divided, the most important were the *Massyli* in the E. and the *Massæsylli* in the W. Masinissa, king of the former, and an ally of Rome, first welded the various nomadic tribes into a state. Of his successors, the most notable was Jugurtha (q. v.). After the defeat of Juba by Cæsar, B.C. 46, the larger part of N. became a Roman province. The western part was joined to Mauretania, and when the latter also became a Roman province in the reign of Claudius, it was split into two, the part to which N. was annexed being called *Mauretania Cæsariensis* (from the town of Cæsarea; mod. Tenez), and the other *Mauretania Tingitana* (from the town of Tingis; mod. Tangier). Among its great cities during the Roman period were Hippo, Lambæsis, and Cirta (now Constantine). Its subsequent history is traced under Algeria. See Davis, *Ruined Cities within Numidian and Carthaginian Territories* (Lond. 1862), and Nau de Champlouis, *Carte de l'Afrique sous la Domination des Romains* (Par. 1864).

Numismat'ics (from Lat. *numisma*, a 'piece of money,' a 'coin') is the science of the description and interpretation of coins and medals. The leading technical terms are obverse, reverse, field (what is clear of design), legend, exerge (or lowest design). If coins had always been what modern coins are, mere crowned heads and heraldry with legends repeating political titles and the value of the money, this would not have been a fruitful science. But as in the local token coinage, which England had from 1770 to 1820, when 'Sheffield pennies' bore the heads of Nelson, Newton, or Wellington, with appropriate patriotic mottoes, so in the ancient world it was understood that coins had nobler uses than to pay reckonings with, and even where, as in Athens, a great commerce rendered necessary a constant mark (Pallas and the Owl) it was found possible to celebrate almost all great political events upon the coins, which thus became not mere currency or chronology, but an æsthetic abstract of the times. As Pope says (*Moral Essays, Ep. V.*),

> 'Beneath her palm here sad Judæa weeps;
> Now scantier limits the proud Arch confine,
> And scarce are seen the prostrate Nile and Rhine;
> A small Euphrates through the piece is rolled,
> And little eagles wave their wings in gold.'

They show art, commerce, laws, conquests, treaties, religion, language, all social life. The necessity of N. in settling dates is obscured by the great mass of materials, and by the fact that the evidence is broken up into many isolated portions. The pre-Christian coins (viz., before Constantine the Great, by which time the local mints had ceased to issue coins, and the *nummi tincti* or washed copper were taking the place of silver) extend from Ebora in Portugal to Bactria in Central Asia, and from Camelin in Britain to Coptor on the Nile and over a period of one thousand years. Thus Leake in his *Numismata Hellenica* has shown clearly the immense geographical range of Greek inscriptions, of much of which no other record remained. The Athenian Owl is found on the same *staters* and *oboli* as the Corn ear of Sicily, the Elephant of Africa, the Pegasus of Corinth, the Sphinx of Egypt, the Rose of the Rhodians, the Lion of Leontium, &c., thus indicating close commercial relations. The silver tetradrachma of Alexander the Great—with its head of Hercules, with the lion skin, and the sitting Jupiter—was used over a great part of his empire long after his death. Again, Athens had no gold, while the frequent silver didrachms of Etruria and Magna Græcia indicates high prices or abundance of metal. A comparison of the silver and copper coinages of Syracuse shows that the value of the two metals was in the ratio of 445 to 1; and the three great cities of Corinth, Syracuse, and Athens seem to have adjusted their currency for mutual convenience. The early supremacy of Argos and the importance of Chalcis and Eretria, in the 7th c. B.C., depend for proof on the Argive and Æginetan coins of Phidon and on the prevalence of the Euboic standard of weight money. The Zeus Ikmaios, the Bee and the Amphora with the rough *quadratum in cussum* crossed by diagonal lines and the name Carthæa, show that Ceos was an agricultural Phœnician colony which adopted the Solonian standard of coinage. From

the style of the die-engraving, too, inferences may be drawn as to the state of the contemporary arts, and from them to other elements of social progress. The divisions of provinces are often determined by the phrase *anō* or *katō* used on the coin; and the sites of forgotten cities are found in the local deposit, especially of copper coins. Again, it is almost entirely on the scale of weights, the designs, and the alphabet used on coins that the evidence rests for the connection between Athens and Etruria, and between Sicily and Latium, where the talent, drachma, obol, and mina system coalesced with the pound and ounce system. An Athenian coin has even been found on the Etrurian Amber Route in Posen. All we know of Poseidonia or Pæstum (except that roses grew there) and of Sybaris comes from the coins. Alliances between Rome and other Italian cities are recorded by coins bearing both names and a figure named *Pistis* or Faith. While silver pieces in Greece were thick, often stamped on one side only, and in general without inscriptions, the Italian Achæans cut large thin coins with inscriptions from two similar dies partly cut in relief, partly sunk. These were called encased, the style of impression protecting the coin from the counterfeit of plating inferior metal with their silver foil. The brilliant gold coins of Tarentum (mostly marked with the child of Taras riding a dolphin or with a horse-soldier) have been described in Combe's *Hunterian Catalogue*. The absence of the word *Basileos* from the coins of Hiero II. is supposed to confirm the popular and democratic tendency of his rule. Again the coins of Panormus show that the Greeks were there before the Carthaginians, who never adopted the Greek idea of a commercial currency. In the bilingual coins of Phistelia, &c., with Greek and Oscan characters written from right to left, a spica of wheat, dolphin and mussel shell, sometimes with the Pentagram or Pythagorean symbol of health, we find the history of the Samnite invasion of Magna Græcia. A Samnite coin, which calls Mutilus the Embratur (Imperator), shows the bull of Italy goring the wolf of Rome. The progress of Roman coins through the *aes rude* and *aes signatum* of the first copper casting to true coining, with inscription including the national Janus and ship's prow, and from the oblong stamped bars to oval elliptical and finally circular shapes was very slow and really depended on Hellenic art. The *aes grave* of Iguvium and Hatra contains a striking record of religion, writing and rude art; *inter alia* the bearded Bacchus. It was to avoid the enormous weight of *aes grave* that the Syracusan *litra argurion* was coined. Mr. Warren's *Essay on Greek Federal Coinage* (1863) points out that the uniformity and extensive currency of such coins as the Amphictyonic (with its veiled head of Demeter and the sacred Omphalos encircled by a snake) are tests of the strength of the various early Leagues in Greece. Forty-one towns accepted the Achæan coinage. Much information is given about individual cities. Nicomedia celebrates the reconcilation of her Senate and Commons, Tarsus her freedom from taxation, Tyre her right of sanctuary, Ephesus her worship of Diana, and the names of many civil officers are preserved in the same way. The Macedonian multilingual coinage has been for Lassen, Prinsep, and Wilson the key to the sepulchral inscriptions of the Bactrian Topes; dynasties of kings are formed from the 'saviours,' 'unconquered,' and 'king of kings,' mentioned on the coins; and the gradual declension from the pure Greek style, legends and types of the Seleucidæ, shows the breaking up of the empire. In the later ages of Rome the *Family Series* of coins arose from the practice of voting a certain amount of bullion to the magistrates for the time, who had it minted according to their own types. Hence such a mass of detailed information that the coins of the Romans have been called their gazettes. These family coins often represent some story of the gens: thus some Aemilian coins represent M. Lepidus as *Tutor Regis* giving the crown to Ptolemy Epiphanes, with the head of personified Alexandria on the obverse (see Akerman, *Roman Coins relating to Britain*). The *denarius argenteus* (copper plated with silver) was never able to drive the drachma out of the Eastern empire. At a much later date the coins throw unexpected light on social conditions. In Nerva's short reign several distinct doles (*Congiaria*) seem to have been given to the people; and the coins of the same reign record all we know of a tax called *vicesimlati*. The chronology of Trajan and Hadrian is strangely dependent on their coins (see Clinton's *Fasti Romani*). We can only allude to the important uses of coins, especially bilingual, in the preservation of archaic alphabets. The Punic lines in Plautus have been recovered in this way; and 'every philological fact is a history abridged.' The Celtiberian dialect stands half-way between the Phœnician and the Greek coins of Spain. Coins also throw light on passages in the classics, especially the poets, and embody important facts in music, mathematics, and mechanics. From Creuzer's *Symbolik* it may be seen what vivid ideas of mythology and of historical changes in religion are given by coins. The peculiarities of art on coins are supposed to have decided the Oriental origin of Greek and Roman religion. It was from coins that De Luynes constructed his theory of the lunar reference in the Greek Triads. The coins bear copies of public monuments, and in this way are histories of art. The rude disproportion and extravagant posture of the Ægean goat are succeeded by the magnificent coinage of Syracuse, contemporary with Phidias, and later (B.C. 400–350); the Peloponnesian and Tarentine coinage, in which the subjects become symbolical and melodramatic. The works of many great sculptors live only on the coins, which also contain the only portraits of some of the world's greatest men. The *dupondii* of Livia are supposed to be the finest of coin-portraits. Many of the allegorical figures, spes, fides, &c., have been perpetuated by the Italian painters. Although, therefore, allowance has to be made for conscious anachronisms, re-stamping with new dies, and forgery, the evidence of coins when you have deciphered them is generally admitted to be superior to that of other written records. In this notice we have endeavoured to explain by example the leading applications of N. Space forbids the enumeration of coins of different countries. The most important modern work on N. is the International *Numismata Orientalia* (named after Marsden's celebrated *Numismata Orientalia*, in the British Museum) now being edited by Mr. Thomas. It consists of contributions from numismatists all over the world. In 1875 appeared the editor's 'Indian Weights;' in 1876 Mr. S. L. Poole's coinage of the Turkoman Emirs; in 1877 Mr. B. V. Head's work on the coins of Lydia and Persia, down to the fall of the Achæmenidæ, in which he shows how these weight and money systems were derived from the *minæ* recorded on the lion and duck weights of Assyria; and how the imperial currency which Crœsus attempted to give to Asia developed into the royal currency of Persia. In 1877 also two large works have been published on the Coins of the Tuluni Dynasty in Egypt, by Mr. E. Rogers, Minister of Public Instruction at Cairo; and on the Parthian Coinage, by Mr. Percy Gardner. The last work especially shows the value of coins, for except the rock-sculpture of Goterzes and the ruins of Hatra there are no other monumental records of Parthian handiwork. On these coins, Greek as well as Pehlvi characters appear: the Greek diadems and wreath as well as the Scythian bow; and the turreted female figures, clad in the long chiton and himation, represent the Greek towns in Asia. The names and figures of Arsaces (*basileus basileōn, Arsakes, euergētēs dikaios, epiphanes, philhellēne*) and other kings and gods are given; and the dates are from the era of the Seleucidæ. The costume is more purely Parthian; and the puffed hair of the Persians is conspicuous. See, besides the later works mentioned in the article, Humphrey's *Coin Collector's Manual*, 1855; Mead, *Value of N.*, Arnold Prize Essay, 1864.

Nummulites. See NUMMULITIC FORMATION.

Nummulit'ic Forma'tion is an extensive tract of limestone, belonging to the middle division of the lower Tertiary formations, and characterised by its wealth of *nummulites* (Gr. 'money-fossils,' a genus of *Foraminifera*, so called from their resemblance to coins). From Spain and Morocco this formation stretches along on both sides of the Mediterranean, through the Alps and Carpathians to Asia Minor, and through the Barbary States to Egypt, the stones of whose pyramids are quarried from it. It is traceable through Lebanon, the Caucasus, and Persia to India, and thence through the Himalayas and Altai Mountains to China. In all, its distinctive fossil character is preserved.

Nun (Lat. *nonna*, Gr. *nonis*) was a female who devoted herself to a monastic life (see MONACHISM), as *nonnus* was a monk. Convents for nuns were as ancient as for monks. The first was founded in the Egyptian desert by the sisters of St. Anthony and St. Pachomius, who were soon joined by 400 others. At the end of the 4th c. there are said to have been 40,000 in Egypt. The word N. is Coptic, and according to one writer means 'holy,' 'chaste,' according to another, 'paternal reverence,' and

according to a third is properly *Ennueuch* or *Nueneh*, 'one who is not of this world,' who has renounced the world. In the early centuries there were two kinds of consecration: a kind of perpetual novitiate made at home at the age of sixteen; and a perpetual vow made at the age of twenty-eight, or, according to other regulations, forty. In the middle ages there were also two classes of nuns; the 'mynchen' (Gr. *monachai*) or woman-monks, and 'nonnæ,' aged spinsters or widows, the former observing a stricter discipline than the latter.

Nunc Dimitt'is are the first words in Latin of the Song of Simeon (Luke ii. 29–32), which hence gets this name. It is one of the hymns appointed to be sung after the second lesson at even-song by the Anglican Prayer-Book.

Nuncu'pative Will is a verbal will, which in Scotland is valid to the extent of £8, 6s. 8d. If the legacy exceed £8, 6s. 8d. it is still good for that sum, but ineffectual as regards the surplus.

Nundydrúg ('the fort of Nandi,' the sacred bull of Siva), a celebrated hill fortress in the district of Kolar, State of Mysore, India, 4810 feet above the sea, and 31 miles N. of Bangalore. The village at the foot has a cattle fair, attended by 50,000 people. The fort, which was reckoned impregnable, and had been strongly garrisoned by Tippoo Sultan, was stormed by Lord Cornwallis in 1791.

Nuneat'on (Old Eng. 'nuns' water town'), a market-town of England, in Warwickshire, on the Anker, 9 miles N.N.E. of Coventry by rail, has three churches, a town-hall, market-house, and the ruins of a priory, founded in Stephen's reign. Iron-founding and manufactures of hats, ribbons, elastic webs, and edge-tools are the principal industries, and in the neighbourhood are extensive collieries and quarries of freestone. Pop. (1871) 7399.

Nun'quam Indebita'tus, in English law is the plea, in an action for debt, that no debt is due.

Nürn'berg or **Nur'emberg**, an old town of Bavaria, on the Pegnitz, 100 miles N. of Munich, with which it is connected by rail. An independent town of the empire till 1806, and formerly the wealthiest and most important of the free imperial cities, it is singularly rich in medieval architecture. The fortifications, perhaps the most interesting feature of the town, date from the Middle Ages, and are still in fair preservation; since 1866 they have been formed into promenades. The Pegnitz, which is here crossed by numerous bridges, divides the town into two nearly equal parts. The picturesque streets of N., with their quaint gables and balconies, are richly storied with beautiful carving. Of the many grand buildings the principal are the Gothic church of St. Sebaldus (12th–15th c.), containing rare sculptures and paintings; that of St. Lorenz (1270–1322), with its magnificent altar and superb windows; the Rathhaus, erected 1616–19 in Italian Renaissance style, containing a great hall adorned with frescoes by Dürer; and the splendid Gothic fountain, originally of 1385–96, restored in 1821–24. The Burg or imperial castle, founded in 1024 by Konrad II., is a Gothic structure rising on a sandstone rock, to the N. of the town. It was restored and presented to N. by King Max in 1855. A statue of Dürer by Rauch was erected in 1840. N. has valuable art collections, a town library of 40,000 vols. and 800 MSS., and a 'Germanische museum' (founded 1852, extended 1877) for the promotion of historical research, &c. Outside the town are extensive breweries and factories for the making of railway carriages, ultramarine, and chemicals. N. is famed for the production of watches, children's toys, carvings in wood, metal, and bone, lead pencils, and fancy wares. Pop. (1875) 91,017, of whom 7000 are Roman Catholics and 1200 Jews. N. owes its origin to the ancient castle, and is first mentioned in history in 1050. It became a free town of the empire early in 1112, and was the frequent residence of the Emperors Heinrich IV. and Barbarossa. The office of Burg-graf, at first that merely of a deputy of the emperor, was originally held by Friedrich I. of the Hohenzollern family, but his successors acquired independent power, and in 1363 styled themselves 'princes.' Imperial diets were held here in 1324, 1356, 1390, 1522–24. The Peace between the Reformers and the Emperor was concluded at N. in 1532. At the beginning of the 16th c. N. had become next to Augsburg, the chief seat of trade between Germany, Venice, and the East, and a great art centre. About this period it was the residence of the painters Wohlgemuth, Dürer, Kulmbach, and Altdorffer, of the sculptor Adam Krafft, the brass-founder Vischer and his sons, the woodcarver Veit Stoss, the glass-painter Hirschvogel, and the minstrel Hans Sachs. The Reformation doctrines were favourably received at N. as early as 1525, and Melanchthon founded the gymnasium in the following year. The discovery of a sea route to India greatly affected the prosperity of the town, which also suffered severely during the Thirty Years' War. Since it escaped the yoke of the patrician families and became a Bavarian city in 1806, N. has recovered in part its former prosperity, and is now the most important seat of trade and industry in S. Germany. See *Die Chroniken der Deutschen Städte vom 14 bis ins 16 Jahrh.* (vol. i. 'N.' Leips. 1862); Mayer, *N. und seine Merkwürdigkeiten* (3d ed. 1861), and the later work by Hagen (1867).

Nur Jehân ('light of the world'), the celebrated wife of the Mogul Emperor Jehangir. She was born at Kandahar, of a noble Persian family, and was married by Akbar to a courtier, with the object of removing her from the sight of the young prince. But when Jehangir became emperor, the husband, who refused a divorce, was killed, and, after some years of genuine reluctance, N. J. was made empress in 1611. Her influence was unbounded; her name was placed on the coins, and by herself and her relations she conducted the whole administration. She died in 1646, having survived her second husband nineteen years.

Núrpúr ('the town of light'), the name of several towns in India. The largest is in the district of Kangra, in the Punjaub, on a tributary of the Ravi River, among the S. Himalayas. Pop. (1868) 9928. It is situated on the main route to Cashmere, and commands an important trade. It has also an extensive shawl manufacture.

Nurse, Military. The system of sending trained nurses to the seat of war owes its origin to Miss Florence Nightingale, who with a few other devoted women rendered incalculable services to the suffering soldiers during the Crimean War. Her example had much to do with the international conference organised by M. Henri Dunant, held at Geneva in October 1863, and attended by representatives from most European governments. The United States Sanitary Commission did excellent work in organising nurses during the American Civil War. An account of their operations is given in *A Woman's Example and a Nation's Work* (Lond. 1864). Ladies of various nations have tended the sick and wounded in the Franco-German War (1870) and the Russo-Turkish War (1877). For general nursing see *Notes on Nursing* (1860) and *Notes on Hospitals* (3d ed. 1863), both by Miss Florence Nightingale.

Nur'sery, in its horticultural sense, is a tract of ground with numerous adjuncts, specially set apart for the propagation of plants of all descriptions. The name may be applied to that portion of a well-ordered garden where this is done simply for home use, but it is generally understood to refer to the 'farm' of the nurseryman, in which operations are conducted on a large scale for purposes of sale. It is here used in the latter sense. Necessarily it is impossible to enumerate all the various departments in the immense range of this business, but the following are some of the most important. Out-door, we have ground for the common kinds, as larch and spruce, and for the choicer descriptions, such as Wellingtonias and araucarias for ornamental purposes; acres for forest trees, both utilitarian and ornamental; the same for fruit trees and shrubs; and vast areas for evergreens and deciduous shrubs, with special selections of those that possess a long series of varieties, such as the holly. We now also find the rock garden, with its display of alpine plants, &c., in many N., and a large portion is allotted to herbaceous and bedding plants, bulbs, &c. The ground under glass comprises with a small village in extent, embracing propagating houses, fruit-houses, greenhouses, conservatories, stove-houses, hothouses with orchid-houses, palm-houses, fern-houses, &c. In addition to the above are the semi-private departments where plants are experimented upon, and where new introductions are multiplied previous to being issued to the public. The Romans were the first original propagators of trees. France probably has grown and distributed more from her commercial nurseries than any other nation. Now-a-days in Britain, and indeed in every civilised country, inclusive of China and Japan, the nurseryman's business is widespread, and often individually very exten-

sive. A recent return gives the acreage of N.-ground in Great Britain as 11,743, of which the counties of Surrey and Edinburgh head the list with 1309 and 601 respectively. The American acreage is computed on good authority at 500,000, and that of France at 200,000.

Nursingpore' (*Narsingpúr*), the chief town of the district of the same name, Central Provinces, British India, on the W. bank of the Singree, a tributary of the Nerbudda, 562 miles N.E. from Bombay, and 53 W. from Jubbulpore. Pop. (1872) 7554. It is a station on the railway, and a centre of the grain and cotton trade of the Nerbudda valley.—*N. District*, which is constituted by the upper half of this valley, has an area of 1916 sq. miles; pop. (1872) 339,395. The staple crops are sugar-cane, wheat, gram, and cotton. A great fair at Bisman Ghaut, occasioned by the bathing of pilgrims in the Nerbudda, is attended by 75,000 persons, and goods are sold to the value of £40,000, chiefly English piece-goods, lac ornaments, and copper utensils. At Mopani is a coalfield, connected with the railway by a branch line of 8 miles. The output in 1873 was 11,000 tons. The miners are Gonds.

Nursingurh', the capital of a native State of the same name in connection with the Bhopal Agency, Central India, 109 miles W. from Saugor. The State of N., which dates from 1681, has an area of 720 sq. miles. Pop. 87,000; revenue, £40,000; army, 98 horse and 65 foot; a tribute is paid to Holkar of £8500. The products are grain and opium. The State has been well administered, and the present Rajah was brought up under an English tutor.

Nusseerabad' (*Násirábád*, 'town of the defender;' so called after Sir David Ochterlony), the British cantonment in Rajputana, India, 15 miles S.E. from Ajmere, and 143 miles N. of Saugor. Pop. (1872) 18,336. Here is stationed the Rajputana Field Force of Europeans and Bombay sepoys; and sufficient riding camels are always kept in readiness for a forced march. The situation is hot, but healthy; and there is a sanatarium close by on the Taraghur hill, 3300 feet above the sea. In 1857, the Bengal sepoys then stationed at N. mutinied, and marched at once to Delhi. N. is also the native name of the civil station of the district of Mymensing (q. v.).

Nut is botanically a one-celled fruit with a hardened pericarp, surrounded by bracts at the base, and when mature containing only one seed. (In the young state the ovary contains usually three ovules, but only one comes to maturity.) It is illustrated by the fruit of the hazel and chestnut, which are covered by leafy appendages in the form of a *husk;* and by the acorn, in which the leaves or bracts are united so as to form a *cup*. The three layers of which the pericarp consists are in the N. so blended together as to appear one. The word N. used by itself, that is, without any prefix, is in popular acceptation understood to mean the fruit of *Corylus Avellana*, and in various varieties—more precisely called hazel N., cob N., Barcelona N—of filberts. In a few cases, N. (which is etymologically connected with a series of words implying a round, hard lump), is applied to certain tubers, *e.g.*, the earth N. (*Bunium flexuosum*). It is frequently used also in reference to the seed (in distinction to the fruit) of a plant. See ACHÆNE.

Nuta'tion (Lat. *nutatio*, 'a nodding') is a small gyration of the earth's axis round its mean precessional position, due to the variation of the moon's attraction upon the earth's equatorial mass as the inclination of the lunar orbit to the ecliptic performs its cyclic change. Supposing for the moment the earth's axis to suffer no precessional motion, it would describe in virtue of N. a small ellipse, having a major axis of 18".5 and a minor axis of 13".74. The period of description is about nineteen years—is indeed the same in value as the Metonic cycle. In virtue of precessional motion, however, the earth's axis moves in a circle of much greater dimensions than those of the nutational ellipse, and the effect of N. is to transform the precessional path into a waved circular line. See PRECESSION. N. was discovered by Bradley, soon after his discovery of the aberration of light.

Nut'cracker, the name applied to a species of Crow—*Nucifraga caryocatactes*—common in some parts of Europe, but rare in Britain. It is one of the true crows, and attains a length of 13 or 14 inches. Its colour is a deep brown on the top of the head. The other parts of the body are of a warm brown hue spotted with long white markings. The tail is dark or blackish-brown. The nest is built at the end of a cavity scooped out by the powerful bill in the trunk of a tree, and the eggs, numbering five or six, are greyish-yellow spotted with dark hue. Clark's N. (*N. Columbiana*) is a shore-living species, of a light brown colour above and grey below. Its length is 13 inches.

Nut'hatch, the name given to various species of *Insessorials* or Perching Birds, allied to the *Certhidæ* or Creepers, and belonging to the section *Tenuirostres*. The genus *Sitta* includes the *S. Europæa* or common N., the most familiar example of the group. In this genus the bill is straight and the nostrils are in a broad groove. The wings have their first quills short and the third and fourth long. The tail is broad, and its feathers are very short. The tarsi are stoutly built, and the hinder toe is larger than the middle one. The common N. is agile in climbing the trunks of trees. Its colour is grey above with slate tints, and white on the throat, warming into reddish-brown on the belly. The tail is black with a grey tip. The nest of the N. is built in the hollow of a tree, and the bird defends its eggs and young with great courage and pertinacity. It feeds on insects, but chiefly lives on nuts, seeds, &c., breaking open the hard coverings of the fruits by aid of its strong bill

Nut'meg is the albuminous kernel of several species of *Myristica*, a genus of trees and shrubs that gives name to the natural order *Myristiaceæ* (q. v.). They are natives of tropical countries, especially of India, and as a rule are aromatic, and abound in a reddish acrid juice. *M. fragrans* furnishes the chief supply of N. It is a handsome tree, from 20 to 30 feet high—pretty in form, foliage, blossoms, and fruit—somewhat similar in appearance to a pear tree. The fruit is smooth externally, and about the size, and something like an ordinary peach. It consists—first, of a rather thick fleshy covering, which when mature separates into two nearly equal longitudinal parts; secondly, of the aril or Mace (q. v.), which, when ripe, is of a bright scarlet colour; and thirdly, of the seed proper. The last has a smooth and hard outer coat, and a thin inner membrane closely investing and sending prolongations into the substance of the seed; these prolongations being coloured impart the marbled or mottled appearance characteristic of the N. The produce of this species are marked by their full and rounded form, and their delicate and aromatic flavour: they are called female N. *M. fatua* yields a kernel about half as long again as the above, of a pale colour, and less aromatic: it is sold under the name of long N. Another kind termed false, wild, or male N., and worthless as a spice, is chiefly the produce of *M. Malabarica*. The N. is cultivated in the Molucca Islands, especially the Banda group; also in Sumatra, Java, Penang (introduced 1798), Singapore (introduced 1819), S. India, Bengal, Bourbon, Madagascar, some of the W. India Islands, and Brazil. When the Dutch were masters in the East they endeavoured to confine the growth to the one island of Great Banda, and the trees in the other islands were systematically destroyed. These monopolising efforts were considerably hindered from the distribution effected by the fruit-pigeon (*Carpophaga*). Indeed it was found necessary to send a commissioner every year to the different islands to uproot the trees sown by the agency of these birds. The N.-tree commences to bear in its ninth year, and lives to the age of about seventy-five. A good tree yields about 600 nuts yearly, or 8 lbs. weight. In Banda three crops are annually obtained. The fruit is gathered by means of a barb attached to a long stick; the mace is then separated from the nut, and cured by being pressed together, flattened on a board, and exposed to the sun for three or four days (the amount obtained averages 1 lb. to 430 nuts). The nut is smoke-dried for two months, or until the N. rattles in the shells. Previous to exportation these are cracked with a mallet and the N. extracted, or occasionally they are shipped just as cured. Being subject to the attacks of a beetle, the N. is often covered with dry lime, or soaked in a paste of lime and water, as a preventative, before it is shipped. Nutmegs are in large use as a spice, and medicinally as stimulants and carminatives; in large doses they have narcotic properties. They contain both a fixed and a volatile oil; the former is extracted by pressure and the latter by distillation. What are called American or Calabash nutmegs are obtained from *Monodora Myristica;* Brazilian nutmegs from *Cryptocarpa moschata:* Madagascar nutmegs from *Agathophyllum aromaticum.*

Medicinal Properties of N.—The kernel of the seed of the

Myristica officinalis is employed in medicine as an aromatic, stimulant, and carminative; but it is chiefly used to cover the taste of other medicines. N. is contained in *pulvis catechu compositus, pulvis cretæ aromaticus, spiritus armoraciæ compositus, tinctura lavandulæ composita*, and is administered in doses of from 1 to 5 grains.

Nutria. See COYPU.

Nutri'tion, the function of living beings in the exercise of which food is received, digested, and assimilated. It may be regarded as the function through which the 'individual' retains its place in the world, and makes good the loss of substance incessantly occasioned by the act of living. It differs from *Reproduction* (q. v.), the function that makes good losses which the 'species' or 'race' sustains through the death of its members. The physiology of N. concerns itself with the quality and nature of the food, and the consequent quality of the blood from which the the nutritive functions derive their material; while the influence of the nervous system, the age, and constitution of the individual, and other conditions, such as heat, cold, &c., naturally affect the N. of the body as a whole. Impaired N. gives rise to diseased conditions, as also does excessive N. The necessity for N. arises from the fact that the body is continually losing substance in the form of its particles, while chemical action is also constantly wasting its matter. The essential end of the function of N. is that of supplying materials to the already formed parts of the body, so that these parts may develop new particles. The active seats of N. in the body would therefore appear to be the *nuclei* or *cytoblasts*—the minute solid particles—which are seen in all tissues. Thus in muscles, and especially in active and well developed organs, these nuclei are well seen; they are also abundant in the brain, and constitute the germinal or reproductive centres from which new substance is added to the muscular and nervous tissues. *Growth* follows as the result of perfect N. Growth may either consist in a maintenance of the equilibrium of the body, as, for example, where the repair of an organ simply counterbalances its waste; or in the accumulation of material from which new parts and structures are to be formed, or from which additions may be made to already formed parts. Thus, in early life, the living organism has to accumulate more material in proportion to its size than in adult life, since it requires a kind of nutritive deposit-account on which to draw for the increase of its parts; while in adult life, the body being in healthy equilibrium, the waste and repair are equal, and the process of N. simply serves the purpose already mentioned of maintaining this evenly-balanced state.

The N. of *Plants* is derived from various chemical elements, of which carbon, oxygen, hydrogen, nitrogen, and sulphur are absolutely necessary; and in addition to these, iron, calcium, potassium, magnesium, and phosphorus, are constituents of every healthy plant. In the lower orders of the vegetable kingdom the whole surface is the means by which the food is acquired, whilst in the higher the root is specially designed for this purpose, the leaves in addition being adapted for the absorption of nutrient material in a gaseous condition. It is only in a gaseous or fluid state that the elements can pass into the interior of the cells, and this is effected by means of *osmose* between the cell sap and the water absorbed by the plant. 'Carnivorous plants' appear to have the power of taking in nitrogenous pabulum through appendages to their leaves, or other peculiar contrivances. See PLANT, SAP, and VEGETABLE PHYSIOLOGY.

Nux Vom'ica, the specific name of a species of *Strychnos* (q. v.), is applied in a commercial and medicinal sense to its seeds, from which the powerful poisons known as Strychnine (q. v.) and brucine are obtained. It is a moderate-sized, straggling, branched tree, a native of India and Cochin-China. The small flowers are succeeded by a fruit of the size and appearance of an orange, but with a hard rind enclosing a mucilaginous pulp in which the flattened circular fruits are embedded. These have an intensely bitter taste. The bark, either through inadvertance or fraud, was at one time substituted for that of *Galipea cusparia*, and though through the fortunate investigation of Dr. O'Shaughnessy the dreadful mistake was soon detected, the name of 'false Angostura Bark' still holds. In India preparations of the wood, roots, and leaves, are used for snake bites, fevers, and rheumatism.

Nuzz'ur, or **Nuzzera'na** (*Nazr*), a term of Arabic origin, universally used throughout India for the present offered by the inferior to the superior, in accordance with Oriental custom; and also for the fine or relief paid by the son on succeeding to a hereditary office or property, such as a *jagheer*. Among Mohammedans it is specially applied to the fee for charitable donations paid at the great festivals.

Nyamtz', a town in Rumania, capital of a district of the same name, lies on a hill 62 miles W. of Jassy. It has large yearly fairs, and a shrine of the Virgin which attracts numerous pilgrims. Pop. about 10,000.

Nyanugg'ur, or **Beawár**, the chief town of the district of Mairwarra in Rajputana, India, 31 miles S.W. of Nusseerabad. Pop. (1872) 9544. It was founded by Colonel Dixon in 1835, and is surrounded by a wall. N. has now become a considerable centre of trade in cotton and grain. There are two cotton presses, but the bales are usually laden unpressed on camels. The total export is valued at £200,000.

Nyan'za ('the water'), a native name given in equatorial Africa to large sheets of water, as in the case of the great lakes Ukerewe and Mwutan, better known as the Victoria and Albert N. (q. v.).

Nyass'a or **Nyanja** (a name identical seemingly with *Nyassa*), a lake in the interior of Africa, 350 miles from the coast of Mozambique, discovered by Dr. Livingstone in 1861. It lies 1575 feet above the sea, is 250 miles long from N. to S., and 50 broad, has an extreme depth of 100 fathoms, and is drained by the river Shiré into the Zambesi. The mountains which surround it have a height for one stretch of 100 miles of from 10,000 to 12,000 feet above the lake. Among the mountains Livingstone found a numerous population growing maize, cassava, tobacco, and English peas, which had been introduced by Arab traders. The lake itself is visited at a certain season by dense clouds of midges; these the natives gather and make into cakes. The waters are sweet, and well-stocked with fish. On a promontory at the S. end is the Scotch mission-station and trading-post of Livingstonia. In 1876 the mission launched a steamboat on the lake, which, unfortunately, has not a single navigable influent. In his interesting account of the circumnavigation of the lake Capt. Young expresses his belief that there is a flow of water from the N. as well as from the S. end, and that the N. effluent is the Rovuma. See *N., a Journal of Adventures*, by E. D. Young (Lond. 1877).

Nyáya (lit. 'entering into, analysis'), the name of one of the six great systems of Hindu philosophy, and also of the work in which it is contained, reputed to have been written by a legendary philosopher, Gotama. It is directly opposed to Sankhya (q. v.) = synthesis. It treats of the instruments, the methods, and the objects of right knowledge; and it is, in fact, a complete system of metaphysics based upon an analysis of the reasoning faculties. Its chief interest lies in the circumstance that it represents a theory of logic arrived at entirely independently of the logic of Aristotle, the basis of all European systems. The analysis of the syllogism and of other fundamental processes of reasoning has been highly praised. On the other hand the N. contains an innumerable series of rules for the conduct of verbal disputations; and it is this latter portion of its contents that has always been most studied and practised in India. At the present day the *pundits* of Nuddea (q. v.) enjoy the highest reputation as teachers of N., and about forty pupils also study it, under English professors, in the Sanskrit College at Benares. Like the rest of the early Hindu philosophical works, it is written in *sutras* or aphorisms, each of which has become the subject of many commentaries. The Sanskrit text was published at Calcutta in 1828. See also Colebrooke's *Miscellaneous Essays* (vol. i. Lond. 1837), and *Hinduism*, by Professor Monier Williams (Lond. 1877).



Mirabilis jalapa.

Nyctagina'ceæ, or **Marvel of Peru Family**, consists of about 120 species of trees, shrubs, or herbs, with opposite or alternate leaves, flowers often enclosed by large leafy or coloured bracts,

and a bladder-like fruit. They are widely dispersed over the tropics, the pretty and fragrant *Abronia* extending to N.W. America. As a rule the medicinal properties are purgative—indeed at one time it was supposed that jalap was the root of *Mirabilis jalapa*. This species, under the name of Marvel of Peru, has long been cultivated in gardens, as also other handsome plants belonging to the same genus. The *Bougainvillæas* are also garden favourites on account of their gorgeous appearance from their large showy bracts; and various species of *Pisonia* and *Boerhavia* are in cultivation, but they have no particular beauty or interest to recommend them.

Nycterib'ia, a genus of Flies forming the type of a special family, *Nycteribidæ*. They are popularly known as 'Bat-ticks,' although in no way related to the true Ticks (q. v.). They are spider-like insects, with a pointed head, and four simple eyes or ocelli—no compound eyes being found. The antennæ are two-jointed. The proboscis is feather-shaped, and the legs are long. The N. are very small, attaining an average length of only 2 or 3 lines. *N. Westwoodii* is a familiar species.

Nyiregyha'za, a town in Hungary, in the comitat of Szabolcs, 32 miles N.N.E. of Debreczin by rail. It has large yearly fairs, and important manufactures of spirits, saltpetre, soda, and oil. Pop. (1870) 21,896.

Nyköping, a seaport on the Baltic coast of Sweden, the chief town in the län of Södermanland, at the mouth of the Nyköping-aa, 53 miles S.W. of Stockholm. It has 2 churches, 2 hospitals, and a high school. There is a considerable trade with the interior, and corn and timber are exported. Pop. 5016.

Nyl-Ghau, a species of *Antilopidæ* or *Antelopes*, inhabiting forest lands in India and Persia, and attaining a height of 4 feet. It is thus one of the largest of the antelope family. Scientifically named, the N.-G. is the *Portax picta* of zoologists. In general form it is not unlike the llamas included in the camel family. The horns, borne by the males alone, are simple in shape, of black colour, and are curved upwards and forwards. The neck is long, exhibits a prominence in front, and bears a short mane, while the breast has also a prominent tuft of hair. The back is 'humped' between the shoulders. The N.-G. is hunted both in India and Persia, and from its fleetness gives sport of a very superior kind. Its colour is a blackish-brown.



Nyl-Ghau.

Nymph, a term applied to the *chrysalis* or *pupa-stage* of insects. More frequently the term 'pupa' is employed to denote this stage, which in the perfect form of metamorphosis is marked by quiescence, the animal being enclosed in a pupa-case or cocoon. See METAMORPHOSIS.

Nymphæa'ceæ, a natural order of aquatic dicotyledonous plants with shield-like or heart-shaped fleshy leaves proceeding from a rootstock that extends into the mud at the bottom of the water. The flowers are often large, with from three to five sepals, numerous petals, and an indehiscent many-celled fruit with numerous seeds. Three sub-orders are now included under N.—viz., *Nymphæa* or water-lilies, *Cabombeæ* or water-bucklers, of which the curious, wide-ranging, and edible *Hydropeltis purpurea* is the representative; and the *Nelumboneæ* or water-beans. In all, there are about 40 species found through the temperate and tropical zones. The properties, so far as known, are unimportant, but several species supply articles of food, &c. See EURYALE, LOTUS, NELUMBO, VICTORIA, WATER-LILY.



Nymphæa alba.

Nymphs, in classic mythology, a race of inferior female divinities, almost infinite in number, who may be divided into two main classes—the first consisting of embodiments of natural phenomena, the second of personifications of states and cities. To the former class belong the Oceanids of ocean, the Nereids of the sea, the mountain Oreads, freshwater Naiads, the Dryads and Hamadryads of the woods, &c. Among the N. associated with special localities were the Lemniæ, Nysiades, and Dodonides. Though always young and fair throughout their period of existence, the N. were not immortal, the life of a hamadryad ending with her tree. Their offerings usually consisted of goats, lambs, oil, and milk, never of wine.

Nynee Tal (*Náini Tál*), a hill station and sanitarium in the district of Kumaon, N.W. Provinces, British India, 22 miles S.W. of Almora, and connected by a good cart-road with the plains. N. is 6520 feet above the sea. Pop. more than 8000 in the hot weather. A church was erected by subscription in 1847; and during the troubles of 1857–58 many European families took refuge here. It is a favourite resort during the sultry months, and a sort of summer headquarters of the N.W. Provinces Government; it is also a sanitarium for the troops in Oude and Rohilcund.

Nyssa. See TULEPO TREE.

Ny'stad, a small seaport of Finland, in the government of Abo, on the Gulf of Bothnia, 46 miles S. of Björneborg. In 1871 there were 41 vessels of 7550 tons belonging to the port. The exports are laths, wooden utensils, hosiery, &c. Pop. 3495. By the Treaty of N. (1721) Sweden ceded to Russia the Baltic provinces, Viborg, Keaholm, and numerous islands, August 30, 1721. On the 5th of July 1855, during the Crimean War, N. was bombarded by the English.

O.



the fifteenth letter of the English alphabet, and the fourth vowel, corresponding to the Semitic Ain. Its proper pronunciation is a long open sound, as in the interjection *oh!* but in many languages, and particularly in English, the pronunciation is very anomalous. In 'on,' 'one,' 'only,' and 'onion,' four distinct sounds are represented by this one vowel; and an additional anomaly is furnished by *oo* which in English has the pronunciation properly signified by the cognate vowel *u*. In Greek separate symbols were in use for short O (Omikron) and long O (Omega), the latter of which was only introduced late in the history of the alphabet, as implied by its position in the series. As a general rule O undergoes comparatively few changes in affiliated languages. Long O is represented by diphthongs, into the composition of which O enters: *e.g.*, Lat. *ovum* = Fr. *œuf* and Ital. *uovo;* Lat. *totus* = Fr. *tout*. In Latin, as in French, O was not well distinguished from AU, as may be seen in the form of 'Clodius' for 'Claudius;' 'explosion' has the same root as 'applaud.' In Greek, especially in the Æolic and Doric dialects, O was similarly confused with *ou*, which diphthong in modern Greek is pronounced not as *ow* in 'how,' but as *oo* in 'boot:' cf. Gk. *Mousa* = Lat. *Musa*.

As an abbreviation O stands for *optimus*, 'best,' as in the phrase common on inscriptions, D. O. M. = *Deo optimo maximo*.

O, a common prefix in Irish names, forms a patronymic, and answers accordingly to the Gael. *Mac*, the Cym. *Ap*, and the Norm. *Fitz*. It is probably derived from the Erse *ua*, 'a grandson' (*cf.* Gael. *ogha*, and Low. Scotch *oe*), though some regard it as a mere corruption of the Eng. *of*.

Oahu. See HONOLULU and SANDWICH ISLANDS.

Oak (Old Eng.) is the name now given to the genus *Quercus*, a genus comprising about 300 species, widely distributed over the northern hemisphere, and found also in S. America, Mexico, Java, and New Guinea. Although the different kinds vary considerably in general appearance, the acorn seated in its cup provides a good distinguishing character for the whole. It would be difficult to name any group of trees that possess more general interest, whether considered with reference to their varied uses, their historical traditions and associations, or their great age, vast size, and their noble appearance. The British O. (*Q. Robur*), once the chief forest-tree of England, extends through the greater part of Europe and W. Asia, attaining a height of 120 feet, and a girth up to 70 feet (Cowthorpe, Yorkshire), or even 90 feet (France, *teste* Humboldt). There are two varieties, viz., *Q. pedunculata*, supplying most of the O. timber for shipbuilding, and preferred for joiners' work from the 'silver grain' being conspicuous, and *Q. sessiliflora* or Durmast O., with a darker, heavier timber, more elastic and less easy to split. The last is the quickest grower, and lives on poorer soil. Its bark is also richer in medicinal, tanning, and dyeing properties. The following are the most important foreign species of O. *Q. Ægilops*, native of S. Europe and Syria, a nearly evergreen tree; the acorns are eaten raw and boiled; the cups, known as valonia, are largely used for tanning and dyeing; the wood is capital for furniture. *Q. alba*, the white or Quebec O., a most valuable timber-tree, 100 feet high, and 7 feet in diameter; the wood largely used by shipbuilders, wheelwrights, coopers, &c. *Q. aquatica*, native of N. America, height 60 feet, furnishes a superior bark for tanning, also wood for shipbuilding. *Q. cerris*, the Turkey or mossy-cupped O., native of S. Europe and W. Asia; a large tree, of more rapid growth than British O., but having wood of a similar structure; used by cabinetmakers, wheelwrights, turners, coopers. *Q. coccifera* or Kermes O., a shrub or small tree of the Mediterranean region, supplies a tanning bark; a *coccus* which lives on this species furnishes a red dye, much employed before the introduction of cochineal, and still used in the East. *Q. coccinea*, the black O. of N. America, height 100 feet, has a bark rich in tannic acid; the yellow dye known as quercitron comes from this tree. *Q. densiflora*, the Californian chestnut O., a large evergreen tree of beautiful outline, dense foliage, and compact growth, has a bark very valuable for tanning. *Q. falcata* of N. America, a tree attaining 80 feet in dry, sandy ground, produces an excellent tanner's bark, and galls for superior ink. *Q. Garryana* of N.W. America, a gigantic tree; its timber is remarkably pale, but hard and fine-grained, of great strength and durability; the acorns are an excellent meat for hogs. *Q. Ilex*, the holm or holly O., of wide distribution through S. Europe, Algeria, and eastwards to the Himalayas; a tree of about 50 feet; the wood is close-grained, very heavy and hard, and takes a fine polish; the bark is used for tanning; the acorns of a variety named *Q. Ballota* form an important article of food in Spain and Algeria. The tree was introduced into England in 1581, and is often planted, being the largest and handsomest of evergreen trees suited to the climate. *Q. infectoria*, the gall or dyer's O., a shrub or middle-sized tree of the Mediterranean region, with cylindrical acorns, the leaves grey underneath; yields the galls used in medicine and dyeing. *Q. lyrata*, the overcup O. of N. America, a majestic tree, is recommended as one of the most valuable for timber cultivation. *Q. Mongolica*, native of Manchuria; it is on this tree and on *Q. serrata* that the silk insect peculiar to O. trees is reared. *Q. Phellos*, the willow O. of the United States; its acorns are available for food. *Q. Prinus*, the N. American swamp O., a large tree growing in wet ground; the wood is strong, elastic, and of fine grain; the bark yields a red dye. *Q. rubra*, the red O. of N. America, 100 feet high; the wood is poor, but the bark is rich in tannin; its acorns form useful hog food. *Q. Sideroxylon*, a native of the mountains of Mexico, grows to a large size; its timber is compact and almost imperishable in water. *Q. Skinneri*, also Mexican; the acorns measure nearly six inches in girth, and are available for various domestic animals. *Q. stellata*, the post O. of N. America; not a large tree, but has very durable and dense wood, and is in much requisition for posts, and highly prized for shipbuilding. *Q. Suber*, the cork O. of Mediterranean regions and Algeria, attains a very large size in Andalusia, and is hardy in England; it is an evergreen, long-lived tree, yielding the bark of the cork of commerce; after about twenty years of age it can be stripped of its bark every six or seven years. The allied *Q. occidentalis* yields a superior cork, harder than the above. *Q. Toza*, native of S. Europe, is a small but handsome tree, with young shoots silvery white; it forms vigorous coppice-woods on sandy soil, and furnishes an excellent bark for tanning; the wood is mainly used for fuel. *Q. virens*, the live O. of N. America, is an evergreen tree of about 50 feet; its timber is heavy, compact, fine-grained, and most valuable for shipbuilding; it can live on seashores, and is the strongest and most durable of all American oaks.

Medicinal Properties of the O.—The dried bark of the small branches and young stems of the *Quercus pedunculata* is collected for medicinal purposes, in spring, from trees growing in Britain. O.-bark is a valuable astringent, and is administered generally, or topically, in such cases as tenderness of the gums, leucorrhœa, prolapsus, &c. For internal use, the powder may be given in doses of from 30 to 120 grains; and the decoction, in from 1 to 2 oz. two or three times daily.

The word O. by British colonists has been applied to trees that botanically have no claim to it, thus Botany Bay O. is a species of *Casuarina*, and New Zealand O. is *Alectyron excelsum*. African O. used in shipbuilding is *Oldfieldia Africana*. The poison O. of N. W. America is *Rhus Toxicodendron*. See BARK, CORK, GALLS, ILEX, QUERCITRON, TANNING, VALONIA.

Oak Beauty (*Biston prodromaria*), a species of brown moths found in the S. of England. The front wings are marked on their upper surface with two dark curved bands; the hinder wings have only one band. The larvæ feed on oak leaves.

Oakeley, Sir Herbert Stanley, Mus. Dr., second son of the late Very Rev. Sir Herbert Oakeley, Bart., was born July 22, 1830, and educated at Rugby and Christ Church, Oxford, taking the degree of M.A. in 1853. He was appointed Professor of Music in the University of Edinburgh in 1865, and his services in that capacity include the institution of the annual Edinburgh Orchestral Festivals conducted by Mr. Charles Halle, and the formation of a musical society among the students. On the occasion of the unveiling of the Scottish National Memorial to the Prince Consort in Edinburgh in August 1876, when he conducted the musical arrangements, he received the honour of knighthood. Sir Herbert, who is an accomplished organist, has composed a large number of songs, part songs, quartetts, and anthems, &c., of considerable merit.

Oak'ham (Old Eng. 'Oak-Dwelling'), the county town of Rutlandshire, England, 25 miles N.W. of Peterborough, is connected with the Midland Railway by the Syston and Peterborough branch. It possesses a grammar school, founded in 1581, and a church with a fine tower and spire, the interior of which was restored in 1858 at a cost of £6000. Brewing and malting are carried on, and the knitting of hosiery engages a considerable number of females. Pop. (1871) 2911.

Oak'land, a town in California, U.S., 6 miles from San Francisco, with which it is connected by rail and steamboat, is the terminus of the Central Pacific Railway. It has marble and iron works, a cordage and jute factory, flour and planing mills, and potteries, 17 churches, 2 libraries of 6000 volumes, and 4 daily newspapers. Pop. (1870) 11,104.

Oak Leaf Roller (*Tortrix viridana*), a well-known species of moth belonging to the *Tortricida* or 'Leaf Rollers.' It is one of the most brightly-coloured members of its family, and is of a prevailing brown hue, but the front wings are a bright green. It feeds on oak leaves, and does immense damage to these trees.

Oak'um (Old Eng. *acumba*, 'what is combed'?), the separated fibres of old hempen rope, chiefly used with pitch in caulking ships. The work of teasing O. constitutes in gaols one of the light punishments inflicted on criminal prisoners.

Oann'es was a Babylonian deity, who, according to the account of Berosus (q. v.), as quoted by Appollodorus and Alexander Polyhistor, appeared from the Erythræan Sea in the first year (of the existence of Babylon). His form was that of a fish with the head and feet of a man subjoined to the head and tail of the fish respectively. This being passed the day among men, teaching them letters, arts, and sciences, such as architecture, legislation, geometry, agriculture—in short, all the arts of civilisation; but at sunset he retired to the sea, and passed the night in the deep. Figures answering the description of Berosus have been discovered on the Babylonian and Assyrian sculptures, and it has been supposed that O. is the Hea of the Babylonian Theogony, who is the God of the Sea and of Hades, Lord of generation, and of all human beings, of wisdom, of mines and treasures, of gifts, of music, of sailors and of fishermen, corresponding in some respects to Saturn (q. v.) or Cronos, and in others to Neptune (q. v.) or Poseidon. See Smith's *Chaldean Account of Genesis* (Lond. 1876).

Oar (Old Eng. *ár*, 'that which *ploughs* the water,' from *erian*, to plough; comp. Lat. *arare*), an implement of wood for propelling boats. It consists of a pole forming the *handle*, *loom*, and *shank*, and expanding at the end into a wide flat *blade*, which is dipped into the water. A *button* or projecting piece of leather, placed on the underside where the loom merges in the shank, serves to keep the O. in proper position between the row locks by pressing against the one nearest the oarsman. *To feather the oars* is to bring the blade after the stroke into a horizontal position so that it offers least resistance to the air; this is done by turning the O. round till the button be on the underside. In rowing, the foremost O. is called the *bow* O. and the aftermost the *stroke* O.

O'ases (Coptic *ouah*, 'dwelling'), fertile and habitable places in the desert, usually under the general elevation, yielding water and dates. They are formed and rendered capable of cultivation by water flowing subterraneously, or forming small lakes and rivers, which, by means of canals, water the fields and gardens of the inhabitants. The O. of the desert of Libya have warm springs, the temperature of which Rohlfs in 1874 ascertained to be, at Farafrey, 79° F.; in Dakhel, from 92° to 99° F.; and in Siwah, the famous oasis of Jupiter Ammon, from 82·4° to 84·4° F. Several O. have brackish water, containing strong salt in solution, and are uninhabited, as also some of the smaller ones, which, however, are used by the caravans as night stations. The larger O. usually consist of a series of smaller ones, connected with one another by tracts of steppe-like country. In ancient times O. were of much more commercial and even political importance than now, as the remains of temples point out. They are first mentioned by Herodotus, and the visit of Alexander the Great to the temple of Jupiter Ammon in the oasis of Siwah was an event which was much celebrated in the ancient world. The chief O. of the Sahara are those of Tafilet, Tûat, and Wargla in the W.; Fessan, with Murzuk, and Audxhila in the centre; Sivah, Farafrey, and Dakhel in the E.; and Tibesti, Bilma, and Air in the S.

Oat or **Oats** (Old Eng. *ata*, from *etan*, 'to eat') properly signifies any kind of food, but is specially applied to all the species of the genus *Avena*. These number about 40, occurring in temperate and cold regions. The genus is distinguished by the somewhat membraneous glumes enclosing two or three florets, the outer palea of which are furnished with a long, bent, and twisted awn. The native country of the Common O. (*A. sativa*) is unknown, and as usual, in such cases, Central Asia is surmised. It would appear, however, from experiments undertaken by Professor Buckman and others, that it is an improved form derived by a continued and selective cultivation from what is called the Wild O. (*A. fatua*)—a plant of Europe, N. Africa, Siberia, Japan, and N. W. India. It was known to the Greeks and Romans, but is not one of the grains mentioned in the Bible. Although it can be grown under a wider range of climatal differences than wheat, it has not so high a boreal zone as barley, but is extensively cultivated throughout the whole of Northern Europe, and in Britain is produced to a greater extent, and of a better quality in Scotland than in England. A recent return for the United Kingdom gives the area devoted to O. as 4,238,957 acres, as against 3,321,065 under wheat. Though chiefly grown as food for horses, there are two forms in which it is largely used for human food—these are oatcake and oatmeal porridge. See OATMEAL. Import into the United Kingdom 1876 was 11,205,588 cwt., of value £4,619,427. The bristle-pointed O. (*A. strigosa*), a smaller and more slender plant than the above, was formerly much grown in Scotland, and is still occasionally seen as an introduction or remnant of cultivation. It continues to be grown in other countries where the soil is poor. The following are British species of the genus *Avena*:—Meadow O.-grass (*A. pratensis*), a plant of moors and dry pastures. It yields a sweet fodder. Yellowish O.-grass (*A. flavescens*) is one of the best perennial meadow-grasses for a dry soil, especially if intermixed with other species. It furnishes a considerable bulk of fine foliage, eagerly sought by sheep. This species has a wide distribution, nearly the same as *A. fatua* above mentioned. Downy O.-grass (*A. pubescens*), met with in dry pastures, especially in limestone and chalk, is a nutritious and prolific fodder plant. *A. elatior* or False O.-grass, from its widely creeping propensities comes into the catagory of troublesome weeds; it yields an abundant herbage, but is not relished by cattle or sheep. Other species of O.-grasses, of which the relative value as fodder produce is not yet known, are peculiar to N. America and other parts of the globe. A curiosity in the genus is the animal O. (*A. sterilis*) of S. Europe. The seeds, when ripe and fallen, move about on the ground in a manner simulating animal life, caused by the torsion of their awns altering according to the varying conditions of the atmosphere. Water O. is an American name for *Zizania aquatica*, a grass belonging to the rice tribe.

Oates, Titus, 'the thrice renegade son of a twice renegade father,' born about 1619, was the son of a parson of the Church of England, who had originally been a ribbon-weaver and then an Anabaptist preacher. O. became chaplain to the Duke of Norfolk, and afterwards a navy chaplain. From both posts he was expelled with disgrace, and also from the Jesuit Colleges of Valladolid and St. Omer, where he had pretended to be a convert to Catholicism. He then returned to England, and in 1678 communicated to the Government his abominable 'Popish Plot.' The Pope, Innocent XI., he said, had assumed the sovereignty of Britain in consequence of its heresy; had appointed Oliva, the general of the Jesuit Order, as Deputy-Governor, and issued new appointments to all the offices in Church and State. Arundel was to be Chancellor, with Powis, Bellasis, Stafford, Godolphin, and Coleman under him; Wakeman, the queen's physician, was to poison the king; and London was to be burned by a general rising of Catholics. The story was believed, for, though O.'s statements were inconsistent and obviously false, the nation had become uneasy about the Duke of York's Catholicism, and the impression was deepened by the murder of Godfrey, the magistrate who took O.'s declaration, and by the discovery of a treasonable correspondence between Coleman and Père la Chaise, which, however, had no resemblance to the 'Popish Plot.' By the aid of hired perjurers, such as Tonge (author of the *Index to Jesuits' Morals*, who entered into an agreement with O. to write up the plot), Kirkby the chemist, Carstaires, and Bedloe, and of the unscrupulous C. J. Scroggs, O. denounced and procured the conviction of many Catholics, including Coleman and Lord Stafford. Shaftesbury took advantage of the popular panic to pass a bill excluding from Parliament all Catholics, with the exception of the Duke of York and his family; and the movement had one good effect in incidentally revealing the treachery of the king and Danby in selling the national honour to France. O. was now called the 'saviour of the nation,' and received a pension of £1200. In 1685 his villany was discovered; he was convicted of perjury, pilloried, whipped from Aldgate to Tyburn (1700 strokes), and thrown into prison for life. As the cartoons of the time said, it was right to make his back blush, as his face could not blush. The only illegal part of this sentence was 'the stripping of the canonical habits.' In the trial Jeffreys made the celebrated ruling against O.'s accomplice, Smith, that the evidence of a man to prove an act of perjury previously committed by himself could not be received. On the Revolution he was liberated and received another pension. He died July 23, 1705, some ardent Protestants believing in him to the last. See Macaulay's *History of England*, also Howell's *State Trials* (vol. x.).

Oath, in Law, is a declaration accompanied by certain formalities which the law requires a person to emit before filling some public office, or previous to giving evidence before a court of justice. The highest office of the State, that of the Sovereign of the United Kingdom, requires the Coronation Oath (q. v.). With regard to the oaths to be taken by officers of the State, see ABJURATION, OATH OF. Members of certain religious sects objecting to the usual forms of oath are allowed to substitute Affirmation (q. v.). Under 6 Will. IV. c. 62, justices of the peace are prohibited from administering oaths unless they are specially prescribed or sanctioned by law. The object of this statute was to stop creditors from gaining moral preferences over one another, as was not unfrequently done by some one of them requiring the common debtor to take an oath in his favour. The usual mode of administering an oath in England in Court is for the officer of the Court to repeat the words of it, after which the witness intimates assent by touching the Gospels with his lips. In Scotland, the judge and witness stand, each raising his right hand, the latter repeating after the former the words:—'I swear by Almighty God, as I shall answer to God at the great day of judgment, to tell the truth, the whole truth, and nothing but the truth.' The judicial oath of England and of Scotland, if conscientiously taken, of course indicates certain religious belief or conviction on the part of the witness. The Jew is sworn on the Pentateuch to tell the truth as he believes in Jehovah. The Mohammedan is sworn on the Koran by his belief in Allah. Some legal difficulty is found should the witness openly profess atheism, pantheism, or polytheism, as it is held essential that a witness should believe in the existence of one supreme moral ruler of the universe, who will after death resuscitate all mankind, and reward or punish each individual according to the morality of his actions. On the other hand, to reject the evidence of a witness because he does not believe this, nor feel fully convinced of its truth, would necessitate rejection of the testimony of some of the most eminent and conscientious men of our day; and otherwise be quite inconsistent with the ends of justice. It would probably be sufficient in order to extract the truth from a witness, to rely solely upon the penalties which the law justly attaches to the crimes of Perjury and Subornation (q. v.)—just as we rely on the penalties of the law alone to protect us against forgery or any other crime.

Oath, Religious, is an appeal to the Deity, or to anything sacred, in attestation of an assertion or in confirmation of a promise given or a duty undertaken. The use of oaths seems to have been common among most ancient nations. According to the Greeks, the gods themselves swore by the Stygian lake; and they themselves swore chiefly by Jupiter, who specially presided over oaths, but also on various occasions by all the other gods, by natural objects, by various persons, by the dead and the living, by the members of their bodies, &c. The O. was accompanied by various ceremonies, such as pointing to heaven, laying the hand on the altar, &c. Among the Hebrews the use of oaths was very common, both in public transactions and private intercourse; *e.g.*, when agreements were made for the performance of certain acts (Gen. xiv. 22, xxiv. 2–4, xxxi. 53, l. 5, 25; Josh. vi. 26; 2 Kings xi. 4), when allegiance to God, fealty to a sovereign, or obedience to a superior was professed (2 Kings xi. 17; 1 Chron. xi. 3, xxix. 24). Judicial oaths were demanded by the Mosaic law on four occasions: (1) From a person with whom goods had been deposited and lost (Ex. xxii. 10, 11); (2) from one suspected of having lost property in his possession (Lev. vi. 3); (3) from a wife suspected of adultery (Num. v. 12–28); (4) from a whole community for the discovery of a theft (Lev. v. 1; Judg. xvii. 2; Prov. xxix. 24). The *form* of the O. was generally an imprecation by God or Jehovah, but also by heaven, the earth, the sun, Jerusalem, the temple, the angels, or distinguished persons (1 Sam. i. 26, xvii. 55; *cf.* Gen. xlii. 15). The ceremonies observed in connection with an O. were such as sacrificing *seven* animals (the Heb. verb to swear is literally *to seven*, *cf.* Gen. xxi. 23–31), calling seven witnesses, pointing to heaven (Gen. xiv. 22; Deut. xxxii. 40), putting the hand under the thigh (Gen. xxiv. 2, xlvii. 29), which is a euphemism for taking hold of the genital organs, a part of the body always considered sacred, as appears from phallic worship and circumcision. One of the most solemn rites was when two parties making an agreement cut one or more animals in halves and passed between the pieces laid opposite each other, implying an imprecation that the fate of the divided animals might befall the one who should break the agreement (Gen. xv.; Jer. xxxiv. 18, 19). See Smith's *Dict. of the Bible* (1863); Kitto's *Cyclo. of Bib. Lit.* (new ed. Edinb. 1866); Spencer's *De Legibus Hebr.* (Hagæ, 1686); Potter's *Ants. of Greece* (4th ed. 1722).

Oatmeal'. For the preparation of O. the oats are first kiln-dried and submitted to a process of milling by which the husks are removed, leaving the grain in the condition of groats or grits. These subsequently ground to a more or less coarse meal constitute ordinary or Scotch O. O. made into Porridge (q. v.) or baked into cakes formerly constituted the staple food of the Scotch peasantry and working classes, and considering that it formed at once an eminently wholesome, nutritious, and economical diet, it is a matter for great regret that the substance is now more looked on as a luxury for the wealthy than as the staple food of the poor. As compared with wheaten flour, O. contains much larger proportions of albuminoid or nitrogenous matter, fat and mineral matter, but less starch and water. The following shows the average composition of 1 lb. of good Scotch O.:—Water, 350 grs.; fibrin, &c., 2 oz. 252 grs.; starch, &c., 10 oz. 352 grs., fat, 1 oz. 269 grs.; cellulose, 259 grs.; mineral matter, 147 grs.

Oaxa'ca (pron. *Oaháca*), one of the S. states of the Mexican confederation, lies S. W. of the Isthmus of Tehuantepec, bounded S. by the Pacific, E. by Chiapas, N. by Vera Cruz, and W. by Puebla and Guerrero. Area 35,591 sq. miles; pop. (1875) 648,779. The surface is covered in the E. with offsets from the mountains of Chiapas, and in the W. is a high plateau, rising in the Cerro ('mount') de Zempualtepec to 11,483 feet, and broken by deep valleys, from which the Rio Verde flows to the Pacific.

and the Rio Alvarado to the Atlantic. The climate is mild and healthy except in the plains near the coast. Violent earthquakes are frequent. The soil of O. yields abundant maize, rice, sugar, coffee, and indigo, and there is rich mineral wealth still unwrought.—**O.**, the capital of the State, is situated in a fertile valley of the river Atoiac 4967 feet above the sea, and 185 miles S.S.W. of Vera Cruz. It is the seat of a bishop and of a university, and has manufactures of cigars and chocolate, but the chief industry is the raising of cochineal. O. was founded in 1528 on the site of the ancient capital of the Zapotecks, and has large ruins of palaces and temples. Pop. 25,000.

Ob, or **O'bi**, the principal river of Western Siberia, is formed by the confluence of the Bia and Katunga, which rise in the Altai Mountains, the former in Lake Toleskoi ('gold lake'), the latter at Mount Belucha, and unite 8 miles below Biisk. Following a general north-westerly course, the O. receives on the right the Tom, Chulim, and Kat, and on the left the Charish, Irtish and Konda; and after a course of some 2600 miles flows into the Gulf of O., an inlet of the Arctic Ocean. It passes the towns of Barnaul, Narim, Surgut, Beresov, and Obdorsk; and drains an area of 1,300,000 sq. miles. Owing to the slight fall of the stream—4 feet in 12 miles—it readily overflows its banks; and it is frozen over for half the year. Steamboats, however, have for some years been established on its waters. In the spring of 1876 an expedition was despatched from Bremen by the German Polar Society to explore the territory of the O., and in the same year, the English steamer *Louise*, despatched by M. Trapeznikoff, a Moscow merchant, ascended the O. and Irtish to Tobolsk, a distance by river of more than 1000 miles.

Obadi'ah (Heb. 'servant of Jehovah') is the name of the fourth of the Hebrew 'minor' prophets, whose 'vision' is directed against the Edomites for their malice and perfidy when Jerusalem was destroyed. If this was the destruction by Nebuchadnezzar (B.C. 588), as seems most probable, then O. wrote some time during the Babylonian captivity.

O'ban (Gael. 'the little bay'), a town of Argyleshire, Scotland, on a bay of the same name, which forms an excellent harbour, being of great depth, and protected by the island of Kerrera in front, and the elevated shores of the mainland behind. Though of recent origin, O. has become a great rendezvous for tourists, and is sometimes called the 'Queen of the Western Highlands.' It contains several superb hotels, and a court-house, while on the heights above the town numerous villas have been erected. To the N. are the interesting ruins of Dunolly Castle, and three miles N. is Dunstaffnage Castle, which preceded Scone as the seat of the Scottish Kings. O. belongs to the Ayr group of burghs. Pop. (1871) 2426.

O'beah, a species of magic practised by the W. African races, and from them transferred to the negroes of the United States and W. Indies. It is a development of Fetichism (q. v.), being based on a supposed connection between living beings and inanimate objects. Spells, philtres, and waxen images, form, as in witchcraft, the chief instruments of the O. man or woman. The superstition still lingers on in the W. Indies; and cases have recently occurred of negro Methodists of high standing being suddenly smitten with the O. frenzy and abandoning themselves to the most revolting rites. See Bryan Edwards' *History of the British Colonies in the W. Indies* (1793), and E. Tylor's *Primitive Culture* (1871).

Ob'elisk (Gr. *obeliskos*, dim. of *obelos*, 'a skewer or spit'), a lofty four-sided monolithic pillar diminishing in width from the base upwards, and terminating in a low pyramid called a *pyramidion*. The height is invariably about nine or ten times the thickness of the lower extremity of the shaft, and this thickness, compared with that of the upper extremity directly under the pyramid, is usually in the ratio of 8 to 5. Egypt is peculiarly the land of obelisks, which were mostly formed of blocks of rose-coloured granite, quarried at Syene and thence transported to different cities at a marvellous expenditure of manual power. The monoliths were polished, usually covered with hieroglyphics, and raised on pedestals in the form of a cube, or, in early instances, truncated pyramids. The apices were sometimes capped with gold or finished with metal terminals. The true significance of the Egyptian O., which was called *tekhen* (root 'to hide'), is obscure beyond the fact that it was a symbol of the sun and an emblem of the god Amen or Amun, whose name signifies the 'unrevealed.' During the 12th dynasty great obelisks were placed at the sides of the pylons or gates of a temple; and during the 19th and later dynasties they were erected as triumphal monuments. In earlier periods an O. of diminutive size was commonly raised at the tomb of a king; some of these small obelisks are to be met with in European museums. Many of the great Egyptian obelisks have likewise been transported to different continental cities, where they adorn the public places. Rome possesses twelve which owe their removal to the cupidity of Roman emperors. Five of these are of historical importance:—(1) the Lateran O. (105 feet high without base), taken from Heliopolis to Alexandria by Constantine, and thence removed by his son to Rome and erected in the Circus Maximus; it fell and broke, and in 1588 was raised in its present site in the Piazza del Laterano by Pope Sixtus V. (2) An O. of Rameses II. (height 78 feet), erected by Augustus in the Circus Maximus, and transferred to the Piazza del Popolo in 1589, where it now stands as the Flaminian O. (3) O. (height 72 feet) of Psammeticus II. (B.C. 594), set up by Augustus in the Campus Martius as a gnomon, and removed to the Piazza di Monte Citorio by Pope Pius VI. in 1792. (4) O. (height 82 feet) placed in front of St. Peter's about 1590 by Fontana. It was brought to Rome by Caligula and placed in his circus on the Vatican. ? It is said to have been originally erected at Heliopolis by Menephthah, son of Rameses II., but its Egyptian origin has been questioned, as it is destitute of hieroglyphics. (5) O. (height 55 feet) placed by Domitian in the Circus Maxentius, and removed in 1651 by Innocent X. to the Piazza Navona, its present position. Egyptian obelisks are also to be seen at Constantinople, Florence, and in France, at Paris and Arles. The Parisian O. (height 76½ feet) was removed in 1831 from the temple of Luxor and erected in the Place de la Concorde in 1836. The cost of its removal has been variously stated at from £30,000 to £80,000. London, too, is now in a position to boast of its Egyptian O., since one of those popularly called 'Cleopatra's Needles' was in 1877 removed from Alexandria for erection in the British metropolis. The history of this O. is interesting. The Egyptian city An, or Heliopolis (Biblical On) was called *ben-ben-ha*, 'house of obelisks,' and around its temple of the sun six obelisks originally stood; two were raised by Osertesen I. (12th dynasty), and the others by Thothmes III. (19th dynasty) and his successors. Only one O., a shaft of Osertesen, and probably the oldest great O. in the world, now keeps guard over the ruins of the ancient city. Its neighbour shaft has disappeared and probably lies buried in the sands. Of the remaining four obelisks, one is at Rome, another at Constantinople, and two are celebrated as 'Cleopatra's Needles,' which were transported to Alexandria and raised in front of the Water Gate of the Cæsarium in the eighth year (Alexandrian era) of the reign of Augustus, B.C. 23, exactly 1900 years ago. Cleopatra was then dead a few years, but she may have directed their removal before her death. In 1801, one of these Needles lay prostrate, half embedded in the sands, and its removal to England was contemplated by the British forces in Egypt after the disastrous defeat of the French. The companion O. is still erect at Alexandria, but it is reported to have been acquired for the city of New York. In 1820 the fallen O. was formally presented to Britain by Mehemet Ali, and the gift was renewed in 1867 by the present Khedive of Egypt. The Government, however, regarded the venerable monument as unworthy of removal, and it lay on the shore of Alexandria till 1877, when, through the enterprise and munificence of a private citizen—Mr. Erasmus Wilson—it was secured for erection in London. The removal of the O. was successfully accomplished by firmly securing it inside of an iron cylinder, which was built round the O. where it lay, and then rolling the whole down to the sea. The cylindrical vessel, rigged with sails and fitted with steering gear, and called the 'Cleopatra,' was taken in tow by a merchant vessel and brought safely as far as the Bay of Biscay. Here the 'Cleopatra' was cast adrift during a severe storm. In the first attempt to transfer her crew to the merchantman six lives were unhappily sacrificed. The 'Cleopatra,' contrary to expectation, rode safely through the storm, and two days afterwards was sighted by a ship and taken to Ferrol, where she remained till January 1878, when she was brought to London, arriving in the East India Dock, Blackwall, on the 21st of that month. It consists of syenite, and has a total length of 68 feet 5½ inches, 7 feet 6 inches being contributed by the pyra-

midion. The O. is not square at the base, but measures 7 feet 10½ inches by 7 feet 5 inches. The weight is estimated at 186 tons, and the cubical measurement at 2529 cubic feet. Three vertical lines of hieroglyphics are inscribed on each of the four sides. The central line on one side shows that this singularly interesting monolith was originally set up by Thothmes III. as one of 'two great obelisks capped with gold' dedicated 'to his father Haremakhu,' (the sun in the horizon). The lateral lines of hieroglyphics were added by Rameses II. (the Sesostris of the Greeks). Birch's *Notes on Obelisks* in the *Museum of Classical Antiquities* (vol. ii. 1862); Figeac's *L'Obelisque de Lougoor* (Par. 1833); Cowper's *History of Egyptian Obelisks* (Lond. 1877); and Erasmus Wilson's *Cleopatra's Needle* (Lond. 1877).

Obelisk (†) in printing, a mark of reference to a note. It was originally employed in Roman Catholic Church books to guide the priest where to make the sign of the cross.

Ober-Amm'ergau, a village of Upper Bavaria, 34 miles by road S. of Weilheim, which is 31 miles S.S.W. of Munich by rail. The inhabitants (1198 in 1871) are excellent carvers in wood and ivory, but O.-A. is chiefly celebrated for the decennial Passion Play performed by more than 400 actors. A permanent theatre, recently erected, accommodates 6000 spectators. The play was instituted in 1634 in accordance with a vow of gratitude for the cessation of a pestilence. It comprises the entire narrative of the Passion, interspersed with Old Testament tableaux, and lasts from seven to eight hours. The performance of 1870, interrupted by the Franco-German war, was repeated in 1871, and the next will take place in 1880. See Dr. Molloy's *Passion Play at O.-A. in* 1871 (3d. ed. Lond. 1877).

Oberlin, Johann Friedrich, a famous Christian philanthropist, was born at Strassburg 31st August 1740, educated at the university there, and in 1767 accepted the charge of the parish of Waldbach in Steinthal, a mountainous district of Elsass. Here, until his death, 1st June 1826, with the utmost zeal, and with a success which excited the wonder of his contemporaries, he laboured to improve the resources of his parish and to educate his people. His supervision was of the most wide-reaching character, extending even to the most insignificant events in the lives of all his parishioners. He introduced better methods and implements of agriculture, and under his care his parish quadrupled its inhabitants and reached a high degree of cultivation. See Sims' *Brief Memorials of O.* (Lond. 1830), *Memorials of O., with a Short Notice of Louise Schepler* (Lond. 1838–52). There are numerous biographies of O. in French and German, of which the latest is that of Spach (Par. 1866).—**Jeremiah Jakob O.,** brother of the preceding (born 1735, died 1806), became a professor of classical philology in the University of Strassburg, and wrote some interesting works.

Oberlin College was founded in 1833 at Oberlin, a village in Ohio, U.S., 35 miles S.S.W. of Cleveland. It was designed for the liberal education of both sexes, a special feature being that the students support themselves by manual labour. There are departments of theology (under Congregational control), of philosophy, the arts, literature, and music, besides preparatory classical and English schools. The library contains 11,000 volumes. In 1875 the total income of O. C. was $20,603; the faculty consisted of a president, 12 professors, 3 principals, and 14 lecturers, and the number of students was 475.

Oberon (Fr. *Auberon, Alberon;* from Ger. *Alberich,* old Ger. *alb,* 'elf,' or 'fairy' and *rich;* comp. Old Eng. *rica,* 'a king'), king of the fairies and husband of Titania, appears first in the French poem of the 13th c. *Huon de Bordeaux.* A quarrel between O. and Titania and their subsequent reconciliation through Huon, a French noble, and Amanda, daughter of the Sultan of Babylon, whom the former leads home by the help of O. after much difficulty, form the basis of this tale, which was reissued as a prose romance at Paris in 1516. It is from this source rather than from the older poem, that Chaucer, Spenser, and Wieland especially, have borrowed their conceptions of O. Some extracts from it were published by Comte Fressan in his *Bibliothèque Universelle des Romans* (1778), while the old *chanson de geste* was published in 1860 by MM. Guessard and Grandmaison in their collection of *Anciens Poëtes de France.* Shakespeare has introduced O. in his *Midsummer Night's Dream,* and Wieland has made O. the subject of a romantic epic first published in 1780.

Obes'ity or **Cor'pulence** is the term used to denote 'all those anomalous conditions of physical configuration which have as their prominent outward mark an excessive development of the subcutaneous layer of fat as well as a corresponding unshapeliness of the figure.' The morbid tendency to O. may be developed in the fatty tissues all over the body, as well as in certain limited portions of the *tela adiposa,* and the anatomical changes may be regarded as the expression of a general morbid condition, or as the localisation of a constitutional affection. Morbid O. depends, in great measure, on a general lesion of the function of nutrition, the fat-store, or fat laid up in the fatty tissues being markedly dependent both on the amount of food and the assimilation thereof. It is of importance to ascertain the kind of food from which fat is chiefly derived; and 'recent physiology regards the greater portion of the fat-store as probably a product of the decomposition of the *albumen of the pabulum,* just as the fat which occurs in degenerative processes is a product of the decomposition of the *organised albumen.*'

The results of the most recent investigations may be stated as follows:—The fat-store of the animal body is renovated and increased from the albumenates and homologous fat of the food supplied; the remaining constituents of which (heterologous fats, hydrocarbons, glutens) have mainly a conservative action upon the fat already formed, but are not directly lypogenetic. The conditions for the accumulation of fat are most favourable when the quantity of the fat-forming and conservative, or indirectly fat-forming elements of the diet is greatest; when the quantity of oxygen in the blood is least; and when the trophic and plastic energy of the tissues that absorb albumen is smallest.

It is a well-known fact that under identical dietetic conditions, and external circumstances, certain individuals remain thin, while others become fat, even to a morbid degree; so that the tendency to O. is obviously in great measure constitutional, and in many cases hereditary, or at least congenital. The periods of life specially favourable to O. are the first year and above forty, the tendency being greatest in the female sex. The extent to which fat may accumulate in the body is enormous. The normal weight of a man, six feet high, should not exceed 178 lbs., but Daniel Lambert, who died at the age of forty, weighed 739 lbs.

In addition to congenital disposition the following may be mentioned as frequent causes of O.:—(1.) Intemperance in diet and the use of spirituous liquors. Fat meats, butter, oily vegetable substances, milk, saccharine, and farinaceous substances are the most fattening articles of food. The vegetarian races of India have a marked tendency to O. The copious use of alcohol, especially in a concentrated form, is a frequent source of O., as the alcohol greedily absorbs oxygen, and hinders the combustion of the stored up fat. (2.) The influence of local activity. Increased muscular action lessens the tendency to the production of fat, and favours the production of flesh; bodily rest, on the contrary, favours fat production by antagonising the production of flesh. A combination of these predisposing causes invariably results in O., and the principles are so well understood that even amongst savage African races, where O. is much admired among females, the condition is intentionally induced, and frequently to such an extent that the female beauty is unable to assume or to maintain the upright position. (3.) There are certain morbid processes, calculated to produce O. symptomatically and as a sequela, such as chlorosis, morbus Addisonii, &c. There is a form of physiological anæmia, which predisposes to O., though sluggish blood formation, or relaxed constitution, is not invariably followed by O.

Treatment.—The prophylaxis of O. must aim at (1) diminution of the introduction of fat-producing material in the food. (2.) Increase of the trophic and plastic energy of the albumenised tissues of the body, especially those of the voluntary muscles. (3.) Increase of the general stock of red blood corpuscles, by promoting their new formation. (4.) Increase of the animal process of oxidation, by increased introduction of oxygen. In regard to diet, Immermann says:—'A diet which contains an abundance of albumen, little fat, few hydrocarbons, and not a great deal of gluten, is best suited to the prophylaxis against O. . . . The supply of gluten, hydrocarbons, and even fats must

never be so curtailed as to produce a considerable diminution of the natural feeling of strength, and of the functional capacity of the body; and, further, the supply of albumen must never be so great that disorders of digestion, or signs of the lithic acid diathesis are produced.' 1. The articles of food most *permissible* are: Meat broths of ordinary meats—beef and veal (both of them boiled as well as roast), lean ham; of game—venison (red or fallow-deer), hare, chamois, partridge, fieldfare, red grouse, heathcock, ptarmigan, pheasant; of domestic fowl—poultry, pigeon, turkey; of fish—pike, trout (both boiled, but not fried); of other remaining kinds of animal food—oysters and snails. Besides this, green vegetables of all descriptions (asparagus, cauliflower, green peas, beans, spinach, the common kinds of cabbage), prepared in the English or French manner (without fat); acid fruits (raw or stewed).

'2. Articles of food which should habitually be partaken of only in small quantities are:—*Bread*, biscuits, *milk*, *eggs*, *potatoes*, carrots, and other vegetables of the like nature, dried husk fruit, rice, millet, buckwheat, mealy and sweet soups; *sugar*, as an addition to food and drinks (coffee or tea, for instance); of animal foods—mutton in every form, beef in the form of beefsteaks, veal as cutlet; of fish—carp; and besides, green salad with oil, and of dessert dishes, wine jellies.

'*N.B.*—The italicised words represent articles of diet widely used, but from their composition ill-adapted for the prophylactic method, and here enumerated among those articles which may be used in small quantities only, because it would be extremely difficult for most persons to give them up altogether.

'3. Articles of diet which should be used very *exceptionally*, and then only in *very small quantities*:—*Butter* (as an addition to bread, potatoes, &c.; *cream* (as an addition to coffee); *fats*, hot and cold; *sauces* (especially hot butter sauces with fish, Mayonnaise with fish, lobster, poultry); of ordinary kinds of meat—*pork*, &c. (with the exception of lean ham), in every form and preparation, goose and duck; of game—black game, marmot, otter, wild duck, woodcock, snipe, quail, ortolan, lark; of fishes—eel, salmon, common trout, turbot; and of other kinds of animal food—crayfish, lobster, frog's thighs (with their ordinary accompaniment of fatty pastry); all sorts of stuffing (for tame or wild fowl), potato and meat salads, patties (especially *paté de foie gras*), sweets, pastry, *confitures*, creams, ices, sweet grapes (and particularly raisins), dates, and preserved candied fruits of all sorts, chesnuts, nuts, and almonds.' See article 'Corpulence,' by Immermann, in *Cyclopædia of the Practice of Medicine*, by Dr. H. Von Ziemssen, vol. xvi. 1877.

Ob'ject, a term employed in metaphysics, æsthetics, and grammar. In metaphysics it denotes anything of which a thinking being or *subject* can take cognizance. It does not follow that the thing of which cognizance is taken has any real or absolute existence. It may exist merely in the conception of the thinker; but whether it do so or not, it is equally in metaphysical language an O. In æsthetics the term is used in the adjective form. A poem, novel, or picture is said to be *objective* when the author has not allowed his own personality to colour the scene, the incident, or the delineation of character; when everything stands out fresh and wholesome as from the hand of Nature. When the author, on the contrary, is full of himself, and throws his own individualism egotistically into whatever he does, he is then said to be *subjective*. Shakespeare and Scott are instances of the former; Byron and Victor Hugo of the latter. In grammar an O. is the name given to whatever directly determines the application of a verb. It may be a word, a phrase, or a clause. In the following sentences the words italicised are the O. of the action expressed by the verb:—I lifted my *hat*; I wish *you to succeed*; I believe *that the man is guilty*.

Object-Glass, in a telescope or microscope, is the lens or combination of lenses which receives the parallel or diverging rays from an object and converges them to form the image which is viewed through the eye-piece.

Obliga'tion is, in Law, 'a legal tie by which one is bound to pay or perform something to another.' In England, the debtor is termed the *obligor*, the creditor the *obligee*. In Scotland, the corresponding terms are *obligant* and *grantee*. The difference between a real right and an O. is, that the former gives a *jus in re*, or right to possess or recover the subject; the latter gives only a *jus ad rem*, or right of action against the person who has become bound. See PROMISE.

Obligato (compulsory), a term in music applied to an independent or prominent part in a composition, written for a particular instrument. An O. accompaniment is one that is essential, as opposed to one that is *ad lib.*

O'boe, an ancient and charming musical wind instrument, sounded through a reed. The Egyptians had instruments of this description, with reeds or straws inserted in the tubes. The old English name was wayght, but subsequently the French hautbois (derived from its high piercing sound) was current till about eighty years ago, when the Italian name came into use. The present form of O. was introduced about 1720. It has a double reed, is composed of three joints formed of wood, and is shaped like a clarionet, slender in the upper and spreading out conically at the lower end. Its usual compass is two octaves and one fifth, the deepest note being C below the treble clef. The natural notes are obtained by the stopping and opening of holes, and the semitones by the manipulation of keys. It is most effective in simple keys, is much used in pastoral pieces, and with its peculiar and rich tone is adapted for music either of a wailing and plaintive or of a calm and cheerful nature. The term O. is also applied to an organ stop formed by reed pipes made of brass.

Ob'olus (Gr. *obelos*, 'a spit'), the smallest of the four chief weights and coins among the Greeks, was of silver, and in the Attic system equalled 15¾ grains troy, or 1½d., six oboli (a handful) making a Drachma (q. v.). It derived its name either from its being stamped with a spit, or because in the barter of primitive times iron or copper nails were used as money (Aristot. ap. Poll. 9, 77).

O'Bri'en, an ancient Irish family, descended from Brian Boroihme (q. v.), one of the most celebrated heroes in the history of the nation. The successors of Brian called themselves kings of Thomond, became first tributary to the English, and finally in 1543 entered the ranks of the Anglo-Irish peerage, Murrough O., becoming Earl of Thomond and Baron of Inchiquin. From Donough, a younger son of this Earl of Thomond, are descended the O'Briens of Dromoland in County Clare. Sir Edward O., fourth baronet, married the heiress of William Smith of Cahirmoyle, in County Limerick. He died 13th March 1837, and left several sons, of whom the most notable and unfortunate was **William Smith O.**, born 17th October 1803, and educated at Harrow, and Trinity College, Cambridge. He entered public life as a Tory M.P. for Ennis in 1826, but shortly changed his politics and was returned as a Radical for County Limerick in 1835. He was one of O'Connell's strongest supporters till the great Repealer alienated the extreme 'Young Ireland' party by refusing to use other than 'moral force' in his contentions with the British Government. An Irish Confederation was projected in 1846 with O. as its president, the assistance of France was unsuccessfully sought, an appeal was made to the peasantry to take up arms, and the affair culminated on 29th July 1848 in O.'s ridiculous attack upon a body of police near Balingarry, 'the battle of the cabbage-garden,' when eighteen of the rebels were killed. O. was apprehended at Thurles on the 5th August, and being found guilty of high treason was sentenced with three others to be hanged, drawn, and quartered, which sentence was commuted to transportation for life. He was, however, liberated in 1856. He died at Bangor, North Wales, 18th June 1864.

Obscene' Publica'tions. The Act known as Lord Campbell's Act gives additional power to the authorities for suppressing the trade in these. On any one making oath before a magistrate that he believes obscene books or prints to be kept in any place for sale, and on the magistrate being satisfied that the complaint is well founded, he may issue a warrant to a police officer to enter the premises, by force if necessary, and carry any articles which may appear to him suspicious before the magistrate, who will pass judgment upon them, giving seven days' notice to the owner to appear at the trial. If the judgment be unfavourable, the articles are to be destroyed; otherwise, they are to be restored to the owner. An appeal lies to the next general quarter sessions.

Obser'vatory, a building equipped with suitable apparatus for the systematic observation of natural phenomena. An astronomical O. is concerned with the study of the heavenly bodies, a

magnetic O. with terrestrial magnetism, its variations and the laws that govern them, and a meteorological O. with atmospheric phenomena and their relation to weather and climate. Magnetic and meteorological observatories are invariably combined, and occasionally an O. devoted mainly to astronomical research possesses the means of conducting simultaneously the work of the other two.

The instruments of an astronomical O. are such as enable the positions, motions, and sizes of the heavenly bodies to be studied, and also the nature, arrangement, and motions of the molecules constituting these bodies. Accordingly, the instruments comprise the *transit instrument*, *transit circle*, and *mural circle* for meridional observations, the *equatorial*, and the *altitude* and *azimuth instrument* for extra-meridional observations, or study of objects in any part of the heavens, sidereal clocks and chronometers, spectroscopes, photo-heliographs, and many other auxiliary instruments. It is of prime importance that the situation of an astronomical O. be dry, and that the stone piers for the reception of the telescopes be stable, wholly unconnected with the walls of the building, and in the least degree affected by changes of temperature. Public observatories are established in all civilised countries, and by an exchange of the publications of each, showing the results of the work accomplished, astronomical science is constantly advancing. Many private establishments, too, in the United Kingdom especially, possess most perfect means of conducting astronomical investigations, and contribute greatly to the furtherance of the science. It is impossible to do more here than mention some of the principal British and foreign public observatories. The largest and most important O. in Great Britain is the Royal O. at Greenwich, which was founded in 1675 and stands on Flamsteed Hill, named after the first Astronomer-Royal. Greenwich O. 'was expressly built for the aid of astronomy and navigation, for promoting methods of determining longitude at sea, and more especially for determination of the moon's motions. All these imply as their first step the formation of accurate catalogues of stars, and the determination of the fundamental elements of the solar system. These objects have been steadily pursued from the foundation of the Royal O. The lunar deductions in connection therewith are probably the greatest single work ever undertaken in astronomy' (Report of H.M. Astronomer-Royal for 1875). In addition to the main pursuits, photo-heliographic, spectroscopic, meteorological, and magnetic investigations are carried on, and a system of correct time is maintained throughout the country by means of time-signals and clocks, electrically controlled by a standard clock in the O. Under the direction of the present Astronomer-Royal, Sir George B. Airy, the sphere of labour has been considerably extended and the instruments in use vastly improved. One of the latest additions to the equipment of Greenwich O. is a beautiful standard sidereal clock. The Royal O. for Scotland, situated on the Calton Hill at Edinburgh, was founded by the Astronomical Institution of Edinburgh in 1812, and transferred to the State in 1846. The principal work being conducted at this O. is the preparation of a catalogue of stars embodying the results of observations, as to the proper motions of those stars, taken during a period of 40 years prior to 1870. A mean-time clock in the O. electrically controls several clocks in the city, fires a time-gun at the castle, and simultaneously drops a time-ball on Nelson's monument. The meridional instruments are old or out of repair, but it is expected, consequent on the report of a Commission appointed in 1876 to inquire into the condition of this Royal O., that State aid will soon be given to render it more useful and effective. The equatorial reflector, which was designed by the present Astronomer-Royal for Scotland, Mr. Piazzi Smith, to meet the exigencies of the dome under which it is mounted, is remarkable for its 24-inch aperture in relation to the short focus of 10 feet of the silver-on-glass speculum. The observatories at Dublin, Oxford, and Cambridge, and, in the British Dependencies, the Royal O. at Cape Town, and the establishments at Mauritius, Melbourne, and Sydney are noteworthy for their importance and activity. Among foreign observatories those of Paris, Poulkova, and Cambridge (United States) occupy the first rank.

Obsid'ian, a term said to be derived from Obsidius, a Roman general, who first brought the mineral from Ethiopia, is a rock of volcanic origin, being found in lava streams. It is dark coloured, glassy in its structure, breaks with a distinctly conchoidal fracture, and is indeed scarcely distinguishable from many metallurgical slags. In composition it is allied to felspar, containing generally 80 per cent. of silica, 10 of alumina, and varying small proportions of lime, potash, soda, and iron. From its hardness, and the sharp edge its fractured masses take, it has always been a favourite substance with all rude and savage nations where obtainable for cutting-tools, spear and arrow heads, and like purposes.

Ob'verse (Lat. *obversus*, turned towards or against), in numismatics, that side of a coin which bears the head or initials of the sovereign or other image of the state issuing the money.

Occ'am, William, one of the greatest schoolmen of the Middle Ages, known to his admirers and followers, as the *Doctor singularis et invincibilis*, was born at Ockham in Surrey in the latter part of the 13th c. He held several benefices in the English Church before entering the Franciscan order. He then proceeded to Paris, attended the lectures of Duns Scotus, and soon after became a lecturer himself. O. first singalised himself by coming to the rescue of Philippe le Bel in his contest with Pope Boniface VIII., arguing, in his *Disputatio Inter Clericum et Militem*, that Christ *in quantum homo* was not made the judge and censor of kings, and that the Popes have therefore no temporal dominion. The same principles he again asserted in the case of Béranger Salon, a Franciscan of Perpignan, charged in 1321 by Pope John XXII. with the heresy that the apostolical poverty ought to be imitated by the Church. O.'s *Dialogus de Hæreticis, de Erroribus Joannis XXII., et de Potestate Papæ Conciliorum et Imperatoris*, attacks bitterly the canon lawyers of the Church, and the Papal Infallibility. Infallibility resides only in a General Council of the Universal Church. The Pope himself was a noted heretic and sinner, and ought to be tried by a Council, and their sentence carried out by the Emperor. O. was thrown into prison at Avignon, but escaped to Munich, where, under the protection of Ludwig of Bavaria, he lived until his death, April 7, 1347. His *Opus Nonaginta Dierum*, which still retains an honoured place in the *Index Expurgatorius*, is another exposure of the corruption and inconsistency of the Papal position. But it is as the destroyer of the fictions and illusions of scholasticism that O. will be longest remembered. His doctrine of Nominalism demonstrated the unreality of 'universals.' This doctrine carried out, had an incredible influence in freeing philosophy from the trammels of supersensible dogma. O.'s *Expositio Aurea* criticises the *Isagoge* of Porphyry and the *Categories* of Aristotle, and recalled Europe to a proper conception of the Aristotelian psychology and logic. O. also wrote on Predestination and on the *Sentences* of Peter Lombard. See Luke Wadding's *Scriptores Ordinis Minorum* (1650), Haurèau's *De la Philosophie Scholastique* (Par. 1848).

Occa'sionalism, or the theory of occasional, instrumental, or conditional causes, was substituted by Malebranche for the continuous influence or assisting cause of Descartes. The problem was to account for the observed effects produced by matter on mind, two substances essentially distinct, 'and *vice versa*. A physical cause could not produce a mental effect, because the non-extended excludes the idea of the extended. The division is the most fundamental in human experience, and could not be bridged over by any of the ordinary metaphysical abstractions which did duty as *veræ causæ* in either of the two worlds. The only resource was to assume either that the first cause operated everywhere and always, thus depriving particular causes of all real efficiency, or that the first cause had instituted a set of subordinate causes for the purpose of overcoming the difficulty. This latter hypothesis, known as O., really meant that in certain circumstances or on certain conditions the first cause would supplement or vary the ordinary system of secondary causes established in the world. It was succeeded by Leclerc and Cudworth's Plastic Nature, *Ratio mersa in materiam, et veluti corpore ebria*, and by Leibnitz's Pre-established Harmony between the atoms, monads, or entelechies constituting the soul and those constituting the body, which is still the common conception of the mental and bodily life as parallel, and in a sense independent. It is rejected by those who dogmatically assert that mind is merely a function of the body. It is now seen that so far as the question of causes is concerned, the simplest set of physical, chemical, or vital conditions presents as much difficulty as the connection between mind and body, and consists, as regards our knowledge, merely of antecedents and consequents.

Occip'ital Bone, an important bone of the vertebrate skull, forming the hinder bone of the cranium in man and in vertebrates generally. In the newly-born child this bone consists of four distinct pieces: (1) a central or *basilar* portion lying in front of the *foramen magnum* or *occipital foramen*, through which the brain is continued to form the spinal cord; (2) and (3) two lateral portions (*ex-occipitals*), each supporting a *condyle* or rounded process whereby the skull articulates with the first or *atlas* vertebra; and (4) a large central portion or segment lying *above* the 'foramen magnum,' and known as the *supra-occipital* segment. The *basi-occipital* element of this bone or 'basilar' part in the adult skull unites with the *sphenoid* bone, whilst the upper surface is grooved for the reception of the *medulla oblongata* of the brain. In front of each 'condyle' is a foramen or aperture through which the last or 9th cranial nerve (*hypoglossal*) passes. The O. B. articulates with the *parietal* or side bones of the skull, and with the *temporal* bones. The bone itself is made up of two compact bony plates or *laminæ*—the *outer* and *inner* tables—with a soft tissue, the *diploë* between them for the support of bloodvessels. In *Amphibia* the *basi-occipital* segment of the O. B. is represented by a cartilaginous portion, and its hinder end in reptiles and birds bears the single 'condyle' for articulation with the spine.

Occleve, Thomas, of whom little is known except through his writings, flourished about the beginning of the 15th c., living in Chester's Inn, Strand, where Somerset House now stands. He was a writer to the privy seal, and a very frigid but copious poet. A list of his poems, nearly all in MS., may be seen in Warton's *History of English Poetry*. His most successful attempt is a translation of *De Regimine Principum*, by the monk Egidius, in the prologue to which he gives us the only authentic portrait of Chaucer we possess.

Occulta'tions, in Astronomy, are eclipses of stars or planets by the moon, or of stars by other planets. The term eclipse is restricted to the intervention of the moon or earth between the sun and the earth or moon. O. are ordinarily understood to mean the interception of a star's or planet's light by the moon; and such occurrences, predicted in the *Nautical Almanac* several years in advance, are valuable to the navigator as a means of determining his longitude or testing his chronometers. Only those stars can be occulted which lie within the limits of the moon's orbit, *i.e.*, those stars which are confined to a belt of the heavens extending to 5° 8′ 48″ on either side of the ecliptic.

O'cean, a name used to denote the body of water which encircles the globe on every side and separates continent from continent. The O. covers three-fifths of the surface of the earth, and though strictly speaking there is but one O., yet it is divisible into certain areas more or less defined by the intervention of the land—the *Atlantic O.* (q. v.) between America and Europe and Africa; the *Pacific O.* (q. v.) between America and Asia and Australia; the *Indian O.* (q. v.) between Africa and Australia; the *Arctic O.* (q. v.) surrounding the N. Pole; the *Antarctic O.* (q. v.) surrounding the S. Pole. The properties and characteristics of the O. are described under SEA.

Ocea'nia, the name given to the fifth division of land on the globe, including the great island regions of the Indian and Pacific Oceans. It is usually divided into four parts, viz., the Malay Archipelago, Australasia, or Melanesia, Micronesia, and Polynesia.

Ocell'us, the name given to the rudimentary organs of sight found in lower animals (*e.g.* Jellyfishes, *Echinodermata*, etc.), and which are also found in Insects (in addition to compound eyes), in Arachnida (q. v.), &c. In insects the O. in its simplest form consists of a modified group of pigment-cells derived from the skin-tissues. According to Newport, a typical O. consists of a 'convex, smooth, single cornea, beneath which is a spherical crystalline lens, resting upon the plano-convex surface of the expanded vitreous humour, the analogues of the transparent cones of the compound eyes.' Müller states that the function of the ocelli in insects is that of perceiving near objects; the compound eyes being used to perceive distant objects. In adult insects they usually number three. In lower animals the O. are simple masses of pigment, covered by a lens; they are adapted to receive impressions of light and darkness, but are useless for more perfect perception.

Ocelot, the name given to various species of Carnivorous quadrupeds of the family *Felidæ* (q. v.), and which appear to be closely related to the Leopards (q. v.). The Common O. (*Leopardus Pardalis*) occurs in tropical America, where it represents the Old World leopard. It attains a length of 4 or 5 feet. Its colour is a light or greyish fawn, marked with longitudinal bands of darker brown, edged with black. A dark band runs along the whole length of the spine. The head, neck, and inner aspects of the limbs are marked by spots of irregular shape. The ears are black; at the base of each there is a white spot. The O. exhibits all the ferocity and agility of the leopard, and preys upon smaller quadrupeds. It is not remarkably courageous, however, and will not face man unless brought to bay. It is said to be readily and permanently tamed. The Grey O. (*L. griseus*) also occurs in tropical America. It has a more uniformly light fur than the preceding, and the spots and dark markings are lighter than in the common O. The Painted O. (*L. pictus*) is still more definite and rich in its colour-markings. Along its throat a number of very dark streaks are to be seen, and the spinal mark is velvety black. Allied to the O. is the Margay (*L. Tigrinus*) of Guiana and other parts of S. America.



Ocelot.

O'chils (Gaelic, 'the heights;' Lat. *Ocelli Montes*), a range of hills in Scotland extending for about 24 miles through parts of Stirling, Perthshire, Clackmannan, Kinross, and Fife. The scenery is very peculiar in character, the hills from a distance appearing like artificial mounds, but in reality they are separated by deep clefts, so narrow as not to be visible at a distance. Of the peaks, the most picturesque is Dunmyat, and the highest Ben Cleuch (2340 feet). The hills are formed mainly of basalt and greenstone, and offer a rich field to the geologist. They are entirely occupied with sheep-farms.

Ochi'no, Bernardi'no, a noted Italian reformer, born at Siena in 1487, passed in 1525 from the Franciscan to the newly-founded and more rigorous Capuchin order, of which he was chosen general in 1538 and again in 1541. For forty years he had enjoyed a prodigious reputation for his oratory, purity of life, and devotion to the Catholic Church, when, suddenly in the August of 1542, we find him at Florence denouncing that Church as Antichrist. Cited to Rome, he fled to Geneva in the company, says Spondanus, of a young laundress, whom he subsequently made his wife. It is certain at least that he had four children, one of whom was married in 1562. After three years' stay at Geneva, O. visited Basel, Augsburg, and Strassburg, from the last place proceeding to England (1547), on the invitation of Cranmer, who made him a prebendary of Canterbury and Italian preacher at London. On Mary's accession (1553) he returned to Switzerland and held the post of pastor to an Italian church at Zürich from 1555 to 1563, when his *Dialogi XXX.*, containing an approval of polygamy, gave offence to Beza, who calls O. 'a most impure hypocrite, the concealed favourer of Arianism, and a mocker of all Christian doctrines.' Thenceforth O. was hunted like a hare by his co-religionists from Basel to Mühlhausen, and from Nürnberg to Frankfurt, dying at last of the plague at Schlakow, in Moravia, in 1564. He was author of various treatises, both Catholic and Protestant, a list of which is given by J. Voigt in his *Catalogus Librorum Rariorum* (Hamb. 1732). See Karl Benrath's *B. O. of Siena* (Eng. trans. Lond. 1877).

Ochna'ceæ, a natural order of dicotyledonous small trees or shrubs, with simple, alternate, toothed leaves, flowers solitary or in racemes, with their pedicels articulated in the middle, and fruit consisting of several-seeded carpels, attached to the large succulent prolongation of the receptacle. There are about 140 species, widely spread in tropical countries. They generally possess a bitter principle, and some are used as tonics, but are comparatively unimportant. Several species of *Gomphia* and *Ochna*, neat shrubs with yellow flowers, are in cultivation.

O'chre (Gr. *ōchra*, from *ōchros*, 'pale'; Fr. *ocre*) is a term applied to any compact earth or clay coloured yellow, red, or brown, from the combination of hydrated sesquioxide of iron.

O. is used as a painter's and artist's pigment. It is the *sil* of the Romans. O. occurs chiefly in the Secondary and Tertiary deposits. It is extensively mined in France, that of Vierzon being most esteemed for its rich yellow colour. In Cornwall large quantities of ochrey pigments are obtained from the ferruginous sediment, resulting from the treatment of tin and copper ores of poor quality. Holland produces much O., and Anglesey and the Isle of Man are also sources of varieties of this mineral.

Och'terlony, Sir David, a distinguished Indian officer of Scotch extraction, was born at Boston, U.S., February 12, 1758, entered the service of the East India Company, and took part in the wars against Hyder Ali at the close of the last century. In 1804 he defended Delhi with a small force against a Mahratta army under Holkar. In the Goorkha campaign of 1814, his was the only division which did not meet with disaster, and the successful issue of the war in the following year is mainly to be attributed to his wisdom and bravery. He was subsequently employed in the political or diplomatic department. He died July 15, 1825, at Meerut, while Political Resident for Delhi and Central India. A column of mixed architecture was erected to his memory in the Maidan, or Park of Calcutta.

Ock'ley, Simon, born at Exeter in 1678, entered Queen's College, Cambridge (1693), became vicar of Swavesey, in Cambridgeshire (1705), and Professor of Arabic in the University of Cambridge (1711), and died at Swavesey, August 9, 1720. His *History of the Saracens* (1708–18) is commended by Gibbon, who speaks of the author as 'an original in every sense, who had opened his eyes;' but it brought little profit to O., the second volume being dated from Cambridge Castle, where he was imprisoned for debt. Other works by O. were *Introductio ad Linguas Orientales* (1706); *An Account of South-West Barbary* (1713); and translations from Italian and Arabic.

Ockmul'gee, a river of the United States, rises in and flows mainly S.S.E. through Georgia to Colquitt, where it joins the Oconee and forms with it the Altamaha. It is navigable to Macou, and is about 300 miles in length.

O'Cle'ry, Michael, the greatest of the 'Four Masters,' was born near Ballyshannon, in Donegal, Ireland, about 1575, entered the Franciscan Order, and spent his life in collecting materials for elucidating the history of his native island. He was assisted by three other Irish antiquaries, Conary O'Clery, Cucogry O'Clery, and Forfeasa O'Mulconry. The result of their labours was the *Annala Rioghachta Eireann* ('Annals of the Kingdom of Ireland'), commonly called 'The Annals of the Four Masters.' The best edition is that by Dr. John O'Donovan (3 vols. Dub. 1848–51; 2d ed. 7 vols. 1856), which contains, besides the Irish text, an English translation and valuable notes. Another work of O., *The Martyrology of Donegal, a Calendar of the Saints of Ireland,* was also edited by Dr. O'Donovan (Dub. 1864). Several of his compositions remain in MS. O. died at Louvain in 1643.

Oco'nee, a river in Georgia, United States, rises near Hartford, and flows S. by E. almost parallel with the Ockmulgee, to Colquitt, where with the latter river it forms the Altamaha. It is navigable to Milledgeville, 90 miles from Colquitt.

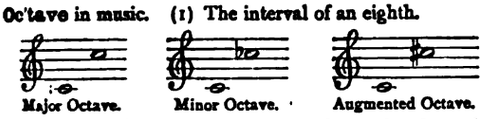
O'Conn'ell, Daniel (known as the 'Liberator,' the 'Irish Agitator,' and the 'Champion of the Church'), was born at Carhen, Co. Kerry, 6th August 1775. His family was an old one which had been deeply implicated in the rebellion of 1641; his great-grandfather had commanded a company of foot at Derry, the Boyne, and Aughrim, and was included in the capitulation of Limerick. Educated at the local school, and at St. Omer and Douay (the president of which told him that he was 'destined to make a remarkable figure in society'), O. arrived in England in 1793. He became a student of law at Lincoln's Inn, and ultimately attached himself to the Munster circuit. 'A large and well-used law library, numerous *liaisons,* a pack of beagles (for hare-hunting), and a good collection of fishing-tackle, attest the variety of his tastes.' This strong healthy animalism lasted all through his life. In 1800 and 1803 he took the side of loyalty with the yeomanry against the United Irishmen. In 1802 he married his cousin, Mary O. of Tralee, and thus lost the inheritance of his uncle, 'Old Hunting Cap.' O.'s skill in addressing juries, and frightening and coaxing witnesses, and his popular speeches on the lost Irish Parliament, brought him a great deal of *nisi prius* business; and in Curran's Rolls Court he also succeeded. It was not till 1809—after both Pitt and Perceval had proved untrustworthy on the subject of Catholic emancipation; after Saurin and the other government lawyers of the day had, by reviving obsolete statutes and instituting press prosecutions, done everything in their power to irritate the Irish population—that O. began to be recognised as the political leader of the Pacificators (in Conciliation Hall) or Repealers (in Mullaghmast), Delegates, Associators, Precursors, who carried on a sort of sham Parliament with the object of repealing the penal laws, collecting and administering the rent, and keeping up the popular agitation. To this work he devoted a great part of a hard-working life, rising at five in the morning, and abstaining from wine and spirits, though these had become almost essential to him. At this time he was 'the best abused man in Ireland.' The corrupt Orange municipality of Dublin passed a resolution to have him shot, which led to O.'s duel with D'Esterre, the latter being killed. Soon after he was challenged by Mr. (afterwards Sir Robert) Peel, secretary to the lord-lieutenant, but this duel was prevented by the police, and O. then registered a vow against the use of duelling pistols. Gradually the efforts of the Catholic Association told, the liberalism of the Canning policy prevailed, and Catholic Emancipation became an open question before 1825. On 5th July 1828 O. was returned for Co. Clare against the popular and liberal Lord Fitzgerald. He entered the House, and proposed to take his seat without taking the oaths except that of allegiance. Next year the Relief Bill passed, and O. became a member for all Ireland. He now sought to revive the movement for Repeal of the Union, which he had only laid aside for Emancipation. In 1831 he was charged along with Messrs. Steele and Barrett with holding meetings contrary to proclamation, but the statute authorising the prosecution expired before the trial could begin. After the Reform Bill, O. represented the following places in succession:—Co. Waterford, Co. Kerry, Dublin, Kilkenny, Dublin, Cork. His motion for repeal was first submitted in 1834, when the division was 523 to 38; 'the O'Connell Tail,' as it was called, being mostly returned by clerical influence. By an adroit use of the 'Tail' he managed to secure much Irish patronage during the Melbourne Administration of 1835–41. When 'the base, brutal, and bloody Whigs' left office, the agitation for repeal increased. Monster meetings were held on the royal hill of Tara, the Curragh of Kildare, the Rath of Mullaghmast. A great military review was announced for the historic plain of Clontarf. Before this, however, O., his son, C. G. Duffy of the *Nation,* Gray of the *Freeman,* Barrett of the *Pilot,* Rev. Mr. Tierney, and others, were arrested and tried for seditious practices. The sentence, imposing a fine of £2000 with imprisonment for a year, was afterwards set aside by the House of Lords on a technical point relating to the loss or theft of some of the jury slips. After this O.'s spirit was somewhat broken, and his purse was also emptied. He entered into friendly relations with Lord John Russell, spoke in favour of the abolition of the corn laws, and proposed test resolutions for the Repeal Association which condemned every effort to redress political wrongs by physical force. This very much disgusted the Young Irish war party, which has subsequently developed into the two branches of the Nationalists. The health of the old warrior was now breaking. The terrible events of 1846–47 further prostrated him, and he died at Genoa, 15th May 1847. O. was one of the greatest of modern speakers. His language was often coarse, and he seldom reasoned conclusively. He had no wide political intelligence, and on all subjects his mind was cramped by Catholic teaching. But he was full of imagination and humour, and possessed an intensity of passionate statement which won its greatest triumphs with the Irish mobs, yet made a deep impression on the House of Commons also. See his son John's *Life and Speeches of D. O.* (2 vols. Dub. 1846–47); Fagan's *Life and Times of D. O.* (2 vols. Cork, 1848). In 1877 a centenary edition of O.'s life was published.

Oc'tagon (Gr.) is any closed figure of eight sides. When the sides are equal and lie all in one plane, the angles are also equal, and the figure is a *regular O.* The regular O. may be easily formed by bisecting each of the four equal arcs into which the circle circumscribing a square is divided.

Octahe'dron is a solid figure bounded by eight faces, and having twelve edges and six angles. The *regular O.* has its faces and edges all equal, and may be regarded as formed of two

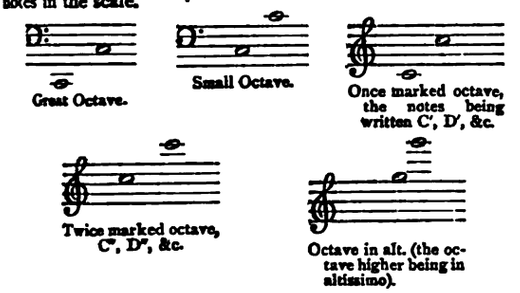
equal square pyramids, with equilateral triangles for sides, placed base to base. The O. is a form of crystal which certain minerals, sulphur, for instance, assume.

Oc'tave in music. (1) The interval of an eighth.



Major Octave. Minor Octave. Augmented Octave.

In the major O., the two notes being struck together form almost one sound, the vibrations in the higher being exactly twice in number those of the lower note. (2) The complete series of notes in the scale.



Great Octave. Small Octave. Once marked octave, the notes being written C', D', &c.

Twice marked octave, C'', D'', &c. Octave in alt. (the octave higher being in altissimo).

Octa'via, a sister of the Emperor Augustus, was first married to C. Marcellus, consul in B.C. 50, and on his death in 41 to M. Antonius. Her beauty, virtue, and accomplishments effaced for awhile the charms of Cleopatra from Antony's breast, but called to the East by the Parthian war (36), he suffered O. to attend him only as far as Corcyra, and himself proceeding to Asia, soon forgot wife and glory alike in the arms of the Egyptian wanton. O. started, nevertheless, in the year following, to cooperate with arms and money against the Armenians, but was met at Athens by a message commanding her return. She obeyed, and, formally divorced by Antony (32), lived quietly at Rome, bringing up his younger son by Flavia, Julus, along with her own family, and after Antony's death (30) even adopting his children by Cleopatra. She died in 11 B.C., and was publicly buried, Augustus pronouncing the funeral oration.

Oc'tet or **Ottetto** (in music), a composition for eight instruments or voices.

October (Lat. *octo*, 'eight') was the eighth month of the year of Romulus, which began with March. The Roman Emperors Commodus and Domitian attempted in vain to change its name to *Faustinus*, *Invictus*, or *Domitianus*. It is the tenth month of our year, and consists of 31 days. Chief among the ancient festivals which occurred in O. was the sacrifice to the god Mars of *Equus Octobris* ('the O. horse') among the Romans. The blood, which dropped from its tail was preserved by the Vestal virgins in the temple of Vesta for the purpose of being burnt to procure a purifying smoke at the festival of the Palilia on the 21st of April. Our English forefathers called it the *winter-fylleth* ('the winter full moon'), because the full moon in October was reckoned by them to mark the beginning of the winter season.

Octop'oda (Gr. 'eight-footed'), a family of *Cephalopoda* (q. v.) or Cuttlefishes, in which eight arms of equal length are developed. The O. are *Dibranchiate* or two-gilled cephalopods. The body is usually oval or globose, and the suckers unstalked. There is no pallial shell, but in one genus (*Argonauta*), represented by the paper nautili, two of the expanded arms secrete the delicate paper-like shell.

Octo'pus, the typical genus of the Cephalopod family *Octopoda*, which is characterised by having eight arms and two branchiæ. The English name for the true O. is *poulp*, and the German *see-spinne* (sea-spider). These molluscs frequent the Mediterranean and contiguous seas, but only lately have their habits been studied with any degree of success. We owe this increase of knowledge solely to the establishment of aquaria in this country and on the Continent. The poulps are extremely pugnacious, and resent the intrusion of any new-comer. Combats with lobsters in the tanks of aquaria have been often observed, and result usually in favour of the O., whose flesh is too soft and spongy to suffer permanent injury from the clutches of his foe. The female deposits her eggs within a nest of large stones, sitting over them and guarding them with the carefulness of a hen. If hard pressed, the O. covers his retreat in an inky discharge, which disappears through gradual oxidation. That the poulp has a more than ordinary degree of intelligence is attested by Professor Kollman, who records that those in the Naples aquarium recognise their keeper and even exhibit attachment to him. The O. is endowed with keen eyesight and well-developed ears, can swim backwards or forwards, and can use his limbs for crawling, grasping, feeling, &c. He has been known to leap 4 feet out of the water, and can change his colour through almost all the shades of the rainbow. See *The O., or the Devil Fish of Fiction and of Fact*, by Henry Lee (1876).

Octroi, or **Octroy** (Low Lat. *auctorium*, from *auctoritas*), originally a privilege or monopoly granted by a sovereign to an individual, in modern times denotes a tax levied in France on articles of produce destined for local consumption, and paid on their entering the gates of a city. The O. was at first solely devoted to the profit of the towns, but since 1663 a part has been taken by the National Treasury (at present $\frac{1}{2}$th). It was suppressed in 1791, but it was found necessary to re-establish it in 1797, and since that date it has given rise to much legislation, and was last reorganised in 1852. The O. was abolished in Belgium in 1860, and, though it never existed in England, has something analogous to it in the coal-tax levied for the good of of the City of London.

O'Curr'y, Eugene, an admirable Irish scholar, was born in County Clare about 1795. Along with Dr. O'Donovan he was employed to transcribe and translate the ancient Irish laws (see BREHON LAWS), was afterwards appointed Professor of Irish History and Archæology in the Catholic University of Dublin, and died 30th July 1862. His *Lectures on the Manuscript Materials of Ancient Irish History* (1861) are among the finest fruits of Celtic scholarship, and are indispensable to every student of the national history.

Od, the name invented by Baron Reichenbach, and applied to what he deemed a new force in nature. This odic force was all-pervading, and manifested itself in certain circumstances as a luminous appearance at the poles of magnets, of crystals, &c. These appearances were supposed to be more evident to some persons than to others. The whole hypothesis seems to have been a fanciful theory with no true foundation in fact, and is now generally discredited. There is, however, a strong resemblance between the properties of this odic force and the so-called *phenomena* of modern spiritualism.

O'dal or **U'dal Right** is a tenure of land from the Crown, which is said to have prevailed in Britain before the introduction of the feudal system, and is still to be found in Orkney and Shetland. The tenure was completed without charter by undisturbed possession for a certain period, which might be proved by witness before an inquest. The tenant was called a Udaller, and he paid a tribute called *skat* to the Crown.

Odd'fellows, Indepen'dent Order of, the name of a very extensive body of friendly societies with a large membership in Great Britain and Ireland, the United States, and various parts of the world. In the latter part of the 18th c. a society composed of London mechanics held convivial meetings under the name of 'The Ancient and Honorable Loyal Odd Fellows,' from which the 'Union Order of Odd Fellows' sprang. Attempts to abolish the convivial element induced a schism in 1812, when the Manchester Unity was founded. In 1825 a central standing committee was formed in Manchester, and since that date the Manchester Unity has included the great body of Oddfellows in this country. The objects of the society are to raise a fund by mutual contributions to meet payments on the deaths of members and their wives or widows, the relief of sick and aged members, and various other charitable purposes. Distressed lodges may apply for assistance to the districts with which they are connected, and distressed districts to the Unity. The number of members in Great Britain and Ireland and the colonies amounted on 1st January 1877 to 518,370, distributed among 457 districts and 4114 lodges; 475,887 members, 424 districts, and 3591 lodges being in Great Britain and Ireland alone. 3984 lodges in all supplied returns of their

income and expenditure during the year 1876. The amount received in contributions was £522,048, 16s.—an average of 20s. 6¾d. per member, and the total income was £683,650. The expenditure was £435,999, 2s. 4d., of which £339,063, 5s. 6d. was for sick benefits (average, 13s. 4½d. per member), and £96,935, 16s. 10d. for funeral benefits (3s. 9¾d. per member). The capital on hand on 1st January 1877 was £3,933,245, 14s. 7d. The *Oddfellows' Magazine* is a quarterly publication. The order is established in every state and territory in the United States, but since 1843 the organisation in that country has had no connection with that in Great Britain. The Grand Lodge at Baltimore is the centre of the American body, which numbered on December 31, 1873, 414,815 lodge members and 80,131 encampment members. The aggregate relief granted during 1873 was $1,490,274.

Ode (Gr. *ōdē*, contracted from *aoidē*), with the Greeks and Romans, denoted any poem intended to be sung to the accompaniment of the lyre. The great classic composers of odes were Pindar, Anacreon, and Horace. Ronsard (q. v.), who introduced the O. into modern poetry, adopted Pindar as his model, ignoring, however, that poet's division into the strophe, antistrophe, and epode. In present usage, the term is applied to a composition irregular in metre, and differing from a song in its greater length, and from an epic in its dealing, not with deeds and events, but with the author's thoughts and emotions. Among our grandest odes may be reckoned those of Milton, Dryden, Gray, Shelley, Coleridge, and Wordsworth.

O'denkirchen, a town of Rhenish Prussia, 16 miles S.W. of Düsseldorf, on the Niers, a tributary of the Maas, has manufactures of silks, half-silks, woollens, and half-woollen stuffs. Pop. (1875) 7848.

O'dense (old form *Odinsve*, 'Odin's sanctuary'), the chief town of the Danish island of Fünen, situated on the O. Canal and the Odenseaa, 3½ miles from its mouth, and 88 miles W. by S. of Copenhagen. The old town lies N., and the new, called the Albani quarter, S. of the river. The chief buildings of O. are St. Knuds Kirke, built 1081–93, burnt in the 12th and 13th c., and restored in 1864; Vor Frue (Our Lady) Kirke, 12th c., restored 1851–65; St. Hans Kirke, restored 1823–24; the castle; and the town-house. One of the oldest towns in Denmark, O. owed its importance in the middle ages (when it had six monasteries), to King Knud IV., the first Danish martyr and saint, killed here 1086 in St. Albani Kirke, and buried in the church named after him, to which many pilgrimages were made. O. was burned in 1247, and was the seat of the National Diets of 1527, 1539, and 1657. Pop. (1870) 16,970.

O'denwald ('Odin's forest'), a wooded mountain district of S. Germany, in the E. of Hessen-Darmstadt, 40 miles in length by 24 to 30 in breadth, extending between the Neckar and the Main as a continuation of the Schwarz-wald. The general elevation is about 1600 feet, while the highest point, Winterhauch, rises to 2063 feet.

Ode'on (Gr. *Odeion*), a Greek building in the style of a theatre, but of a smaller size, used for rehearsal of odes and music. The first O. was erected by Pericles; the most splendid was that of Herodes Atticus.

O'der (Lat. *Viadrus*, Slav. *Odra*), one of the chief rivers of N. Germany, rises on the N. slope of the Odergebirge, in the Austrian province of Moravia, about 5 miles from Olmütz, at a height of 2057 feet above the sea. After passing through the Austrian province of Schlesien, it enters Prussian Schlesien at Oldersberg, and flows mainly N.W. through Brandenburg and Pomerania to the Stettiner Haff, from which it empties itself into the Baltic by the Divenow, Peene, and Swine, inclosing the islands of Wollin and Usedom. The O. becomes navigable at Ratibor, where it has a breadth of 106 feet; at Oppeln it is 266 feet wide, and at Breslau 597 feet. Its chief tributaries are, on the right, the Klodnitz, the Malapane, rising in Poland, the Warthe, and the Ihna on the left, the Oppa, Ohlau, and the Peene. The O. has a length of 513 miles, and drains an area of 46,920 sq. miles.

Odess'a, the most important Russian seaport and commercial town on the Black Sea, and the third city of the Empire, is situated between the mouths of the Dniester and the Bug, and is connected with the former by a canal commenced in 1872. The houses are built of limestone, with flat iron roofs. The finest part of the town stretches along the edge of the elevated platform, in which the land here terminates, which is skirted by a magnificent promenade descending to the shore by a spacious stairway. Good water was first supplied to the town in 1874 by an aqueduct from the Dniester. O., which is the capital of the government Kherson, and the seat of an archbishop, contains 2 cathedrals, 34 churches, 31 synagogues, 2 monasteries, and a university, founded in 1865, with an observatory attached. The university is (1877) the only institution of the kind in S. Russia, and in 1876 had 43 professors, 252 students, a library of 150,000 vols., and schools of history, law, mathematics, sciences, and physics. The harbour consists of three parts, one for merchantmen, one for war ships, and one for vessels in quarantine. The quick growth of this town has been owing not only to the construction of the South Russian railways, but also to the proximity of two large navigable rivers. It has regular steam communication with Constantinople, Galatz, Taganrog, Berdiansk, Nicolæf, and Kherson, and the trade with China and Japan has received a great impulse from the opening of the Suez Canal. The exports in 1874 amounted to 46,977,898 roubles, of which ⅘ths were in wheat; next in value being wool, rye, spirits, barley, and turnip seed. The imports were valued at 42,375,238 roubles, the chief items being cotton, oil, coal, coffee, tea, iron, and hardware. In the trade with O. Great Britain takes the largest part, 180 British vessels having entered the port in 1873, with a tonnage of 144,357. During the last few years the industries of O. have increased in importance, and now embrace, besides shipbuilding, which takes the most important place, the manufacture of flour, maccaroni, ship provisions, ropes, &c. Pop. (1873) 162,814, of whom about 6000 were Germans. Near O. lay the ancient Greek colony of *Udessus*. The Turks erected here the fortress Hadshibei, in the place of which O. was founded by the Vice-Admiral Joseph de Ribas, under the Russian Empress Catherine II. in 1794. At the commencement of the Crimean War, the steamer sent from Britain to take away the British consul, having been fired upon by the batteries of O., the town was invested by 12 British men-of-war, and its fortifications destroyed in a few hours.

Odeypoor' (*Odaipur*), a native State of Chota Nagpur, India, in political connection with the Bengal government. Area, 1051 sq. miles. Pop. (1872) 27,708, of whom 73 per cent. are aboriginal tribes; revenue in 1874–75, £2762; tribute, £53. Much of the area is jungle. The products are rice, oil-seeds, cotton, gold, and lac. Gold is washed in the rivers, and coal is known to exist. The late Rajah was dethroned in 1859 for participation in the Mutiny, and sent to the Andaman Islands.

O'din is in Northern Mythology (q. v.) the highest of the gods. He rules over all, and is called *Allfödr* ('Father of all'), also *Valfödr* ('Father of Battle'), as 'they that die in battle are his beloved sons.' War is called the sport, and the sword the fire of O. He is the wisest of all, and is described as old, tall, long-bearded, and with but one eye, having bartered the other for a drink of the giant Mimir's Well of Wisdom, under the ash-tree of Ygdrasil. In his great hall in heaven, named Valaskjálf, roofed with figured gold, is the high seat Hlidskjálf, from which O. can survey the whole world. On his eight-footed horse Sleipnir he rides through the air, clad in a dark blue cloak, with a helmet of gold, and bearing his spear Gungnir, the work of the dwarfs. Wine is O.'s sole food, and the meat on his table is given to his two wolves Geri and Freki. His two ravens, Hugin ('thought'), and Munin ('memory'), are sent forth at daybreak to return at eve, when they sit upon his shoulders and tell all that they have seen and heard. O.'s attendant is named Hermod the Nimble. From O.'s gold ring, Drypnir (also made by the dwarfs), drop every ninth night eight gold rings of like weight. O. was the inventor of runes. With much ado he found the *Skáldmjöd* ('Scalds' mead'), which the giant Suttung had hid in a mountain; hence poetry is called the Drink of O. and of the Æsir (q. v.), and this he and they quaff every day from golden cups in his palace of Sökkvabek. The name of O. is preserved in many names of places, as Odense (q. v.), Odinshöi, Onsbjerg, and Onsild in Denmark, and in Slesvig Vonsbæk, Vonsild, and Vonsmose.

Wodan (Old Eng. *Wóden*) is the Low-German, and *Wuotan* the High-German name of the same god. It is from a verb meaning 'to storm' or 'rave;' comp. Old Eng. *wód*, and Low.

Scot. variant *wud*, 'mad.' The only pre-Christian writings in which Wodan is expressly mentioned are the two so-called Merseburg Poems, but tradition strongly testifies that the same myths clustered round Wodan in Germany as round O. in Scandinavia. The Lord of Heaven, whose single eye, broad-brimmed helmet, and dark mantle symbolised the sun, the clouds, and the firmament, was not only the giver of fruitful seasons, and the fulfiller of wishes, but inspired the poet and the warrior, and was the source of all knowledge. He was the god of the state, of all public business, laws, and solemn oaths, and kings traced to him their origin and power. Under the Roman Empire the Low-Germans, identifying Wodan with Mercurius, translated the Roman *Dies Mercurius* (Fr. *mercredi*, Ger. *mittwoch*) by the term *Wodnesdæg*, which is still preserved in our *Wednesday*. Numerous local names attest the popularity of Wodan's worship, as, in Germany, Godesberg (*Wodenesberg*), Gudensberg, Godensholt, and in England, Wednesbury, Wednesham, Wansford, Wanstrow, and Wanstead. See references under NORTHERN MYTHOLOGY, also Bender, *Die Deutsche Ortsnamen* (Siegen, 1846).

Odoa'cer, king of Italy, was the son of a chieftain of the Scyrri, Edecon, who with Orestes had been despatched by Attila on an embassy to the Emperor Theodosius (448). On the dispersion of the Scyrri by the East Goths (463), O. led for awhile a wandering life among the Barbarians of Novicum, till, entering the service of the Western Empire, he gained a high rank in the Imperial Guards by his courage and capacity. In 476, with the aid of these mutinous mercenaries, he besieged Pavia, put Orestes to death, and deposing his son Romulus Augustulus, the last of the Roman emperors, himself assumed the title of king. The submissive Italians received him without a murmur, but the better to establish his authority he sent ambassadors to the Emperor Zeno, consenting to the transference of the seat of universal empire from Rome to Constantinople, while requesting his own investiture with the title of Patrician and the administration of the diocese of Italy. O.'s fitness for his high station was evinced in his respect for the institutions and prejudices of his subjects, in his re-establishment of the consulate, and enforcement of the edicts of his predecessors. Himself an Arian, he exercised toleration towards the Catholics; and once more he carried the Roman arms beyond the Alps, in two successful campaigns against the Dalmatians and Ruyians (487). His greatness, however, kindled the jealousy of Zeno, who supported Theodoric (q. v.), king of the East Goths, in the invasion and conquest of Italy (439). Defeated at Aquileia, Verona, and on the banks of the Adda (490), O. threw himself into Ravenna, which he had made his residence. After a three years' siege he reluctantly consented to the partition of the Italian provinces, and six days later was stabbed at a banquet, March 5, 493. See Gibbon's *Decline and Fall of the Roman Empire* (chaps. xxxviii., xxxix.).

Odom'eter (Gr. *hodos*, 'a way,' and *metron*, 'a measure'), a way measurer or instrument for measuring the distance travelled over by a wheeled vehicle. In one form it is designed for attachment to the wheel of a carriage, and in another to be dragged after the vehicle, or driven by a pedestrian, the number of revolutions of the carriage-wheel in the former instance, and of the wheel of the machine itself in the latter, being calculated by a series of index wheels. A kind of O. is described by Vitruvius. In 1550 a degree of the meridian between Paris and Amiens was measured pretty accurately by means of an O. Butterfield in England (1677), Meynier in France (1724), and Hohlfeld in Prussia (about 1760) altered and improved the construction of the O. See PEDOMETER.

O'Donnell, Leopold, Duke of Tetuan, Count of Lucena, of Irish descent, was born at Santa Cruz in Teneriffe, 12th Jan. 1809. By 1832 he had risen to be a colonel in the army, and became a declared partisan of Maria Christina's regency. He compelled Cabrera to raise the siege of Lucena (July 1839), and was appointed lieutenant-general. That year he threw in his lot with the queen-mother and followed her to France, from which he intrigued against Espartero, the regent. After the fall of the latter in 1843, he was nominated captain-general of Cuba. In 1845 he returned with an ample fortune, and was elected to the Senate, holding the post of director-general of cavalry until 1851. He was outlawed for his share in an insurrection (1854), reinstated by Espartero, who created him a marshal, and whom he supplanted by *coup d'état* (July 1856). From 1858 to 1866 he acted as Prime Minister, conducting in person during that period a war in Morocco, whose successful termination lifted him into the highest rank of the Spanish nobility; but in 1866 his government was overthrown by Narvaez. O. died in exile at Biarritz, 5th Nov. 1867.

O'Don'ovan, John, LL.D., the prince of Irish scholars, was the son of a small farmer, and was born at Atateemore, in the county of Kilkenny, Ireland, 9th July 1809. In 1830 he was appointed to an office in the historical department of the Ordnance Survey, Ireland, and was employed to examine Irish MSS. and gather local information, for the purpose of fixing the orthography of places on the ordnance maps. O. was also conjoined with O'Curry (q. v.) in the transcription and translation of the Brehon Laws (q. v.). In 1849 he was appointed Professor of the Irish Language in Queen's College, Belfast. He died at Dublin, 9th December 1861. No Irish scholar has equalled O. in the amplitude and accuracy of his philological and historical knowledge of the national language; his topographical erudition was also immense. His most important works are his *Grammar of the Irish Language* (1845), and his edition of *The Annals of the Four Masters* (2d ed. 1856), besides which, however, he edited several very interesting volumes for the *Irish Archæological and Celtic Society*.

Odon'tophore, the name given to the dental apparatus characteristic of the highest classes of Mollusca (*Pteropoda*, *Gasteropoda*, and *Cephalopoda*), which are hence collectively named *Odontophora*, in contradistinction to the *Lamellibranchiata* in which no O. is developed. The O. is often named the 'tongue' of Mollusca. It consists of a *cartilaginous skeleton*, of a *radula* or *lingual ribbon* armed with flinty teeth, and which is gradually reproduced from behind as it is worn away by the friction in front; and of the *muscles*, by means of which the radula is moved like a chain-saw, and thus rasps down the food on which the animal subsists.

Œcodoma, a well-known genus of the Ant (q. v.), celebrated for their intelligent habits. The species are abundant in America. *Œ. Mexicana* is common on the Gulf coast of Mexico; *Œ. cephalotes* and *Œ. sexdentata* are found in large numbers in Brazil. The Œ. are popularly termed 'leaf-cutters.' They cut and transport leaves to great distances. They build very large nests, occupying a surface frequently of many square yards. A large tree may be stripped of its leaves in a single night by these insects, who are also known to tunnel beneath rivers and streams when occasion requires.

Œcolampa'dius, Johann (orig. Ger. *Heussgen* or *Hussgen*), a German Reformer, was born at Weinsberg, Wirtemberg, 1482. Having abandoned the study of law, which he had begun at Bologna, he studied theology at Heidelberg, Greek at Tübingen and Stuttgart under Melanchthon and Reuchlin, and Hebrew at Heidelberg under a converted Jew Adriani, and became a priest. While preacher in the Minster at Basel he assisted Erasmus with his edition of the New Testament. He became a monk in 1520, but being soon infected with the opinions of Luther, he escaped from the convent and returned to Basel (1522), where he joined the Reformers, and spent the rest of his life as a preacher and professor of theology. He died 1st December 1531. Œ. took a prominent part in the controversy between Luther and Carlstadt regarding the Real Presence (q. v.), having published his views in a letter to his friends in Swabia, entitled 'A Genuine Exposition of the Words of our Lord—This is my body.' Like Zwinglius he maintained that the bread and wine were mere symbols, but differed from Zwinglius, who regarded the word *is* as equivalent to 'represents,' in regarding *body* as used by metonymy for 'symbol of my body.' His other works were chiefly commentaries on the books of the Bible, which were of considerable value owing to his philological and Patristic knowledge. See Herzog's *Das Leben des Joh. Œkolampadius* (Basel, 2 vols. 1843), and the later biography of Hagenbach (Elberb. 1859).

Œcumen'ical. See ECUMENICAL.

Œde'ma (Gr. 'a swelling') is caused by the effusion or infiltration of serum into the cellular or areolar structures. O. may also occur in the submucous and subserous cellular tissues of the parenchymatous viscera. O. is not a distinct disease, but a symptom of a great variety of diseases, and the gravity of the symptom depends

very much upon the locality of the disease; thus O. of the *glottis* may cause death in a very short time. *Active* O., which is by far the most common form, is associated with an inflammatory action in the cellular tissue, and is peculiarly well-marked in erysipelas, and in inflammation of the lungs. *Passive* O. depends on impeded venous circulation, due to obstruction or obliteration of one or more veins, and may result in a variety of local symptoms, according to the nature and extent of the obstruction. Organic diseases of the heart, lungs, liver, and kidneys, give rise to distinct local symptoms, and the amount of O. is often commensurate with the danger which exists. O. is frequently caused by interruption of the venous circulation owing to the pressure of gravid uterus and abdominal tumours.

Œ'denburg (Hung. *Sopróny*, Lat. *Sempronium*), one of the oldest and most beautiful towns in Hungary, 37 miles S.E. of Vienna by rail, is situated among the spurs of the Leitha mountains, on the Ilka, a branch of the Raab, and two miles W. of the Neusiedler See. It has three large churches, several monasteries, and a theatre. The town watch-tower is reckoned the highest in Hungary. Cloth, sugar, and preserved fruit are manufactured, and in the surrounding district one of the finest wines of Hungary is made. The coal obtained from the neighbouring Brennberg forms also an article of trade in the town, whose annual cattle markets are much resorted to. Pop. (1869) 21,108.

Œ'dipus (Gr. *oideō*, 'I swell,' and *pous*, 'foot'), in the Greek myth was the son of Laius, King of Thebes, and Jocaste, who, to avert an oracle that their child should some day slay the father and commit incest with the mother, pierced his feet and exposed him on Mount Cithæron. Found by a shepherd, he was brought to Corinth, to the palace of Polybus and Merope, who reared him as their own child till he had grown a man. But the stigma of his unknown origin affixing itself to his name, he repaired to Delphi to inquire of its truth, and there received the selfsame answer that had affrighted his true parents. Applying it, however, to Polybus and Merope, he determined never more to return to Corinth, and on the way to Daulis fell in with Laius. A scuffle arose, and O. slew his father, thus working out the first part of the doom. Shortly after, the ravages of the Sphinx (q. v.), who killed all who failed to solve her riddles, caused proclamation to be made that her vanquisher should receive the hand of Jocaste. O. fulfilled the task, and wedding his mother became by her the father of Eteocles, Polyneices, Antigone, and Ismene. A pestilence fell upon the land, that should only cease, said the oracle, on the expulsion of Laius' murderer. Him, with tragic irony, O. solemnly cursed, and straightway learnt from the seer Teiresias that he was himself the man. Thereupon Jocaste hanged herself and O. put out his eyes. There are varying traditions as to his later fate—one, that forthwith expelled by his son and brother-in-law Cleon, he fled with Antigone to Attica; another, that he was first imprisoned at Thebes, and only banished by Cleon after his sons had fallen by one another's hands, and that coming to Colonus in Attica, he was honourably received by Theseus and finally translated from this earth by the Eumenides. The myth of O. and his descendants has formed the theme of tragedies by Æschylus, Sophocles, Euripides, Seneca, Corneille, and Voltaire. By comparative mythologists O. has been compared with Indra, the slayer of Dahanâ and the Night who gave him birth, and the Sphinx with Python or Fafnir, the winter dragon of Northern mythology. See Schneidewin's *Die Sage vom Ö.* (Gött. 1852); and Breal's *Le Mythe d'Œdipe* (Par. 1863).

Œhl'enschläger, Adam Gottlob, the prince of Danish poets, was born 14th November 1779 at Vesterbro, near Copenhagen, where his father was steward of the king's summer palace. Forsaking the stage, which he had first chosen as a profession, he spent his twentieth year in the study of law under A. S. Oersted, and during the attack on Copenhagen by the English fleet under Nelson, 2d April 1801, served as an ensign in the student-corps. From this time he mainly devoted himself to the study of the literatures and languages of Scandinavia. In 1803 O. gave the first evidence of his genius in a collection of *Digte* (Copenh.), which were followed in 1805 by *Poetiske Skrifter* (2 vols. *ibid.*), the latter containing the charming Eastern tale *Aladin* (Ger. trans. by O., Amst. 1808) and the tragedy *Hakon Jarl* (Eng. trans. by F. C. Lascelles, 1874). Aided by a royal stipend from the government, O. visited in 1805 Berlin, Dresden, Weimar, and other German cities, and made the acquaintance of Fichte, Schleiermacher, Wieland, Jean Paul, Tieck, and Goethe, and afterwards went to Paris, where he wrote his dramas, *Palnatoke* (Copenh. 1809) and *Axel og Valdborg* (*ibid.* 1810). After residing a few months with Mme. de Staël at Coppet, in Switzerland, he proceeded to Italy, where he wrote the drama *Corregio* (*ibid.* 1811; Eng. trans. by Theodore Martin, Lond. 1854). On his return to Copenhagen in 1809 O. was appointed professor of æsthetics at the university. The controversy between the new romantic school, which recognised O. as its leader, and the older spirit of classicism gradually now settled into a personal contest between Baggesen (q. v.) and O., which lasted till the former left Denmark in 1820. To this period belong some of O.'s greatest poems, *Helge* (1814), *Hroars Saga* (1817), and *Nordens Guder* (1819), a cycle of ballads on the old Scandinavian gods, translated into English by W. E. Frye in 1845. In 1817–18 he went on a second tour through Germany and Italy, and published his impressions, *Reise fortalt i Breve til mit Hjem* (2 vols. Copenh.). He died at Copenhagen, 20th January 1850. In his later years O.'s renown filled all Scandinavia. To his countrymen his name was as precious as that of Goethe to the Germans, and his death was mourned as a national calamity. His dramas and poems are marked by originality and force of imagination; his lyrics are unsurpassed for harmony and sweetness. A collected edition of his *Tragedier* was published by himself (10 vols. 1831–38; *edition de luxe*, 10 vols. 1849), also of his *Digterværker* (10 vols. 1835; *edition de luxe*, 23 vols. 1851–52). O. executed a German translation (4 vols. Leips. 1822–23), of Holberg's *Comedies*, and twice issued German translations of his own works (18 vols. Breslau, 1829–30; and 21 vols. *ibid.* 1839), which include (vols. i. and ii.) an interesting autobiography. The first complete edition of his *Samlede Værker* (38 vols.) appeared 1848–52; the latter of these years also saw the publication of his *Lyriske Digte, Romancer, og Ballader*, in 5 vols. A complete critical edition of his *Poetiska Skrifter* was edited by Liebenberg (32 vols. Copenh. 1857–65). See O.'s *Lebenserinnerungen* (4 vols. Leips., 1850–1), and Deumier, *O., le Poète national du Danemark* (Par. 1854).

Œil-de-Bœuf (Fr. 'bull's eye'), a small round or oval window, gave name to an ante-chamber in Louis XIV.'s palace at Versailles, which communicated with the royal apartment by such an opening in the frieze. The name *fastes* or *contes de l'Œ.-de-B.* was extended from the gossip of the courtiers in waiting to scandal generally.

Œland, an island in the Baltic, off the S.E. coast of Sweden, is separated from the mainland by the Kalmar Sound, which is about 10 miles broad. The island is 92 miles from O. Point in the N. to the Bjornnabben in the S., with an average breadth of 5 miles, and an area of 530 sq. miles. The land, which is but sparsely covered with soil, is chiefly used as pasture ground by the inhabitants, though crops are also grown to a small extent. Alum is obtained and manufactured in large quantities, and along the centre of the island, where there is a low ridge called the Alwar Hills, there are numerous windmills. The capital Borgholm (pop. 829) was founded in 1817 near the ruins of an old castle of that name. O. is chiefly inhabited along the western coast, which is skirted by the only highway that traverses the island. Pop. 45,000.

Oels, a town in the province of Silesia, Prussia, on the left bank of the Oelse, 16 miles N.E. of Breslau by rail. It has four churches, a synagogue, and a large castle with old fortifications. The manufacture of flax and cloth is carried on. Pop. (1875) 8856.

Œnan'thic Acid ($C_7H_{14}O_2$) is one of the results of the destructive distillation of Castor Oil (q. v.). The corresponding aldehyd ($C_7H_{14}O$), or *œnanthole*, also results from the same operation. If castor oil be distilled with caustic potash, the œnanthic compounds do not appear, but instead caprylic alcohol ($C_8H_{18}O$) is obtained. Œnanthic alcohol ($C_7H_{16}O$) belongs to the series of primary alcohols, the corresponding acids of which form the homologous series known as the *fatty acid series*.

Œnothe'ra, a genus of *Onagraceæ* (q. v.) principally consisting of herbaceous plants, with alternate leaves, large yellow, red, or purple flowers, petals four, stamens eight, ovary four-celled, capsule usually splitting when mature into four valves. There are fully 100 species, and, with the exception of one found in Tasmania, all are natives of America. *Ö. biennis*, or the

evening primrose, so called from its primrose-yellow flowers opening at sunset, is often seen in gardens; it has also escaped from cultivation or been accidentally introduced, and has established itself as a weed in various places. In Germany it is grown for the sake of its roots, which are used as a vegetable. Various other species from California and Oregon are also grown in gardens as ornamental out-door plants, *e.g.*, *O. cæspitosus*, with fragrant white flowers 3½ inches across when expanded, and *O. grandiflora*, which is perhaps the largest flowered and prettiest member of the genus.

Œre'bro, one of the wealthiest towns in Sweden, and capital of a län of the same name, is situated on the Svart-Elf where it enters the western end of the Hjelmar lake. It has a fine church, a beautiful council-house, before which stands the statue of the hero Engelbrecht, and an old castle founded by Birger Jarl on a small island. Carpets and woollen goods are the chief manufactures, and there are silver, copper, and iron mines in the neighbourhood. Formerly O. was of political importance, having on several occasions been chosen as the seat of government by the Swedish kings. Fifteen parliaments have been held here, at one of which, in 1540, the throne was declared hereditary, and at another, in 1814, Bernadotte was chosen king of Sweden. Pop. (1875) 10,193.

Oer'sted, Hans Christian, a celebrated Danish physicist, was born at Rudkjöbing, in the island of Langeland, August 14, 1777. He entered Copenhagen University in 1794, studied medicine and chemistry, and at the same time took a lively interest in poetry and the fine arts. In 1800 he became assistant to the Professor of Chemistry, and after several years spent in Holland, Germany, and Paris, which he visited as holder of a travelling scholarship, he was appointed in 1806 Professor of Physics in the University of Copenhagen. In 1819 he made the great discovery which has placed him among the first of experimental investigators—the discovery, namely, of the action of an electric current upon a magnet in its vicinity. It is the fundamental fact of electro-magnetism (see ELECTRICITY), which has since received such an impulse from Ampère and Faraday. The account of his discovery is given in a Latin essay, entitled *Experimenta circa Efficaciam Conflictus Electrici in Acum Magneticam* (1820). In 1829 he became director of the Polytechnic Institute and the Magnetic Observatory. He was an honorary member of most of the scientific societies, receiving from the Royal Society of London and Institute of Paris the Copley Medal and the mathematical prize respectively for his great electro-magnetic discovery. His constant endeavour was to bring science within the reach of the people, and to this end he published numerous works, of which may be mentioned *Ansicht der Chemische Naturgesetze* (1812); *Naturlärens Mechanske Deel* (1844); *Aanden i Naturen* (1850, Eng. trans. in Bohn's 'Scientific Library'); *Die Naturwissenschaft in ihrem Verhältnisse zur Dichtkunst und Religion* (1850); *Die Naturwissenschaft und die Geistesbildung* (1850). Most of his works are translated into German, and he himself wrote both German and French with great facility, as evidenced by his memoirs in Poggendorf's *Annalen*. O. died at Copenhagen, March 9, 1851. See Möller, *O.'s Charakter und Leben* (1851), and a biography by Hauch and Forchhammer (German translation, 1853).

Oe'sel, an island of Russia in the Baltic, forming part of the government of Livonia, and stretching across the entrance of the Bay of Riga. It is 45 miles long with an average breadth of 25 miles. Area 1200 sq. miles; pop. 46,000. The soil is rocky; but in some places grain is raised and good pasture land obtained. Seal fisheries are also carried on. The only town is Arensburg (3378) on the S.E. coast. O. anciently belonged to the Danes, by whom it was ceded to Sweden in 1645. In 1721 it finally came into the possession of Russia along with Livonia.

Œsoph'agus (Gr. 'the food-passage') is the name given to the 'gullet' or canal extending from the *pharynx*, or back part of the mouth to the *Stomach* (q. v.). In shape the O. is almost cylindrical, and in length it measures from 9 to 10 inches. Its upper level in the neck corresponds to the body of the sixth cervical vertebra. It enters and passes through the thorax or chest-cavity, pierces the *diaphragm* or *midriff*, and merges into the stomach, close below the latter muscle. In structure the gullet is composed of three layers. The external layer is the *muscular coat*, which is itself divided into an external and internal portion. The external muscles of the O. run longitudinally, the internal fibres being circular. The *submucous* coat forms the middle layer of the gullet, and consists of bundles of white fibrous tissue intermingled with elastic fibres, and supporting nerves and bloodvessels. The former are given off from the pneumogastric trunks, and the latter from the inferior thyroid artery, the thoracic aorta, and the coronary artery of the stomach. The *mucous coat* lines the interior of the gullet. When the gullet is at rest, this coat exhibits longitudinal *rugæ* or folds. This layer is lined by a thick layer of *squamous* or *pavement epithelium*, whilst papillæ project from its surface, and small *racemose* (mucous) *glands* open on the internal surface of the tube. The deep layer of this mucous coat consists of unstriped muscular fibres arranged longitudinally, this layer being named the *muscularis mucosæ*.

Diseases of the O.—This portion of the alimentary canal is liable to a considerable number of morbid changes, and all the diseases thereof have a tendency to occlude its passage, and hence are commonly described as *strictures* of it. *Œsophagitis*, or inflammation of the œsophagus, may be idiopathic, but it is generally caused by hot, irritating, or caustic substances, and sometimes by direct violence. Stricture of the œsophagus, one of the most terrible diseases with which man is afflicted, may occur as the result of several distinct conditions; folds of the mucous membrane, cicatrices after injury, pressure occasioned by neighbouring tumours, thickening or contraction of its walls, or lastly, and most frequently, cancerous affections of the tube. The symptoms of stricture of the œsophagus are dysphagia and emaciation, but it is often difficult to distinguish the various forms from each other. The malignant differs from the innocent by generally occurring later in life; by the general cachexia; by the implication of the glands of the neck, the larynx, and neighbouring organs. Obstruction from a tumour is generally caused by aneurism of the aorta. The seat of the stricture may be ascertained by passing a bougie, and if it be cicatricial the cicatrix may be divided by either external or internal incision. Billroth has attempted the extirpation of a cancerous deposit in the œsophagus, but the operation is not usually regarded as justifiable. The passage may sometimes be kept open by means of bougies, and failing this, no means of support can be introduced into the stomach except by the operation of Gastrotomy (q. v.).

Spasmodic stricture of the œsophagus usually occurs in hysterical women. The dysphagia in such cases is not constant, and frequently there is less difficulty in taking solids than fluids. Sir J. Paget has pointed out that the difficulty of swallowing may in many of these cases be analogous to that in stammering, viz., an inability from mental causes to co-ordinate the various muscular actions which are necessary to deglutition. Such cases require judicious management more than medical or surgical treatment. It occasionally happens that there is a congenital defect of the œsophagus, the tube contracting into an impervious muscular cord, or terminating in a *cul-de-sac*. In such cases, the child dies from inanition in from the third to the twelfth day.

Foreign bodies in the œsophagus are frequently a cause of trouble and pain, and often of great danger. A pin, a small bone, or a bristle may be hidden behind the arches of the fauces, or at the upper part of the pharynx. Large bodies are generally arrested opposite the cricoid cartilage, but they may pass lower. When a large mass rests above the pharyngeal opening of the larynx, it must be displaced at once, or instant death results; but when lodged in the œsophagus there is no such urgent danger. The first point is to ascertain, as nearly as may be, the size and shape of the substance impacted and its position in the gullet, so as to determine whether it should be pushed down into the stomach or extracted. Extraction may be accomplished with the long œsophagus forceps, by a blunt hook at the end of a probang, or by the horse-hair probang. This instrument contains a skein of horse-hair inserted near its extremity, which is dilated by pulling its handle out. It is useful for extracting foreign bodies, such as coins, bones, &c., which are lodged but do not entirely obstruct the tube. There are certain cases, however, in which it is necessary to cut down on the foreign body and remove it at once.

Œs'tridæ, a family of *Diptera* (q. v.) or Flies, including the 'bot,' or 'breeze-flies.' The body is stout and hairy, the mouth-opening small, and the mouth-organs rudimentary. The larvæ are thick, fleshy, footless grubs, composed of eleven segments.

The O. deposit their larvæ under the skin, or within the bodies of animals—the 'sheep bot-fly' (*Œstrus ovis*) depositing her larvæ within the sinuses or spaces in the frontal bone of the sheep, to which it gains access through the nostrils. *Gastrophilus equi* or horse bot-fly, is of pale yellow colour, banded with black on the chest. Its eggs, deposited on the skin of the horse, are licked off by that animal, and live within the horse's stomach and intestines from May till October, when they are ejected along with fœcal matter. *Hypoderma bovis* or ox bot-fly, has larvæ which live in the *worbles* or tumours found in the backs of cattle.

Offa, King of Mercia, began to reign about 757 A.D. He immediately set himself to deal with the troublesome Welsh on his western border, beating them back from Hereford, and forcing the King of Powys from his capital, which changed its name from Pengwern to Scrobbesbyryg ('the town in the scrub;' mod. Shrewsbury). This position he maintained by planting settlements of English in the basin of the Severn. He likewise asserted his lordship over Kent and Wessex, and raised Mercia to a position of such importance as to incur the serious jealousy of Karl the Great, by whose intrigues, when O. died in 795, it was speedily reduced to insignificance. O. was a skilful soldier and a wise king, as the code of Mercian laws which bears his name testifies; but tradition lays to his charge some acts of revolting cruelty. See Green's *History of the English People* (new and enlarged ed. 1877).

Offa's Dike was a ditch and rampart extending from the mouth of the Dee to that of the Severn, built by Offa, King of Mercia, for the purpose of confining the marauding Welsh within their own country.

Offenbach, a town of Hessen-Darmstadt, Germany, lies in a level district on the left bank of the Main, and is connected with Hanau, Frankfurt, Mainz, and Darmstadt by rail. It contains an old castle, 5 churches, and 1 synagogue. The important industries of O., which owe their growth largely to the influence of French emigration, embrace the manufacture of machinery, cast-iron and plated goods, jewellery, chemicals, carriages, wax-cloth, leather, tobacco, hats, &c. Pop. (1875) 26,008.

Offenbach, Jacques, a popular composer of light music, born of a Jewish family at Köln, 20th July 1822, studied music at the Paris Conservatoire, and became leader of the orchestra at the Théâtre Français in 1847. In 1855 he undertook the management of the *Théâtre des Bouffes Parisiens*. His *Orphee aux Enfers* (1859) was an unbounded success, and is in many respects his best work. On its revival under his management with additional music at the Gaiété in 1874 it ran for 500 nights. His very numerous operas-bouffes include *La Belle Hélène* (1864), *Barbe Bleu* (1866), the enormously popular *Grande Duchesse* (1867), *La Perichole* (1868), *Les Brigands* (1869), *Genevieve de Brabant*, *Le Roi Carotte* (1872), *La Jolie Parfumeuse* (1873), *Bagatelle* (1874), *Le Voyage dans la Lune* (1875), and *Madame l'Archiduc* (1876), most of which have obtained high popularity in this country as well as in France. Though he has never attempted high art, he cannot be denied the possession of an inexhaustible fund of sparkling and graceful melody.

Offer and Promise. An offer is not binding on him who makes it until it is accepted. A promise is not binding on the promiser by English law unless given for a valuable consideration. By the Statute of Frauds no verbal promise is sufficient to ground an action, without at least some note or memorandum of the matter signed by the promiser, or by some one authorised by him, in the following cases: where an executor or administrator promises to meet out of his own estate a claim for damage on the estate for which he is executor or administrator; when a man undertakes to answer for the debt, default, or miscarriage of another, and in this case even a written promise was formerly void, unless a good consideration was specified in the writing, but this was altered by 19 & 20 V. c. 97; when an agreement is made in consideration of marriage; where any contract or sale is made of lands, tenements, hereditaments, or of any interest in these; and when there is any agreement that is not to be fulfilled within a year from the date of entering into it. The statute requires not merely that the bare promise be in writing, but that the terms of the contract and the consideration be stated in writing. The third clause does not include *mutual* promises to marry. An offer may, in ordinary cases, be accepted at any time, if not withdrawn, unless a time be specified for acceptance. But in mercantile affairs there is an implied condition in an offer to buy or sell, that it be accepted without undue delay. An offer bearing that an answer is expected in course of post is not binding after the arrival of that post without an acceptance. In Scotland a promise is binding on the promiser though given without consideration, if deliberately and seriously made. See MARRIAGE LAW. Suppose A offer to sell B anything, say a horse, at a given price, and B promises to consider for a specified time, or to examine the horse on a given day, and A sells the horse while B is considering, or before he has examined the horse, it seems that by English law A is entitled to sell because he has had no legal consideration for waiting, in Scotland he would have been bound to wait. See CONTRACT.

Offering. See FIRST-FRUITS and SACRIFICE.

Offertory (Lat. *Offertorium*), is that part of the Eucharistic service in which the people make their offerings to God. In the ancient Church it was the practice for all communicants who had the means to make oblations of bread and wine, and sometimes other things, at the altar, out of which the elements for the Eucharist were taken, the surplus being devoted to a common feast (*cf.* 1 Cor. xi. 21), and at a later time to the support of the poor and the clergy. As soon as the people's offerings were made, and bread and wine were set apart for the Eucharist, an elaborate service followed, which is described in the Apostolic Constitutions. After thanksgiving to God for all His mercies, and particularly for the redemption of mankind by Christ, a form of Consecration was used, consisting of the words of the institution, with prayers that God would send His Holy Spirit upon the gifts and make them become the body and blood of Christ, and 'would receive the gift that was then offered to him to his altar in heaven, as a sweet-smelling savour, by the mediation of his Christ.' In the Anglican Liturgy the O. begins with the verses appointed to be read while the alms are being collected. The prayer offered in presenting the alms is sometimes called the first or lesser oblation, and the prayer of self-consecration after receiving the Eucharist, the second or greater.

Office (Lat. *Officium*), in the early Church, like Mass (q. v.), order, &c., meant divine worship and also the book containing the method for the regular performance of it. O. is thus the form of divine service appointed in the Breviary (q. v.) to be used daily as distinguished from the Liturgy (q. v.); that is, the Psalms, Lessons, Prayers, and Hymns which form the Canonical Hours (q. v.).

Officers, Military and Naval. Descriptions of the various grades of officers in Her Majesty's service will be found under their respective headings. Officers enter the army as sub-lieutenants under various regulations and subject to certain examinations, and obtain promotions in consideration of services and the passing of examinations. The combatant officers in a regiment consist of sub-lieutenants, lieutenants, captains, majors, lieutenant-colonels, and colonels, the last three being field-officers. The highest rank in the British army is that of field-marshal, next to which come various grades of generals. Non-combatant officers include paymasters, surgeon-majors, surgeons, and veterinary surgeons. The principal classes of officers in the navy are sub-lieutenants, lieutenants, commanders, captains, and the three ranks of admirals. Boatswains, carpenters, and gunners (warrant officers); and a superior class of artificers and seamen (known as petty officers) corresponding somewhat to non-commissioned officers in the army.

Offices, Sale of Public. The buying or selling of public offices has been considered as an offence indictable at common law. By 5 & 6 E. c. 16, if any person bargain to sell any office in the administration of justice, or of the public revenue, he loses his right of nomination to that office. And the person offering to purchase the office is disqualified from holding it. The Act did not extend to the sale of commissions in the army for prices fixed by the Queen's regulations. Its provisions have been extended to Scotland and to Ireland, and to all offices in the gift of the Crown, and to the principal offices of any department of the Government in the United Kingdom and in the Colonies, by 49 G. III. c. 126.

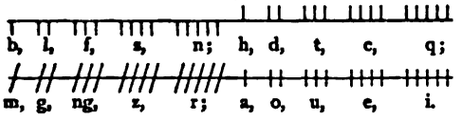
Official Assignee. See BANKRUPTCY.

Offici'nal Plants (Lat. *officina*, 'a shop'), are those plants which have a place in the pharmacopœia, and are therefore sold by apothecaries and druggists. Many medicinal plants have similar properties, but only those which appear in the pharmacopœias are called O. P. See MEDICINAL PLANTS.

Off'set, or Set-off, in Architecture, the part of a wall left bare when the portion above it suddenly diminishes in thickness. Offsets are sometimes covered by projecting mouldings. In classical architecture they are horizontal and plain, in Gothic they slope and have a projecting drip.

Offsets, in Surveying (q. v.), are perpendicular to the chord of an arc or to the longest base of a polygon from points in the arc or from the corners of the polygon. By this means the areas of the jutting or irregular portions of a field are computed with sufficient approximation for practical purposes.

Og'am, the general name of the alphabet employed in their inscriptions by the Celts of Great Britain and Ireland, which, as given in medieval Irish MSS., runs thus :—



Here the continuous line indicates the edge of the stone on which the inscription was engraved, and the vowel marks should strictly be represented by mere notches. There were various special names for the Ogmic alphabet, as the Bethluisnion, in which the twenty letters were named after trees and shrubs (*beth*, 'birch' = *b*; *luis*, 'mountain ash' = *l*; &c.), or the Bobelloth alphabet, where they are called after Biblical names. O. itself may probably be connected with a mythical character, Ogyrven (Cym. 'evil spirit'), the literal counterpart of the Zend Ahriman, and suggests the awe with which the ignorant multitude regarded the clerkly knowledge of the learned few. There is nothing, however, to lead us to suppose that the O. was ever a cryptic alphabet, except perhaps in its last days, when it may have fallen into the hands of those who, like Glendower, were 'profited in strange concealments.' Ogmic monuments are commonest in Ireland, there being seventy-five in Kerry, forty-two in Cork, twenty-six in Waterford, and twelve in the rest of Ireland. There are twenty in S. and one in N. Wales, two in Devonshire, and one in Cornwall. Others have also been found in Scotland, especially in the counties of Fife, Aberdeen, and Sutherland, and in the Shetland Isles; but these have hitherto defied interpretation, and may prove to be not of Celtic, but Teutonic origin. Roughly speaking, the extant Ogmic monuments may be said to range from a date anterior to the departure of the Romans down to the close of the 9th c. The O. alphabet must, however, have been in use some time before the coming of the Romans, as its characters present no traces of Latin influence, and it is inconceivable that so clumsy a system should have been introduced with a better already to hand. Of all the Ogams the Welsh are the most valuable, nineteen out of twenty-one of them being accompanied by a Latin legend, whilst in Ireland this is the case with only two. The Welsh also are as a rule more legible, and it is easier to fix their approximate dates. The vexed question of the history of Ogams is left an open one by Mr. Rhys, the latest and ablest writer on the subject. He inclines, however, to the opinion that the Irish received the Ogmic alphabet from the Welsh, and the latter from the Teutons. 'It is,' he says, 'of a double origin, forming a sort of compromise between the East and the West. The characters used are European, and traceable to the quaternary period, the same may probably be said of the direction of the writing from left to right. The order of the letters, on the other hand, and some of their names, admit of being traced to a Phœnician origin.' See *Transactions of the Royal Irish Academy; Journal of the Kilkenny Archæological Society;* Stuart, *Sculptured Stones of Scotland, Archæologia Cambrensis;* and Rhys, *Lectures on Welsh Philology* (Lond. 1877). Professor Westwood is at present preparing a work, *Lapidarium Walliæ*, on the Ogams of Wales.

Og'densburg, a city of New York, U.S., on the Oswegatchie River, where it falls into the St. Lawrence, 72 miles below Lake Ontario, is the headquarters of the Northern Transportation Company's steamers plying between Chicago and intermediate lake ports, and is on the Central Vermont railway. It has considerable commerce, and possesses six churches, three parks, and three newspapers. Pop. (1870) 10,076.

Ogee' (Fr. *ogive*), a moulding identical with the *cyma reversa* (see MOULDINGS). An O. arch is one in which the sides are formed of ogival curves; it is common in decorated Gothic.

O'glethorpe, General James Edward, a distinguished English soldier, was born at London, 22d December 1696. He entered the army in 1710, and served some time under Prince Eugene and Marlborough. In 1722 he represented Haslemere in Parliament, but having obtained a charter for the foundation of Georgia, he sailed for America in 1733. Two years after he revisited England, but returned in 1735 with John and Charles Wesley to Savannah, which he had founded two years previously. From 1737 to 1742 he commanded in Carolina and Georgia a regiment which he had brought over from Britain. Having returned to England in 1743, he served as major-general against the Pretender in 1745. In 1765 he became general and retired upon half-pay. O. died at Cranham Hall, Essex, 30th June 1785. See his *Life*, by Robert Wright (Lond. 1867).

O'govai, one of the largest rivers of W. Africa, flows into the Atlantic at Cape Lopez by several widely separated mouths, the largest of which are known as the Fernand Vas, the Mexian, and the Nazareth. Formerly these were all regarded as distinct rivers, Du Chaillu having first ascertained them to be merely branches of the O. About 140 miles from its mouth occurs the junction of the two streams by which it is formed, the Okanda, the larger, flowing almost direct from E. to W., with a breadth varying from 100 yards to 1 mile, and the Ngunië, coming from the S.E. The latter was explored for some distance by Du Chaillu in 1864, and in 1872 Walker followed the main stream Okanda as far as the village of Lope, when he discovered the existence of a long series of rapids, which check navigation for a considerable distance, and are caused by the descent of the river through the Okeko mountains from the elevated plateaus of the interior. In 1874 the French travellers Marche and Compiègne passed these rapids, penetrating up the Okanda a distance of 200 miles from its confluence with the Ngunië, 80 miles farther than Walker, where they reached the mouth of a large affluent named the Ivindo. Here, according to the assertions of the Okanda natives, they were only four days' journey from the great lakes from which the river takes its rise, when hostile attacks by the Osyeba tribes forced them reluctantly to return. In 1876 attempts in the same direction were made by Savorgnan de Brazza and Dr. Oskar Lenz, but though these travellers made some further progress the sources of the O. still remain unexplored. See *Proceedings of the R. Geog. Soc. of Lond. for* 1873, No. v. p. 354; Petermann's *Mittheilungen* for 1874, No. xi. p. 425; *Ibid.* for 1877, No. i. p. 40.

Ogy'ges, in Greek legend, is variously described as king of the Hectenes, a Bœotian autochthon, and the first ruler of the Theban territory—hence called Ogygia—in whose reign Lake Copais flooded the valley of Bœotia. The Athenians, again, connected him with Attica; Strabo calls him the last of the Achaian monarchs; and some traditions even make him a king of Egypt.

Ogy'gia, a genus of Trilobites (q. v.), the species of which are found exclusively as fossils in the Lower Silurian rocks and in the Llandeilo Flags of that period.

Ohi'o, an inland State of the American Union, is bounded N. by Michigan and Lake Erie, E. by Pennsylvania and West Virginia, S. by West Virginia and Kentucky, from which it is separated by Ohio River, and W. by Indiana. Area, 39,964 sq. miles; pop. (1870) 2,665,260, of whom 63,213 were coloured, and 100 Indians. The greater part of the State consists of tableland 1000 feet above the sea-level, rising to 1400 feet at the watershed between the basins of the O. River and Lake Erie. The lake-shore is 230 miles in extent, but has few indentations, the principal harbours being in Cleveland, Sandusky, and Maumee Bays. Sandusky Bay, the largest of these, extends 20 miles inland, and contains several islands. The chief rivers are the Ohio, which has a navigable course of 436 miles along the S.

and S. E. boundaries, and its northern tributaries the Mahoning, Muskingum, Scioto, and Great Miami. The Maumee is the only navigable river flowing into Lake Erie. The geological formations belong to the Palæozoic period, and include, besides sandstone, limestone, and shales, a portion of the great Appalachian coal-field, which occupies one-third of the area of the State. The aggregate thickness of all the workable beds of coal is estimated at about 50 feet, and the product in 1874 was nearly 5,000,000 tons. The principal other minerals are iron (mined annually to the extent of 340,000 tons), salt, petroleum, and lime. Fifty years ago four-fifths of the surface of the State were covered with forest; now there is little more than one-fifth, the principal trees being the oak, ash, beech, poplar, and maple. O. is one of the most important States for cereals and fruit. In 1874 the produce of Indian corn was 101,815,494 bushels; of wheat, 26,896,818; of oats, 19,557,014; of barley, 1,233,934; of buckwheat, 240,015; of rye, 235,435; of potatoes, 7,348,907; of apples, 15,918,974; of peaches, 2,235,574; of tobacco, 9,245,520 lbs.; of maple sugar, 1,248,955; of grapes, 17,965,604; of butter, 44,335,657; of cheese, 33,123,880; of wool, 16,684,276, and of hay, 1,508,385 tons. The value of all farm produce in 1874 was $198,256,907. The live-stock comprised 738,839 horses, 894,700 oxen, 778,500 milch cows, 4,333,868 sheep, and 1,778,399 swine —total value of live-stock, $130,148,655. The State of O. ranks fourth in the amount of its manufactures. In 1870 the capital invested was $141,923,964, and the value of the annual produce $269,733,610. The principal manufactures are iron, machinery, farm implements, flour, tobacco, malt liquors, and clothing. The export of white fish, lake trout, &c., from the harbours on Lake Erie amounts to $1,500,000 yearly. In 1876 there were 5650 miles of railway, and 736 of canals. Columbus is the capital, but Cincinnati the chief city of the State; other large towns are Cleveland, Toledo, and Dayton. The territory of O. was first explored by the French under La Salle, but no actual settlement was made in it till 1788, when a colony from New England founded Marietta and Cincinnati. In 1802 O. was admitted into the Union. The battle of Lake Erie, in which the British were defeated by Commodore Perry, was fought at Putin Bay, September 10, 1813. Since then the history of the State has been one of continuous and steadily growing prosperity.

Ohio River (formerly 'La Belle Rivière'), the largest affluent of the Mississippi in respect of volume, is formed at Pittsburg, Pennsylvania, by the confluence of the Alleghany and Monongahela, the former of which rises in Pennsylvania, the latter in W. Virginia. It flows first S., between the States of Ohio and W. Virginia, then W., between Ohio and Kentucky, and finally S.W., separating Kentucky from Indiana and Illinois, falling into the Mississippi at Cairo, after a course of 975 miles from Pittsburg, and of 1265 from its source. Its chief tributaries from the right are the Scioto, Miami, and Wabash; from the left, the Kanawha, Big Sandy, Kentucky, Cumberland, and Tennessee. With its affluents it possesses 5000 miles of navigable waters, though in the upper part of its course it is generally frozen during one month of the year. The only important rapids are at Louisville, Kentucky. The basin of the O. is 202,400 sq. miles.

Ohio Wesleyan University, at Delaware, in the State of Ohio, was founded in 1843. Besides the president, there is a staff of 8 professors, 2 tutors, and a principal of the preparatory department. During the session 1872–73 there were 145 classical students, 28 scientific, 23 unclassified, 180 preparatory, and 46 in the graduating class. The University possesses a well-furnished laboratory, the Prescott collection of specimens in natural history, and the Mann cabinet of geological specimens.

Ohlau, a town of Prussia, in the province of Silesia, between the rivers O. and Oder, which unite at Breslau, 16 miles N.W. by the Upper Silesian Railway. It has a large old castle and manufactures of tobacco, cigars, machinery, &c. Pop. (1875) 7963.

Ohm, Georg Simon, a German mathematician and physicist, was born at Erlangen, March 16, 1787. He was first teacher of mathematics in Nidau (Bern), and then in succession at Neufchâtel, at Bamberg (1815), at Cologne (1817), and at the Berlin *Kriegsschule* (1826). In 1833 he became professor and director of the Nürnberg Polytechnic School, and in 1849 was elected Professor of Physics in the University of Munich, where he died July 6, 1854. He wrote *Die Galvanische Kette* (1827; Eng. trans. in Taylor's *Scientific Memoirs*, Lond. 1841, vol. xi.); *Beiträge zur Molecular Physik* (1849), and *Grundzüge der Physik* (1853). His fame rests, however, upon the enunciation of the law bearing his name, which gives the intensity of a current in terms of the electromotive force and the total resistance of the circuit. See OHM'S LAW.—**Martin O.,** brother of the preceding, was born at Erlangen, May 6, 1792, and died Professor of Mathematics at Berlin, 1st April 1872. His best known works are *Versuch eines Vollkommen Consequenten Systems der Mathematik* (9 vols. Nürnb. 1822–52), and *Geist der Mathematischen Analysis* (2 vols. 1842–45).

Ohm's Law, a fundamental law of current electricity, which rests solely for its truth upon experiment, and has been deduced from no simple hypothesis. If I be the intensity of a current due to an electromotive force or difference of potential E in a circuit whose *total* resistance, including the resistance of the battery and connections, is R—then Ohm's Law states that $I = E \div R$. See ELECTRICITY.

Oïd'ium, a genus of naked-spored fungi, of which in Britain there are nine species occurring on rotten wood, fruits, and, in the case of *O. concentricum*, upon the leaves of various plants. The name has been brought into notoriety from the vine mildew being classed as an O., although subsequent investigation shows it to be the early state of some *Erysiphe*, of which the perfect plant still remains unrecognised. The first notice of the pest, recent as 1845, was made by Edward Tucker, a gardener at Margate—from him the plant was called *O. Tuckeri*. In the course of a few years it was found in France, and made its way up the Mediterranean. In 1853 it appeared in Spain, reducing the Cadiz exports of wine from 70,000 to 18,000 butts, and increasing the price from £7 to £16 per butt. A year later it worked destruction in Portugal, whilst in Madeira it had by this time almost annihilated the grape crop. A damp stagnant atmosphere favours its development, and it attacks vines in all stages of growth. Generally it seizes on the leaves first, looking like a small speck of mould similar to that which appears on decayed fruit. These specks very soon multiply, and increase in size until the leaf is entirely covered, but before this stage is reached, the berries are generally affected, the part showing a small brown spot and decaying. Liberal dusting of flowers of sulphur is the most effectual remedy, and if applied in time will save all. Machines are manufactured to distribute the sulphur. If young vines are propagated from wood which has been affected with the mildew, it appears on them immediately they begin to grow.

Oil Beetle, a name given to beetles of the genus *Meloe*, and specially to the *M. violaceus*, a common British species, which has the power of exuding a yellowish fluid of oily matter from between the joints of its legs. The colour of the beetle is a dull indigo or metallic blue.

Oil-Cake is the solid residue from the extraction of oil from various seeds. As the cake retains a certain proportion of oily matter, and the whole of the nitrogenous and other essential constituents, such as are suitable for cattle-feeding purposes, it possesses high nutritive value. Oil-cakes prepared from linseed, rape, poppy seed, mustard seed, cotton seed, gold of pleasure seed, and palm-nut, are met with in commerce, but of these the linseed cake is by far the most important and valuable, next to which come rape, cotton, and palm cakes. English linseed cake is esteemed the best, and the following represents the mean of several analysis of that variety: albuminoids, 28·56; oil, 13·32; water, 8·60; ash, 7·27 per cent. Rape cake is apt to become rancid and develop a flavour which is disliked by cattle, but does not appear to be disagreeable to sheep. A large amount of cotton seed cake is imported from the United States, and palm-nut cake and meal have now become important feeding stuffs. The imports of O.-C. into Great Britain during 1870 amounted to 190,218 tons, of a value of £1,768,231, the greater part of which was American cotton seed cake.

Oil-Cloth. See FLOOR-CLOTH.

Oil-Mill. See OILS.

Oil of Mustard is a pungent volatile oil containing sulphur, and having the composition C_4H_5NS. It is prepared by distillation of the seeds of black mustard (see MUSTARD), after they have been crushed and moistened. Its presence is at once indicated by its peculiar odour.

Oil Palm (*Elaeis*), a genus of wing-leaved *Palmaceæ*, of which *E. Guineensis* yields the palm oil of commerce. It is an abundant native of tropical Western Africa, the oil forming the chief export of the ports in the Bight of Benin, Liberia, and Bonny River. The palm is a low-growing species, but is of great longevity. The fruits from which the oil is obtained are borne in dense heads or spadices, sometimes two feet long and two or more feet in circumference, the fruits themselves being each about an inch and a half long, and an inch in diameter. The seeds are enclosed in a very hard bony shell, which is covered with a softish pulpy substance, outwardly, when ripe, of a bright orange or yellow colour. It is from this outer fleshy portion of the fruit that the best oil is obtained. The fruits are boiled by women in large earthenware pots, after which they are crushed in mortars. They are then placed in large clay vats filled with water, and women tread out the oil, which immediately comes to the surface, when it is collected and again boiled to throw off the water, after which it is placed in barrels or casks for exportation. Good palm oil is of a bright orange or deep yellow colour, about the consistence of butter, and when fresh has an agreeable smell. It is now most extensively used in the manufacture of soap and candles, and also for greasing the axles of railway carriage wheels. In Africa the solid oil is used for culinary purposes, often in place of butter, and the hard seeds are made into various ornamental articles. The other species of the genus is *E. melanococca*, a native of South America. It is not, however, of any economic or commercial value.

Oil-Refining. See OILS.

Oils (including Fats). The term oil was originally applied to all fluid substances of whatever nature, which flowed with a certain degree of viscosity, as for example oil of vitriol, a name by which commercial sulphuric acid is still known. The term continues to be popularly applied to several distinct classes of substances which, beyond inflammability, and being compounds of carbon, hydrogen, and oxygen, have very little in common. Thus under the general head of O. are included (1) fixed O., (2) essential or volatile O., and (3) mineral or paraffin O. It is only with the first of these, the fixed O., that we have here to do. See ESSENTIAL OILS; and for mineral or paraffin O., see NAPHTHA, PARAFFIN, and PETROLEUM.

Fixed O., from which the fats are only distinguished by being solid at ordinary atmospheric temperatures—the one series passing into the other by insensible gradations—have the following physical properties in common. They are entirely insoluble in water, but dissolve perfectly in ether, and to some extent in warm alcohol; applied to paper they communicate a stain which is irremovable by heat; unlike the volatile O., they are not capable of distillation unchanged, but undergo destructive distillation on the application of high heat; they are all lighter than water, and in a pure condition they exhibit a neutral reaction. All natural O. and fats are chemical compounds of glycerine with certain organic acids, the chief of which are known as palmitic, stearic, oleic, and linoleic acids. These, as well as all the other fatty acids which occur less abundantly, are compounds of carbon, hydrogen, and oxygen, some being fluid at ordinary temperatures, *e.g.*, oleic acid, and others forming solid white semi-crystalline bodies with an unctuous texture, of which stearic acid is an example. By the ordinary process of saponification as pursued in soap-making, the glycerine of the oil treated is separated from combination with the fatty acids; the *rationale* of the process being that a basic substance—soda or potash—having a more powerful affinity for the acids than glycerine is presented to them. Consequently the glycerine is separated, and new combinations between soda or potash and the fatty acids are formed which constitute ordinary Soaps (q. v.). According to their behaviour on exposure to air O. are separated into two classes—1st, drying O., and 2nd, non-drying or greasy O. The drying O., of which linseed oil is the most important example, on exposure to the air absorb oxygen, thicken at first to a transparent elastic mass, and ultimately form a hard varnish. This property of drying is due to the fact that the fatty acid present in linseed and other drying O. is mainly linolein, a substance which in many respects approaches the gum resins in its behaviour. The non-drying O. also undergo changes in the presence of oxygen, but these are due to the presence of fermentable impurities in the O., whereby rancidity is induced, certain volatile fatty acids, as butyric, caproic, and valerianic acids, being evolved.

O. and fats are very generally disseminated in both the animal and vegetable kingdoms, being essential constituents of all the higher animals and of nearly all the more highly organised organs of plants, such as the seeds and fruits. The list of O. which are available in commerce is very extensive, although it only embraces the fatty products of a small proportion of the oil-producing animals or plants. Again, though the fatty matter in many animals or plants are not obtained in a separate form for use, they still play a most important part in almost all animal foods, and in many food substances of vegetable origin (see FOOD).

The industries connected with the collection of the raw materials and preparation of O. are necessarily of a most varied and diverse character, seeing the materials come from sources so widely different and in forms so various. The various O. and fats of any considerable industrial importance will be found noticed in detail under their respective headings; and here they may be classified as follows:—

1. O. and fats of animal origin, including—
   - *a.* Fish O. (so called).
   - *b.* Land animal fats and O.
   - *c.* Insect waxes.
2. Vegetable O. and fats, comprising—
   - *a.* Vegetable wax and fats.
   - *b.* Fluid O. (drying).
   - *c.* Do. (non-drying or greasy).

Of so-called fish O. the most important commercially is whale oil, obtained principally from the blubber or solid fatty matter which internally lines the skin of the great Greenland whale (*Balæna mysticetus*). Other species of whales yield also a similar oil which is not separately distinguished in commerce (see WHALE). Sperm oil is also the product of a species of whale (*Catodon macrocephalus*), being found in the head of the animal along with spermaceti, a solid waxy substance analogous to the fatty acids already mentioned. Seal oil, from its nature, source, and the methods by which it is obtained closely resembles whale oil. The only other fish oil of commercial importance is the cod oil or cod liver oil, obtained from the livers of various species of *Gadus* (see COD LIVER OIL).

Of other animal fats and O. the most important are tallow, the concrete fat obtained from ruminant mammals, and lard, the fat of hogs. From these solid fats a fluid oil is now obtained by pressure, which is extensively employed in soap making, and in oiling textile fibres, &c. Another animal oil of commerce is neats'-foot oil, obtained, as the name indicates, from the feet of oxen. It does not solidify at the freezing point of water, and owing to its fluidity is employed for oiling fine machinery. From the yolk of eggs an oil is extracted in Russia which is there used in the manufacture of a variety of toilet soap held in peculiar esteem; but the manufacture is purely local. Butter (q. v.) is an animal fat of the first importance.

Beeswax is a substance analogous to solid animal fats. Pe la, a waxy substance obtained in China, is deposited by an insect (*Coccus ceriferus*) allied to the cochineal, on the twigs of the tree *Rhus succedaneum*. A similar product (*Ceros delas andaquies*) is is found in the Orinoco Valley in Brazil.

Several solid fats on account of their hardness—some being firmer than beeswax—are known as vegetable wax. The principal of these are products of palm trees, natives of South America, the two chief being the wax of the wax palm, *Cereoxylon andicola*, Carnahuba wax, a similar product from *Corypha cerifera*. The wax exudes from the bark, and from the young leaf shoots of these trees. A similer wax is obtained from the fruits of various species of *Myrica*, chiefly from *M. cerifera* in the United States of America, and like the two preceding it can be profitably made into candles without any further preparation. From the milky exudation of the cow tree of South America, *Galactodendron utile*, a soft waxy substance is also isolated. In the province of Para, Brazil, a solid fat called ocuba wax is obtained from a species of wild nutmeg, and the ordinary nutmeg itself yields a solid fat—the butter of nutmegs.

A solid white 'butter' is extracted from cocoa seeds (*Theobroma cacao*), which at present finds its chief use in pharmacy. Of all the solid fats, probably that of greatest commercial importance is Palm Oil (q. v.). From the kernels of the common oil palm, which were formerly regarded as useless, valuable white fatty oil is now derived by heat and pressure. Next in importance to palm oil for soap and candle making is the coco palm oil expressed from the dried 'nuts' (copperah) of *Cocos nucifera*. From the fruits of various species of *Bassia* Shea butter is procured in India, and Galam butter on the west coast of Africa.

Drying O. pass by insensible gradations into the non-drying series, so that although the distinction between the extremes is obvious enough, there are many O. possessed of a certain amount of drying properties which may be used like the greasy O. and *vice versa*. Drying O. are mainly used for mixing painters' colours, the non-drying class being appropriated for illuminating and soap making purposes. The following is a list of the principal drying O.:

Name of Oil.	Plant Yielding Oil.	Sp. Grav.	Remarks.
Linseed Oil	*Linum usitatissimum*	0.9351	Seeds yield up to 22 per cent.
Nut Oil	*Corylus avellena*	0 9288	About 60 per cent. from kernel.
Walnut Oil	*Juglans regia*	0.9260	From 40 to 70 per cent. from kernel.
Poppy Oil	*Papaver somniferum*	0.9270	
Hemp Oil	*Cannabis sativus*	0.9307	Seeds yield 14 per cent. of oil.
Cucumber Oil	*Cucurbita*, Various Species	0.9231	Yield about 25 per cent.
Sunflower Oil	*Helianthus annuus*	0.9250	Yield about 15 per cent.
Tobacco-Seed Oil	Species of *Nicotiana*	0.9232	Yield about 31 per cent.
Grape-Seed Oil	*Vitis vinifera*	0.9202	Yield about 11 per cent.
Oil of Honesty	*Hesperis matronalis*	0.9232	
Camelina Oil	*Camelina sativa*	0.9252	Yield about 28 per cent.
Weld Oil	*Reseda luteola*	0.9358	From 29 to 36 per cent.
Cress Oil	*Lepidium sativum*	0.9240	Yield about 55 per cent
Madia Oil	*Madia sativa*	0.9286	
Pine-Seed Oil	Various species of *Pinus, Abies, etc.*		
Cotton-Seed Oil	*Gossypium*, Various species of	0.9306	
Castor Oil	*Ricinus communis*	0.9639	Yield up to 62 per cent.
Croton Oil	*Croton tiglium*	0.94263	Used only medicinally.

Linseed oil and other drying O. are prepared for painters' use by boiling with litharge. The change thereby induced in the constitution of the O. appear to consist in the absorption of the ordinary oleic acid by the litharge to form an insoluble hard soap, and in the more or less complete decomposition of the glycerine, thus leaving a comparatively pure linolein or linoxin, which is quickly acted on by atmospheric influences.

Non-Drying O. are more numerous than the drying series, and a larger proportion are of commercial importance. The following list embraces the principal :—

Name of Oil.	Plant Yielding Oil.	Specific Gravity.	Remarks.
Olive Oil	*Olea Europæa*	0·9170	Yield 32 p.c.
Almond Oil	*Amygdalus communis*	0·9184	,, about 45 p.c.
Ben Oil	*Moringa pterygosperma*		
Apple-seed Oil	*Pyrus malus*		
Beech-nut Oil	*Fagus sylvatica*	0·9230	,, about 16 p.c.
Oil from seed of	*Butea frondosa*	0·9170	
,, ,,	*Calophyllum inophyllum*	0·9420	
,, ,,	*Canarium commune*		
Colza Oil	*Brassica campestris oleifera*	0·9136	,, 39 p.c.
Oil of Cyperus Grass	*Cyperus esculentus* (root)	0·9180	
Cherry-stone Oil	*Prunus cerasus*	0·9239	,, 33 p.c.
Cornel-berry Tree Oil	*Cornus sanguinea*		
Oil of Daphne	*Daphne mesereum*	0·914 to 0·921	
Earth-Nut Oil	*Arachis hypogæa*	0·9180	,, 42–50 p.c.
Ergot Oil	*Secale cornutum*	0·9220	
Henbane-seed Oil	*Hyoscyamus nigra*	0·9130	
Horse-Chestnut Oil	*Æsculus hippocastanum*	0.9150	
Laurel Oil	*Laurus nobilis*		
Mesua Oil	*Mesua ferrea*	0·9540	
Black Mustard Oil	*Sinapis nigra*	0·9210	
White Mustard Oil	*Sinapis alba*	0·9338	Yield ab. 30 p. c.
Oil from seed of	*Nigella sativa*	0·9200	
Oil from root and seed of	*Paris quadrifolia*	0·9350	
Parsley Oil	*Petroselinum sativum*	1·0780	
Plum-kernel Oil	*Prunus domestica*	0·9127	,, 33 p.c.
Oil from seed of	*Pongamia glabra*	0·9150	
Summer Rape Oil	*Brassica præcox*	0·9155	,, 33 p.c.
Winter Rape Oil	*Brassica napus*	0·9165	,, 32 p.c.
Oil of Radish seed	*Raphanus sativus oleifera*	0·9187	
Sesamé or Teel Oil	*Sesamum orientale*	0·9241	,, 46 p.c
Spindle-Tree Oil	*Euonymus Europæus*	0·9571	
Spurge Oil	*Euphorbia lathyris*	0·9261	,, 30 p.c.
Oil from seed of	*Sterculia fœtida*	0·9230	
Thea and Camellia Oils		0·9270	
Candle-Nut Oil	*Aleurites triloba*		
Oil from seed of	*Telfairia pedata*		

Extraction of Oil.—The O. contained in most seeds are extracted practically by the same mechanical means, with only a few modifications suited to the structure of the seeds and the condition of the oily product. Grinding of the seed, heating, and pressing, are the three main processes. For the first and finer portions of some O. the heating is omitted; but the cake resulting from cold pressure is in that case reground and pressed, with the application of heat, by which a further proportion of oil is obtained. The manufacturing process is conducted in oil-mills, of which there are two principal kinds—1st, the Dutch mill, in which the pressure is obtained in strong boxes by means of wedges driven in by cam stamps; and 2d, hydraulic mills, where the pressure is obtained by hydraulic presses. The hydraulic mills appear to be gradually superseding the older Dutch method.

A brief outline of the stages in the expression of linseed oil may be taken as a typical example of oil extraction. The seeds are first bruised by being passed through a hopper between a pair of heavy iron rollers, set horizontally close to each other. The bruised seed is next ground to a fine paste under a pair of heavy edge-rollers, which revolve in a shallow circular trough. If a fine cold-drawn oil is wanted, the paste is now filled into the flannel bag for pressure, but generally it is first heated in a steam-kettle. The flannel bags, filled with the material ready for pressure, are wrapped in horse-hair bags, and thus are ready for either the Dutch or the hydraulic press. The Dutch press consists of a strong cast-iron box in which two bags of seed are accommodated, each being placed between a pair of perforated iron plates. Against these a number of upright and oblique blocks are arranged, and between a pair of oblique blocks a wedge is inserted, the head of which is powerfully struck by a stamper falling on it. A means of unlocking the whole is secured by a spring or reverse wedge, which with a light tap falls down and frees the various blocks. The hydraulic press is generally used double, one side being under pressure while the other is being emptied and recharged. The bags are pressed between strong cast-iron plates, the oil exuding on all sides.

Refining of Oil.—Crude O. generally contain some proportion of mucilaginous and albuminoid substances, besides other impurities which render them turbid and liable to early rancidity. Several processes are pursued for freeing them from these impurities, most of them depending on the oxidation and consequent precipitation of the foreign substance. For some O., however, it is only necessary to employ simple filtration through newly-burned charcoal. In other cases the O. are mixed with hot water, or steam is forced through them, after which a flocculent deposit takes place, and a process of filtration is applied to the supernatant O. Menard's process consists in mixing the O. with 1 or 2 per cent. of strong sulphuric acid, which attacks the impurities and carries them down as a tarry sludge. Chromic acid, hypochlorous acid, and other oxidising agents are also used, and tannic acid is similarly employed, its action consisting in forming insoluble tannates with the impurities. A further process of bleaching is in some cases necessary, and that is best accomplished by the exposure of the O. to sunlight.

O. and fats form an essential feature in all diets, and are regarded as the chief force-producing constituents in human

food. In medicine, both internally and externally, several are of great use; and medicated O. are much employed for external application in various diseases. For preparing soaps, for burning in lamps, and for making into candles, the consumption of O. is of course enormous. Among other industrial applications may be mentioned the currying and dressing of leather, the lubrication of machinery, the oiling of flax and other fibres for spinning, the preparation of oil paints and varnishes, and the manufacture of ointments and plasters. Perfumed and other O. are also much used for the hair.

Exclusive of butter, and of the vast quantity of oil expressed from raw materials imported into or produced in the country, the following figures represent the imports of oil of Great Britain for 1876:—Train oil and blubber, 13,466 tuns, valued at £445,262; spermaceti head matter, 3218 tuns, of a value of £290,359; animal O. (neats'-foot, &c.), 26,914 cwts., value £62,515; castor-oil, 79,677 cwts., worth £133,838; cocoanut-oil, 199,431 cwt., valued at £377,480; olive-oil, 24,022 tuns, value £1,089,176; palm-oil, 879,824 cwts., worth £1,529,360; seed oil, 22,759 tuns, of a value of £811,421; and of oils unenumerated to the value of £145,504. The value of the tallow and lard imported was £4,454,891; and of seeds for oil-extracting, £469,275. The greater part of the latter item is made up of palm seeds from the west coast of Africa, which formerly were regarded as waste and useless.

Oil-Wells and Trade. See NAPHTHA and PETROLEUM.

Oint'ments or Unguen'ta. *Simple* ointment is prepared by melting together, and stirring till cold 2 parts of white wax, 3 of almond oil, and 3 of lard. *Resinous* ointment is prepared by similarly treating 2 parts of resin in coarse powder, 1 part of yellow wax, and 4 of simple ointment. These O. may be regarded as the bases of all the O. of the British Pharmacopœia, the various medicinal substances being added. The following are the official O.:—viz., Ung. aconitiæ, antimonii tartarati, atropiæ, belladonnæ, cadmii iodidi, cantharidis, cetacei, creasoti, elemi, gallæ, gallæ cum opio, hydrargyri, hydrargyri ammoniati, hydrargyri compositum, hydrargyri iodidi rubri, hydrargyri nitratis, hydrargyri oxidi rubri, hydrargyri subchloride, iodidi, picis liquidæ, plumbi acetati, plumbi carbonatis, plumbi iodidi, plumbi subacetatis compositum, potassæ sulphuratæ, potassii iodidi, resinæ, sabinæ, simplex, sulphuris, sulphuris iodidi, terebinthinæ, veratriæ, and zinci.

Oise (*Esia*), a river of France, tributary of the Seine, rises in the forest of Thiérache, in Belgium, within 3 miles of the French frontier, flows S.W., joining the Seine at Conflanz-Sainte-Honorine, after a course of 187 miles, 96 of which are navigable. About 2½ miles from Compiègne, it is joined by its chief tributary, the Aisne (q. v.). The O. is connected by canals with the Somme, the Sambre, and the Scheldt, and forms an important means of communication between Paris and the N.

Oise, a department of northern France, extending along the Seine and Oise. Area, 2260 sq. miles; pop. (1872) 396,804. The surface is flat, and is watered by the Aisne, Therain, and other affluents of the Oise. Agriculture is in an advanced state, the soil being generally fertile. The chief products are cereals, wines and brandies, wood, coal, especially fruits and vegetables for the Paris markets. O. has manufactures of carpets, felt, tapestry, linens ('half-hollands'), leather, and cordage. The chief town is Beauvais; others are Compiègne, Clermont, Noyon, and Senlis.

Oiti (*Moquilea tomentosa*), a Brazilian tree belonging to the sub-order *Chrysobalanaceæ* of *Rosaceæ*. The wood is very hard, and useful for shipbuilding purposes.

Oka, a river of Central Russia, tributary to the Volga, rises on the frontier of Orel, flows N. between banks 656 to 788 feet high through Kaluga, then E. forming the boundary between Moscow and Tula, then with great windings through Rjâsan, and finally N.E. through Vladimir and Nijni-Novgorod to the Volga, which it joins near the town of Nijni-Novgorod. Length, 929 miles; area of basin, 120,000 sq. miles. The stream is slow, without any rapids, but is covered with ice from November to March. The O. receives on the right the Upa (184 miles), the Pronja (120 miles), and the Zna (276 miles); on the left the Sisdra (115 miles), the Ugra (253 miles), the Moskwa (248½ miles), and the Kljäsma (368 miles). With its extensive network of watercourses, the O. forms for Central Russia a very important system of river communication.

Okecho'bee, the largest lake in the southern half of the United States, lies in the S. of Florida, and has a length of 40 and a breadth of 25 miles. Its area is 1200 sq. miles; its maximum depth only 12 feet. It is largely overgrown with weeds and grass, and is enclosed on all sides by an impenetrable swampy jungle. The Kissimee River is the largest stream which it receives, and its waters ooze out through the Everglades without forming anything that can be called a stream.

O'ken (properly **Oikenfuss**) **Lorenz,** a great German naturalist, was born at Bohlsbach near Offenburg, August 1, 1779. He studied at Würzburg and then at Göttingen, where he began his career as a *Privatdocent*. In 1807 he accepted the extraordinary professorship at Jena, and then made a wide reputation as a lecturer on natural science generally, including comparative anatomy and physiology. In 1812 he became ordinary professor of natural science; but this post he was forced to resign in 1819 in consequence of the opinions he expressed in the *Iris*, a semi-scientific, semi-political journal, which he conducted from 1817 to 1848. In 1827 he settled in Munich, and in the following year became professor in the newly established university. In 1832 he removed to a similar chair at Zürich, where he died August 11, 1851. He wrote *Lehrbuch der Naturphilosophie* (1808-11; Eng. trans. Lond. 1847), *Lehrbuch der Naturgeschichte* (3 vols. 1813-27), and *Allgemeine Naturgeschichte* (13 vols. 1833-41). His system of nature is a curious *à priori* philosophy, with a method of nomenclature totally unlike any that had preceded it. He was too much of a theorist and transcendentalist to find much favour among other naturalists; but he made some highly important discoveries in natural history. He was the first to conceive of the cell as the ultimate component of all animal tissues, and to suggest that the bones of the skull are merely modified vertebræ.

Okhotsk', Sea of, a large gulf of the N. Pacific Ocean, on the E. coast of Siberia, is bounded N. by the mainland, E. by the peninsula of Kamtchatka, S. by the Kurile Islands, W. by the islands of Yeso and Sagalien, and communicates with the Sea of Japan by the Sound of Tarrakai and the Straits of La Perouse. It is about 1000 miles long by 500 broad. The coasts, which are quite barren, are for the most part steep and mountainous; and the sea, though free from ice during the greater portion of the year, is often visited by storms and dense fogs. It is chiefly frequented for the sake of the walrus fishing. On the northern shore lies the small town of O. (pop. 250) at the mouth of the river Okhota. The S. of O. was discovered in 1639 by Siberian Cossacks under Ivan Moskoitin.

Olaf the Saint, King of Norway, 1015-28, was descended by a side line from Harald Harfaager (q. v.), and was born in 995. He was early distinguished for pride and bravery, and in his twelfth year began a series of Viking expeditions in the Baltic and on the English and French coasts. After being converted to Christianity, and baptized at Rouen, he returned in 1015 to Norway, and soon afterwards wrested the sovereignty of that country from the powerful Jarls Erik and Svend. He now set himself to follow Olaf Tryggvesön's (995-1000) example, propagating Christianity by fire and sword, and establishing his dominion over the whole of Norway. He married Astrid, daughter of the Swedish king Olof Skötkonung, who was forced by his people to yield his crown to his son Anund Jacob, in alliance with whom O. harassed Denmark during the pilgrimage of King Cnut. But after his return Cnut overpowered O., and even drove him from his own kingdom, where he re-established the *régime* of the Jarls. In 1033 O. reappeared in Norway, and was soon after defeated and slain at the battle of Stiklestad, near Throndhjem Fjord. O. was canonised in 1164, is the patron saint of Norway, and till the Reformation his tomb in Throndhjem Cathedral was that country's chief sanctuary and place of pilgrimage.

Ol'bers, Heinrich Wilhelm Matthias, a distinguished astronomer, was born at Arbergen, near Bremen, October 11, 1758. In 1777 he began the study of medicine at Göttingen; and on finishing his studies settled as a physician in Bremen. In 1811 he won the prize offered by Napoleon for the best *Memoir on the Croup;* but afterwards he devoted all his leisure to the study of astronomy. Comets were the great subjects of his re-

search, and he discovered no less than five. His great renown, however, rests upon the discovery of the Asteroids (q. v.), three of which—Pallas, Vesta, and Ceres—he first noticed himself. His observations and calculations of comets and planets are published in Bode's *Annuaire*, Encke's *Annuaire*, Zach's *Monatliche Korrespondenz*, and Schuhmacher's *Astronomische Nachrichten*. O. died at Bremen, March 2, 1840.

Old'bury, a town of England, in Worcestershire, 3 miles E. of Dudley by rail, on the Tame, a tributary of the Trent, and on the Birmingham Canal. It has a parish church (restored 1867), and numerous dissenting chapels, a people's hall, temperance hall, &c. There are large chemical works, iron foundries, steel works, malt kilns, and barge-building yards, and in the neighbourhood are iron mines, coal pits, and brick-fields. Pop. (1871) 16,049.

Old'castle, Sir John, 'the good Lord Cobham,' was born in Edward III.'s time. He became peer by marrying the daughter of the Lord Cobham who so sturdily opposed Richard II. In Henry IV.'s time he won a high reputation by his military prowess in France. Under Henry V. he was accused of heresy; and the king long reasoned with him privately, but in vain. Scholar as well as soldier, and a man of the firmest religious principles, Sir John had early embraced the tenets of Wiclif, and a Wiclifite he remained in spite of the king's entreaties and threats. He defrayed the expense of transcribing and circulating Wicklif's writings, and was most active in sustaining the labours of itinerating preachers. Examined before the Archbishop of Canterbury, he was committed to the Tower as a heretic, and from thence he escaped to Wales. He was accused of heading the rising at St. Giles's Fields, and subsequently of raising an army of 20,000 Lollards. The king believed the report; a bill of attainder was passed against Sir John, 1000 merks being set upon his head; and on the 25th December 1417 the brave knight died at the stake in St. Giles' Fields—hung in chains as a traitor, and at the same time burnt as a heretic. He was one of the bravest, wittiest, most religious yet most tolerant men of his time. He wrote *Twelve Conclusions Addressed to the Parliament of England*. See Gilpin's *Life* (1765); and Gaskey's *Life and Times of Sir John O.* (1844).

Old Cath'olics (Ger. *Altkatholiken*), the name assumed by a sect which has sprung up in Germany since the promulgation of the dogma of the Infallibility, July 18, 1870. Michelis' denunciation of Pius IX. as a heretic and devastator of the Church was followed by the protest of Döllinger, Friedrich, and forty-four other Munich professors against the binding authority of the Decrees. In August the leaders of the movement met at Nürnberg, and thence issued a manifesto declaring that they would not profess with their mouths that which, being men learned in ecclesiastical history, they could not believe in their hearts. Recalled by their bishops to obedience, some of the professors, as Haneberg and Dieringer, obeyed; others, of whom Döllinger, Reinkens, and Friedrich were the most prominent, refused, and were excommunicated, April 19, 1871. In the September of that year the first Old Catholic Conference was held at Munich, when it was affirmed that the object of the O. C. was not to create a new sect, but to reform the church from within, and that they accepted the Tridentine Decrees. Nevertheless, on August 11, 1873, Reinkens was consecrated 'Old Catholic Bishop of the German Empire' by the Jansenist Bishop of Deventer, and himself proceeded to consecrate a bishop of Basel. In October the Prussian government, in accordance with their policy throughout the whole ecclesiastical conflict, ratified Reinkens' consecration, and voted him a sum of £2400. The Bonn Conferences of 1874–75 discarded the authority of Trent, and 'came to an agreement' on the burning questions of the Immaculate Conception, the number of the sacraments, the merits of the saints, the nature of the Eucharist, &c., &c. At the same time it was agreed 'that the way in which the *Filioque* was inserted in the Nicene Creed was illegal, and that, with a view to future peace and unity, it is much to be desired that the whole Church should set itself seriously to consider whether the creed could possibly be restored to its primitive form.' The last concession was a sop to the Greek Church, self-chosen delegates from which, as well as from the Anglican communion, attended the conferences, hoping to further the reunion of the O. C. with the Oriental, Greek, and Russian Churches, and their 'gradual understanding with the Protestant and Episcopal Churches.' In Germany permission to marry has hitherto been conceded only to the non-parochial clergy—in Switzerland it is open to all. The principle, however, of a married clergy is as fully admitted in one country as in the other. The advance of the O. C. in numbers has been far less rapid than in doctrine. In Germany, out of a Catholic population of 14,867,600, they claimed in 1876 but 17,203 adherents, divided into 118 communities, and served by 60 priests. The Mainz Congress (1877) attracted but 1500 hearers against the 5000 of the Congress of 1871; and secessions have already commenced, two Old Catholic priests having resigned their office in October 1877—Klein of Wiesbaden and Klemm of Hirschberg. For Switzerland there are no trustworthy returns, the numbers of priests being stated at 66, and of the members of their congregations at from 20,000 to 70,000. There, changes have been swifter, dissensions rifer, than even in Germany, celibacy and confession having both been abolished by the National Synod of Olten (June 8, 1876), while the very founder of the Swiss branch, Père Hyacinthe (q. v.), has quitted it in disgust. In truth, the Old Catholic schism has from the first been singularly lacking in vitality. Emphatically negative at the outset, it appealed to no fact or doctrine that could inspire growth into its members; a purely scholastic movement, it has served for a time the ends of careless Gallios, and, once discarded, must share the speedy extinction of the 'German Catholics,' or the lingering death of the Jansenists of Holland. See Döllinger's *Erklärung an den Erzbischof von München-Freising* (Mun. 1871); *Bericht über die Verhandlungen des Katholiken Congresses* (Mun. 1871); *Report on the Resolutions of the Bonn Conference of* 1875 (Lond. 1876); and *The Offices of the Old Catholic Prayer-Book, done into English, and compared with the Offices of the Roman and Old German Rituals* (Oxf. 1876).

Oldenbar'neveld. See BARNEVELD.

Old'enburg, a grand-duchy of Northern Germany, consists of three distinct territories—the duchy of O. and the principalities of Lübeck and Birkenfeld. Total area, 2471 sq. miles; pop. (1875) 319,314, of whom 71,743 are Catholics. O. PROPER (area, 2076 sq. miles; pop. 248,136) is bounded N. by the North Sea, and on the three remaining sides by Hanover. The chief rivers are the Weser in the E., and in the W. the Vechta, Leda, and other tributaries of the Ems. Uniformly level, the duchy consists of sandy moors (*geestland*), alternating with arable districts of no great fertility; while the coast is fringed by rich marshes protected from the sea by dykes. The moors cover 1600, the marshes 430 sq. miles, and three-eighths of the entire area are uncultivated. The absence of coal and scarcity of timber are partly compensated by immense stores of turf. LÜBECK (area, 201 sq. miles; pop. 34,085), 85 miles N.E. of O., consists of two portions, of which the northern and larger is entirely enclosed by Holstein, while the southern is bounded N. and W. by Holstein, S. by the free state of Lübeck, and E. by the Lübische Bucht. With less marsh land than O., it has several large lakes, is watered by the Trave and Schwartau, and is well wooded. BIRKENFELD (area, 194 sq. miles; pop. 37,093), 184 miles S. of O., a hilly, vine-growing district, lies among the Hundsrück Mountains, between the French frontier and the left bank of the Rhine, is watered by the Nahe, and is the only part of the grand-duchy that is rich in minerals—iron, copper, lead, coal, &c. The population of West O. is of Frisian, of East O. and Lübeck of Low German, and of Birkenfeld of Frankish descent. The leading industries of the grand-duchy are agriculture, horse and cattle rearing, shipping, fishing, spinning, weaving, and the manufactures of sugar, tobacco, leather, &c. In 1876 it had 361 ships, of 57,364 tons; and in July 1877, 217 miles of railway. There entered its ports (1875) 2778 vessels, of 159,517 tons; and cleared 2801, of 166,283 tons. The government is a constitutional monarchy, the executive being vested in a responsible ministry of three departments, and the legislative in a *Landtag* of thirty-three deputies elected for three years. In the budget of 1877 the revenue was £296,985, the expenditure £328,112, and the public debt at the end of 1876 was £1,854,518. O. sends one member to the Bundesrath and three deputies to the Reichstag. Its military contingent is composed of an infantry and a dragoon regiment, with two batteries, all belonging to the 9th Army Corps. In the entire grand-duchy there are four gymnasia, one pro-gymnasium, nine *realschulen*, a school of navigation, and an agricultural college. O. (the capital) is the only town with more than 5000 inhabitants.

History.—From immemorial times the territory of O. was ruled by grafs, who claimed descent from the Saxon chieftain Wittekind, but first appear in history in the person of Egilmar (1108). His domains were divided among his descendants, vassals of Heinrich the Lion, Duke of Saxony, but were reunited under Dietrich the Fortunate, who in 1424 married Hedwig, a daughter of Gerhard VI., Duke of Slesvig-Holstein. The eldest son of this union, Christian, was elected King of Denmark (1448), of Norway (1450), and Duke of Slesvig-Holstein (1460), and became the ancestor of the Danish or Holstein-Glückstadt dynasty (extinct in 1863), and of the Dukes of Gottorp, one of whom in 1762 ascended the Russian throne as Peter III. (q. v.), his cousin Adolf Friedrich having nine years before been chosen King of Sweden. O. fell to Dietrich's second son Gerhard, whose grandson Anton I. (1526–73) introduced the Reformation, but remained true to Karl V. in the Schmalkaldic War, and from him first received his grafschafts as formal imperial fiefs. The younger line expired with Anton Günther, a wise and powerful ruler (1603–67), and for more than a century O. was governed by Danish viceroys. In 1773 Christian VII. ceded it to Paul Petrovitch, Duke of Holstein-Gottorp, and afterwards Paul I. of Russia, and he in turn renounced his claims in favour of a cousin, Friedrich August (1773–85), of the younger Gottorp line. A year later the Emperor Josef II. raised the grafschafts of O. and Delmenhorst to the duchy of Holstein-O. The second duke, Peter Friedrich Wilhelm (1785–1823), being insane, the governing power was intrusted to his cousin and successor, Peter Friedrich Ludwig. During his regency O. was forced by Napoleon to enter the Rheniah Confederation (1808), and in 1810 was annexed to the French Empire. Restored to the ducal family after the battle of Leipsic (1813), it was raised by the Congress of Vienna (1815) to a grand-duchy, and received an accession of territory in the principality of Birkenfeld. O. entered into a *steuerverein* ('impost-union') with Hanover and Brunswick (1836), during the revolutionary movement of '48 received a new and more liberal constitution (revised in 1852), which swept away many bureaucratic abuses, and greatly promoted trade and industries by joining the Zollverein (1854). Duke Nikolaus Friedrich Peter (1853–78) advanced his claims to the duchies of Slesvig-Holstein (q. v.) on their separation from Denmark, (1864), but having sided with Prussia against Austria in the war of 1866, relinquished those claims in favour of the former power (September 27, 1866), receiving a compensation of £150,000. See Runde's *Oldenburger Chronik* (3d ed. Old. 1863).

Oldenburg, the capital of the above duchy, is situated on the navigable Hunte, 24 miles W. of Bremen by rail. Its chief buildings are the Evangelical Lambertuskirche (1791), the Residenzschloss, with a library of 120,000 volumes; the Augusteum, containing the grand-ducal picture gallery; the Museum, Kathhaus, and theatre. In June 1876 a monument was erected to Herbart (q. v.), who was born here. There are manufactures of iron, tobacco, leather, gloves, &c.; and a lively river trade is carried on with Bremen and Bremerhaven. Pop. (1875) 15,701.

Oldham, an industrial town of Lancashire, on an eminence near the right bank of the Medlock, and 6 miles N.E. of Manchester by rail. Its textile industries existed prior to the reign of Charles I., but the rise of O., which has been unusually rapid, dates from the end of last century, and is due to the introduction first of Arkwright's large water-mills, and subsequently of steam-power, and to the situation of the town on the edge of the Lancashire coal-field, which gives employment to many of the inhabitants. O. has a parish church, rebuilt in 1830, a handsome town-hall, a school of science and art (1865), a Blue-coat school, founded by Thomas Henshaw, a public infirmary (1874), and a grammar-school, dating from 1617. During the period of distress consequent upon the failure of the cotton supply in 1863, various improvements were effected, the chief being the extension of the water-supply at a cost of some £200,000, and the laying out of the Alexandra Park, a recreation ground of 60 acres. Cotton is the staple product, and some of the finest cotton-mills in the kingdom, holding in the aggregate about 2,000,000 spindles, have been built in the town within the last three years (1875–78), the shares being largely held by working men upon the Limited Liability principle. Other manufactures are fustians, velveteens, corduroys, machinery, steam-engines and boilers, iron and brass wares, gas-meters, leather, and cordage. Pop. (1871) 82,629; of parliamentary borough, 113,100. O. returns two members to Parliament, and publishes three newspapers.

Oldham, John, an English poet, born 9th August 1653, was the son of a nonconformist minister at Shipton, in Gloucester. He studied at St. Edmund Hall, Oxford, where he took his degree in 1674. While an usher in a school at Croydon, his gift of verse was accidentally discovered by the Earls of Rochester and Dorset and Sir Charles Sedley. After a short time spent in tutoring, O. proceeded to London, and found a patron in the Earl of Kingston, but was prematurely carried off by small-pox, 9th December 1683. O. had a fine and strong wit, and might have won fame had he lived. His chief work is a series of *Satyrs upon the Jesuits*, in which he imitates Horace and Persius with considerable success.

Oldha'mia, the name of a peculiar fossil organism, represented by various species (of which the best known is *O. Antiqua*), occurring in the Lower Cambrian rocks of Wicklow, Ireland. It consists of a central and jointed axis of small calibre, from various points of which, at regular intervals, fibres or branches radiate. According to Forbes the impressions of cells may be seen on these branches. O. has been regarded variously as one of an extinct group of *Sertularian* zoophytes allied to the existing 'sea firs,' as belonging to the *Polyzoa*, and as a fossilised seaweed of Calcareous type. It is one of the oldest forms of life known, and is named after Dr. Oldham, late Director of the Geological Survey of India.

Old Red Sandstone, the name given to the formations, intermediate to the Silurian and Carboniferous, which stretch over the N.E. of Scotland, a large tract of Russia, and in a modified form over a portion of N. America. They seem to have been deposited contemporaneously with certain strata in Devon and the S.W. of England, described and grouped by Murchison and Sedgwick. These geologists regarded the O. R. S. of Scotland as identical with these English formations, and suggested the name Devonian as better applicable to the series. This name is now in general use, especially among the Continental geologists. It seems advisable, however, to retain both names, since the Scotch and English present distinct palæontological differences. Rocks of the true Devonian type are marine, and are met with in Ireland and the Rhinelands near Koblenz and Köln. The rocks of the O. R. S. type have evidently been deposited in freshwater lagoons. The fossils are scarce; but when they do occur, it is usually in isolated groups, exactly as if they had collected in separate ponds or lagoons. Further, the species, mostly fishes, are not generally met with among the Devonian deposits, whose fossils are of deep-sea origin. In the S. of Scotland the O. R. S. is found skirting the hills in old valleys; it also occupies the larger part of the great central valley, and is widely developed in Forfar, Aberdeen, along the shores of the Moray Firth, in Caithness, Orkney, and Shetland. There are ordinarily recognised three subdivisions—Lower, Middle, and Upper—probably, however, as suggested by Professor Geikie, there are in reality only two. In certain localities the Lower seems to pass without break into the Silurian—near Edinburgh, however, there is an unconformability. The Lower consists of conglomerate and sandstone, singularly destitute of organic remains; but there are traces of crustaceæ, and the fish Cephalaspis is found. Volcanic rocks are frequent, especially in the lower strata. The Middle is represented by the Caithness flags, and passes down conformably to the Lower. Fossil fish and obscure vegetable remains abound. The characteristic genera are Coccosteus, Asterolepis, and Dipterus. The first occurs sometimes in Devon and the Rhine lands. The Upper Old Red resembles and passes conformably into the Carboniferous, and is unconformable with the Middle or Lower O. R. S. The characteristic fossil fish are the Holoptychius, Pterichys, Dendrodus, &c. The O. R. S. is further traceable through the Orkney and Shetland Islands to the S. of Scandinavia and eastward to Russia. In Russia they extend in unbroken strata just as they were deposited, and are identical in fossil contents with the Scottish rocks. In America—in New York, Pennsylvania, Canada, &c.—the rocks seem intermediate in character to the typical Old Red and the typical Devonian. The O. R. S. is for ever associated with the name of Hugh Miller, who did more than any other man to disclose its fossil contents. See Miller's *Old Red Sandstone* (1847).

Ol'dys, William, an English bibliographer and antiquary, was the natural son of Dr. Oldys of Lincoln, and was born July 14, 1696. In 1737 he succeeded Wanley as Lord Oxford's librarian, and was employed on the catalogue, and in the selection of *The Harleian Miscellany*. In spite of extreme habits of dissipation he was a laborious student, and in his *Life of Sir Walter Raleigh* and *The British Librarian* has collected much curious information. He likewise wrote *The Scarborough Miscellany*, *The Universal Spectator*, and 22 articles in the *Biographia Britannica*. But the most valuable of all his works is an annotated copy of Langbaine's *Account of the Early Dramatick Poets*, now in the British Museum. He is credited with the authorship of the delicious Anacreontic, beginning 'Busy, curious, thirsty fly.' Norfolk made him Norroy king-at-arms in 1755. He died of drink, 15th April 1761. See Yeowell's *Memoir of O., together with his Diary*, &c. (1862), and Disraeli's *Curiosities of Literature*.

Olea'ceæ, a natural order of about 150 species of lofty or middle-sized trees or shrubs generally much branched. The leaves are opposite, simple, or winged; the flowers rarely unisexual, the corolla four-lobed or cleft, sometimes absent, and the stamens generally two; fruit, a drupe—as in the olive, or dry capsule—as in the lilac, or a winged samara—as in the ash. They are widely distributed over temperate regions, chiefly in the northern hemisphere. The properties are bitter, tonic, and astringent. Some yield a fixed oil; others furnish manna. See ASH, OLIVE, LILAC, PRIVET.

Olean'der (*Nerium*), a genus of *Apocynaceæ*, or the dogbane family, consisting of shrubs with a milky juice, entire leathery leaves, flowers large, in terminal cymes, with a crown of torn appendages opposite to the corolla lobes; fruit when ripe a cylindrical capsule. *N. Oleander*, a common handsome evergreen shrub of moist ravines in the Mediterranean region and Syria, has been cultivated in Britain for three hundred years for its ornamental appearance. The whole of the plant is poisonous, and it is recorded that persons have died from eating meat cooked on spits of the peeled stem. *N. odorum*, an Asian species, common along the sides of rocky stream beds in India, is grown in the gardens there with single and double flowers. Both bark and root are poisonous; the leaves are used in native medicine.



N. Oleander.

Oleas'ter. See ELEÆAGNUS.

Olefiant Gas (C_2H_4) is a product of the action of heat upon coal or other substance rich in carbon, and is an important constituent in the illuminating gases obtained from such materials. It may be prepared by acting upon alcohol with strong sulphuric acid. It burns in oxygen with a bright clear light, is more soluble in cold than in hot water, and can be liquified under great pressure. If heated intensely it is decomposed partly into carbon and marsh gas (CH_4) and partly into acetylene and hydrogen. It acts upon an equal volume of chlorine, and forms a heavy oily liquid known as *Dutch Liquid*, which resembles chloroform in odour. It gives a similar reaction with bromine.

Ole'ic Acid ($C_{18}H_{34}O_2$) is the most important acid of the fatty group, and is obtained by saponification of *olein*, the fluid constituent of most fats and fixed oils. By cooling olive oil to 4° C. or lower, a large quantity of fat solidifies. This solid portion is mainly palmitin or margarin (see MARGARIC ACID), and the oily liquid left behind is chiefly olein ($C_{57}H_{104}O_6$). The olein is obtained pure by dissolving the liquid in alcohol, filtering, and then driving off the alcohol by heat. During the process of saponification, this oil is resolved into glycerine and O. A., which is readily distinguished from other fatty acids by its melting at 14° C. to a colourless limpid oil, which solidifies at 4° C. into a hard white crystalline mass. When solid it oxidises but slowly in the air; but when liquid, it absorbs oxygen rapidly, becoming yellow and rancid, and exhibiting a strong acid reaction. O. A. itself reacts neutral. It is insoluble in water, but very soluble both in alcohol and ether. A characteristic feature is its behaviour when subjected to destructive distillation—yielding a solid crystallised dibasic acid known as *Sebacic Acid*. The other members of this dibasic series (suberic, pimelic, adipic, lipic, azelaic, &c., acids) result from the action of strong nitric acid upon O. A. O. A. forms neutral and acid salts, but the only important compounds of this class are the neutral oleates of potash and soda, which are soluble, and by evaporation of their aqueous solutions form *soaps*. The acid oleates are liquid and insoluble in water. The oleates of the alkalies occur in the animal body in the blood, chyle, bile, &c.

Oléron, Isle of (*Iluro, Uliarus*), an island of France, in the Bay of Biscay, S. of the Pertuis d'Antioche and N. of the dangerous Pertuis de Maumusson, at the mouth of the Charente, belongs to the department of Charente-Inférieure. It is separated from the mainland by a narrow and shallow channel, is 18½ miles long, from 2½ to 6½ miles broad. Area, 59½ sq. miles; pop. 18,200. The soil is remarkably fertile, and yields wheat, maize, wine, and fruits. There are large saltworks and fisheries, with some shipbuilding. The chief places are St. George d'Oleron (pop. 4110), Maraus (3020), and St. Pierre d'Oleron (1575).

Ol'ga, Saint, a Russian saint, was wife of the grand-duke Igor of Kiev. After the death of her husband, she governed in his stead with great prudence for several years, and was finally baptized in 955 at Constantinople under the name of Helena, without, however, being able to induce her son Swatoslav to follow her example. Later tradition tells that she solicited German missionaries from the Emperor Otto I. She died in 969. St. O. is profoundly venerated in the Russian Church. Her festival is held on the 21st of July.

Olib'anum. See FRANKINCENSE.

Ol'ifant's River, the name of two streams in Cape Colony—(1) O. R. West rises in the Great Winterhock Mountains, and after a westerly course of 150 miles, falls into the Atlantic in 31° 40′ S. lat. Near its mouth this river overflows its banks, leaving fertile deposits of mud, on which account it has been grandiloquently termed 'the Nile of S. Africa.' (2) O. R. East, after a course of 150 miles from E. to W., through a very fertile district at the base of the Great Zwarteberg range, joins the Gauritz River in 33° 32′ S. lat.

Ol'igarchy (Gr. *oligos*, 'few,' and *archō*,' 'I rule'), a form government in which the supreme power was restricted to a small exclusive class, usually composed of the wealthier members of a community, who legislated less for the common welfare than for their own personal aggrandisement. Aristotle regarded it as a corruption (*parekbasis*) of an aristocracy, to which it stood in the same relations as despotism does to monarchy. The Venetian constitution presents the latest and most powerful O.

Oligochæ'ta (Gr. 'few bristles'), an order of *Annelida* or Worms, of which the earthworm is the type. The name is applied to these worms from the absence of the characteristic bristles seen in the *Errantia* (q. v.) or marine worms. The body is segmented, the mouth anterior, and the anus posterior. In most of the segments paired 'segmental organs' exist. The O. are hermaphrodite, and the reproductive organs are situated in the front region of the body. To the order O. also belong the river-worms *Naïs*, *Tubifex*, &c.

Olin'da. See PERNAMBUCO.

Oliphant, Lawrence, son of Sir Anthony O., C.B., sometime Chief-Justice of Ceylon, was born in England in 1829. He visited India in youth, and having accompanied Jung Bahadoor to the Nepaulese court, published an account of his visit, entitled *A Journey to Katmandhu* (1852). Returning to England, he passed advocate in Scotland, and was also called to the English bar. After travelling through Russia, he wrote *The Russian Shores of the Black Sea* (1853). He was Secretary to the Earl of Elgin, Governor-General of Canada, and later Superintendent of Indian Affairs. O. travelled extensively in the United States, and published *Minnesota and the Far West* (1855). His *Coming Campaign* (1854) was followed by the *Trans-Caucasian Campaign under Omar Pasha* (1856), a personal narrative. He accompanied Lord Elgin on a special embassy to China in 1857, and in 1860 published a *Narrative of the Earl of Elgin's Mission to China and Japan*. He is the author of two novels, *Patriots and Filibusters* (1861) and *Piccadilly* (1870), the latter of which is a trenchant and witty satire on fashionable society. From 1865 to 1868 he represented the Stirling boroughs in Par-

liament; but in the latter year joined the semi-religious community established in Portland Township, New York, U.S., where he continues to reside. He was correspondent of the *Times* in Paris at the outbreak of the Franco-Prussian War, and a manager of the Direct Cable Company 1873–75.

Oliphant, Mrs., was born in Liverpool of Scotch parents about 1818. Her first work, *Passages in the Life of Mrs. Margaret Maitland of Sunnyside*, appeared in 1849; and wherever, as in this admirable book, the authoress has relied upon her thorough knowledge and humorous application of Scotch character she has been uniformly successful. Among her other novels are, *Merkland* (1851), *Adam Græme* (1852), *Harry Muir* (1853), *Katie Stewart* (1853), *Magdalen Hepburn* (1854), *The Quiet Heart* (1854), *Lilliesleaf* (1855), *Zaidee* (1854), the first series of the *Chronicles of Carlingford*, including *The Rector* and *The Doctor's Family* (1863); the second series, including *Salem Chapel* and *The Perpetual Curate* (1864), *Agnes* (1866), *The Minister's Wife* (1869), *John* (1870), *Three Brothers* (1870), *Squire Arden* (1871), *Ombra* (1871), *At his Gates* (1872), *Innocent* (1873), *May* (1873—perhaps the best novel of this authoress—its descriptions of Fifeshire scenery as fine as any of Black's northern sketches), *For Love and Life* (1874), *A Rose in June* (1874), *The Story of Valentine and his Brother* (1875), *The Curate in Charge* (1876), *Phœbe Junior* (1876—a *Last Chronicle of Carlingford*), *Mrs. Arthur* (1877), and *Carita* (1877). Mrs. O. has also written a very able *Life of Edward Irving* (1862), *Historical Sketches of the Reign of George II.* (1869), *St. Francis of Assisi* (1870), *A Memoir of Montalembert* (1872), and *Makers of Florence* (1877)—full of vivid description. She at present (1878) edits Blackwood's series of *Modern Classics for English Readers*, to which she contributed the first volume—a very interesting study of Dante (1877).

Oliva'rez, Don Gasparo de Gus'man, Count of, Duke of, San Lucar, was born at Rome, 6th January 1587, studied at the University of Salamanca, went to the Court of Spain, where by his adroit demeanour and convenient marriage he rose to the greatest favour. By the time Philip IV. ascended the throne O. had made himself essential to his existence by skilfully catering for his pleasures, and the position of Prime Minister he continued to retain for twenty-two years (1621–43) partly by a pursuit of the same policy and partly by bringing to disgrace all his rivals. But his enormous expenditure gradually sapped the resources of Spain—the war with France in 1636 was a failure, the Catalans and Portuguese revolted in 1643, and O. was dismissed to Toro, where he died, 22d July 1645.

Olive (*Olea*) a genus of about 30 species of trees or shrubs with opposite, leathery, evergreen, entire leaves; small, often fragrant flowers, frequently disposed in axillary racemes or terminal panicles; a drupaceous fruit consisting of an oily flesh and a hard kernel, which is rarely more than one-seeded, the cells of the fleshy albumen being filled with oil. The species are mostly Asian and African, though some reach Australia and New Zealand, but it is not certain whether the common O.—notwithstanding its name of *O. Europea*—is indigenous in Europe. That it is a native of Palestine is certain, and that it was well-known in Greece in the 6th c. B.C. is evident from Solon enacting laws regarding its cultivation. Greek colonists early carried it westward, and it is now thoroughly naturalised through the Mediterranean region. It was first planted in England in 1643. Quite recently it has been established in America, where it thrives well, particularly in Peru and California. From the earliest times the object of its cultivation has been the oil which is obtained by expression from the pulp of the fruit, forming a most important food-provision in many of the countries where the tree flourishes, and one of their principal exports. There are, besides the two recognised forms of the species, three principal varieties and perhaps fifty subvarieties in cultivation. The quality of the O.-oil differs according to the country of growth, and care in preparation. That from Nice, Genoa, and Florence (Leghorn), is the best—the last in its wickered flasks being known as salad-oil. It is extensively used in various arts, manufactures, and in medicine. Spain alone yearly produces 250 million lbs. Some varieties of the unripe fruit preserved in brine are with many a favourite relish. The O. is a picturesque tree, and its associations give it special interest. It is remarkable for its fecundity and vitality, *eg.*, there are specimens on the Mount of O. at Jerusalem reckoned on good authority to be 2000 years old. The wood is of a yellowish-brown, irregularly mottled, and veined with blackish-brown. The gum-resin exuded by the bark contains the crystalline olivil. From *O. cuspidata* a medicinal oil is extracted in Afghanistan; its very hard dark-brown and beautifully mottled wood is highly prized in India for turning. *O. fragrans*, well known in a wild or cultivated state in India, China, and Japan, bears fascicles of white flowers with an exquisite fragrance, used by the Chinese to flavour tea.

Olivenite, a copper ore occurring in prismatic crystals or in velvety coatings. Its colour varies from olive-green to brown. It consists chiefly of arsenate of copper with a little phosphate.

Oliven'za, a town of Spain, province of Badajoz, 10 miles S.S.W. of that city, on a small tributary of the Guadiana. It is strongly fortified, has manufactures of oil, cloth, and pottery, and carries on a trade in corn and wine. Pop. 10,000.

Olive Oil, one of the most valuable of all oils as a source of food, and for use in many industrial processes. Its qualities and purity vary much according to the processes adopted for its extraction. Virgin O. O., flowing either spontaneously from the fleshy pericarp of the olive, or obtained by very gentle pressure, is the finest quality, but it is comparatively scarce. Fine or salad oil is obtained by crushing the entire fruit and pressing it at a gentle heat; by allowing the fruit to ferment previous to pressing it, a lower quality of oil, much used for food, is obtained. By fermenting and boiling the oil-cake resulting from these processes, a proportion of oil of inferior quality is obtained, and what is termed *huile d'enfer*, or oil of the infernal regions, is skimmed from the waste water of such boiling, which is run into reservoirs and allowed to settle. The oils of the various localities have different values; thus Provence oil is the finest for the table, next to it come the Florence and Lucca oils. Gallipoli oil is the most important for all industrial applications, and Spanish oil is generally of inferior quality. Besides being used extensively as a substitute for butter on the Continent, O. O. is largely consumed in the preparation of tinned sardines. Gallipoli oil is indispensable in Turkey-red dyeing, and is also much used in making a special kind of soft soap. The imports into Great Britain during 1876 were 24,022 tuns, valued at £1,089,176.

Medicinal Properties of O. O.—Olive oil is used in medicine for its nutritious and laxative properties, and as a demulcent and a laxative enema. It is employed extensively in pharmacy, in the preparation of liniments, ointments, and plasters. For internal use, it is given in doses of from ½ to 1 oz.

Olives, Mount of (mod. *Jebel et-tur*, 'the mount,' and *Jebel ez-Zeitun*, 'the mount of olives'), a low hill on the E. side of Jerusalem, separated from the city by the valley of the Kedron. With Luke it has a distinct proper name, Elaion ('olive,' xix. 29, xxi. 37, xxii. 39, Acts i. 12, 'Olivet'). The name only occurs once in the Old Testament (Zech. xiv. 4), although the hill is several times alluded to (2 Sam. xv. 30, 1 Kings xi. 7, 2 Kings xxiii. 13, Neh. viii. 15, Ez. xi. 23). The M. of O. rises abruptly from the bed of the Kedron, in terraced slopes and white limestone crags, to a height of about 600 feet (2786 feet above the sea), while on the east side it slopes very gradually away to the wilderness of Judea. There are three summits. The central and highest, which is crowned with the Church of the Ascension, lies due east of the site of the Temple. About 500 yards to the north of the church, and a few feet lower, is the northern summit, called Viri Galilæi (*cf.* Acts i. 11; mod. *Karem es-Seiyad*, 'Sportsman's Vineyard'). Nearly the same distance to the south is the third summit, which is a little lower; and 1000 yards S. by W. is an eminence called the Mount of Offence. The M. of O. has many historical associations. Four events in the history of our Lord are specially connected with it: the triumphal entry into Jerusalem (Matt. xxi.); the prediction of the destruction of Jerusalem (Mark xiii.); the betrayal by Judas (Matt. xxvi.); and the Ascension, according to Luke (xxiv. 50). At its foot near the bridge over the Kedron is the Garden of Gethsemane.

Olive'tans, or Brethren of the Holy Mary of Mount Olivet, were a congregation of Reformed Benedictines founded on the olive hill of Siena by John Tolomei, and confirmed by Pope John XXII. in 1319. The Society has long since declined, and has now only a few houses.

Ol'ivine, or **Olivin**, in Mineralogy, anhydrous silicate of magnesia, coloured pale or dark green by protoxide of iron. It is a common kind of Chrysolite (q. v.). It occurs in erupted rocks in volcanic districts.

Oll'a Podri'da (lit. 'putrid pot'), the Spanish equivalent for the Fr. *pot-pourri*, and the Sc. hotch-potch, a kind of dish prepared from meat chopped up into small pieces and with a mixture of vegetables of all kinds boiled up to a broth or soup. The term has also come to signify any miscellaneous or incongruous collection.

Olliv'ier, Emile, a French minister not likely to be forgotten, was born at Marseille, 2d July 1825, studied law, and passed advocate at Paris in 1847. At the Revolution of 1848, the Republican Government sent him to the Bouches du Rhône as *Commissaire général*, and soon after he was made préfet of Haute-Marne. Returning to Paris in 1849 he resumed his position at the bar, and rapidly attained distinction as an eloquent pleader. In 1857 he was elected one of the deputies for Paris against a Government candidate, and in the Legislative body became the nucleus of a Liberal opposition which, though very small in point of numbers, was composed of men of brilliant talents, and gave the Emperor much trouble. He took a prominent part in the discussions (1858) on the *Loi sur la Sûreté Générale*, the Franco-Italian War (1859), the liberty of the press (1860), &c. He was more than once 'suspended' professionally for his bold and incisive speech. Yet soon after 1863 he began to show a leaning towards the Imperialist policy, which increased every session, until finally on the 2d of January 1870 he became Minister of Justice and Religion, and nominally, but only nominally (as appears from his recent defence), head of the Cabinet. In July 1870 he pronounced passionately for war with Prussia. The 'light heart' with which O. went into the fatal conflict was no doubt heavy enough before the 10th of August, when he and his colleagues were overthrown, and General Montauban, Comte de Palikao, was charged by the Emperor to form a new ministry. Since then O. has resided chiefly in Italy, but has written *Principes et Conduite* (1875), a defence of his policy.

Olmütz' (Slav. *Holomuc*), a strongly fortified town of Austria in Moravia, on the March, about 132 miles by rail from Vienna, is the seat of an archbishop, and of a university (founded 1581, transferred to Brünn 1778, and restored 1827). Its library contains 50,000 volumes. O. has 13 churches, the chief of which are the Cathedral, a fine Gothic edifice erected by King Wenceslaus, who was murdered here in 1306, and afterwards canonised; the church of St. Mauritius, built 1412, with a famous organ, having 48 stops and 2332 pipes. Other noticeable buildings are the Town-house, with a fine clock of 1574 on a tower 262 feet high; the Tower of the Trinity, on the Oberring, 122 feet high; the Arsenal, and on the heights, half a mile from the town, the Monastery of the Premonstratensians, founded 1074. O. has manufactures of cloth, linen, and porcelain, and is an important centre of trade (chiefly in cattle) between Poland and Moldavia. Pop. 15,229, exclusive of a garrison of 6000 men. During the Thirty Years' War the town was taken by the Swedes, and, during the First Silesian War, by the Prussians in 1741, but was regained in 1742. In 1758 it was unsuccessfully besieged for seven weeks by Friedrich the Great. Here in 1848 Ferdinand abdicated the Austrian crown in favour of his nephew, Franz Joseph, and in 1850, a conference between the representatives of Russia, Prussia, and Austria met to regulate the affairs of Germany.

Olonetz', a Russian government, bounded N. and N.E. by Archangel, E. by Vologda, S. by Novgorod, W. by Finland and St. Petersburg. Area, 59,567 sq. miles. Pop. (1871) 302,490. The territory of O. is a continuation of the plateau of Finland, and comprises a similar variety of lake, forest, and barren steppe. The principal lakes are the Onega and the eastern half of Ladoga. Only three per cent. of the surface is cultivated, flax and hemp being principally grown. The people maintain themselves by woodcutting, hunting, and fishing. The capital is Petrosavodsk; the ancient capital O. (pop. 1341) dates from the 13th c.

Ol'oron or **Oléron-Sainte-Marie**, a town of France, department of Pyrénées-Basses, on the Gave d'O. (formed by the confluence of the Aspe and Ossan), 15 miles S.W. of Pau. It contains the 10th c. churches of Ste. Marie and Ste. Croix, has tanneries, dyeworks, and manufactures of woollen and linen goods, and exports to Spain, hams, timber, wool, &c. Pop. (1872) 7175. The *Iluro* of the Romans, O. was sacked by the Arabs in the 8th, and by the Normans in the 9th c., and was the scene of the peace concluded between Alfonso III. of Aragon and Carlo II. of Naples, July 25, 1287.

Olot, a town of Spain, province of Gerona, Catalonia, on the Fluvia, about 12½ miles from the French frontier. Cotton-spinning and weaving, with manufactures of silks, woollens, hardware, and soap, are carried on. Pop. 10,000.

Oltenit'za, a village in Rumania, on the left bank of the Danube, 37 miles S.E. of Bucharest, was the scene of a Russian defeat by the Turks under Omar Pasha, 4th November 1853. During the war of 1877 it was occupied in force by the Russians, and almost incessantly bombarded by the Turkish artillery from Turtukai on the Bulgarian side of the river. Pop. 1500.

Olym'pia, a plain of Elis, in the Peloponnesus, 3 miles long by 1 broad, was bounded S. by the Alpheus, W. by the Cladeus, and on the N. by Mount Cronion. Within this plain, at the angle formed by the two rivers, lay the Altis or sacred plane-grove (430 yards long by 215 broad), where the Olympic Games (q. v.) were held, and where stood the temple of Zeus Olympius, erected by the Eleans (572 B.C.), and adorned by Phidias and his school (437–33 B.C.). Around the Olympieium sprang up a Metroum, Heræum, prytaneium, gymnasium, &c.; and Pausanias speaks of 240, Pliny of 3000, statues. Overthrown by the earthquakes of 522 and 571 A.D., the monuments of O. served the barbarian invaders as quarries of building-stone. For more than a thousand years they lay overwhelmed in sand, awaiting their resurrection. A French expedition first determined the site of the Olympieium (1829); and in 1875 the German Reichstag, adopting a scheme proposed by Professor Curtius, voted £1850 towards the exploration of the Olympian plain. The result of excavations has hitherto been the unearthing of the temples of Zeus (211 feet by 86) and Here (171 feet by 58), and the discovery of many exquisite sculptures—the Nike of Pæonius of Mende, a Hermes bearing the infant Dionysus, ascribed to Praxiteles, &c. See *Die Ausgrabungen zu O. vom Winter und Frühjahr 1875–76, herausgegeben von E. Curtius, F. Adler, und G. Hirschfeld* (Berl. 1876).

Olym'piads, in Greek chronology, the intervals of four years between the celebration of the Olympic games, were reckoned from the year in which Corœbus won the foot-race (776 B.C.), and closed with the 301st Olympiad (270 A.D.). The name of the champion foot-runner was often substituted for the number of the Olympiad, just as modern sporting-men speak of Blair Athol's or Bluegown's year. This era did not come into use till after Alexander's death, and was first employed in history by Timæus of Sicily (352–256 B.C.). Under the later system, dating from Hadrian's dedication of the Olympieion at Athens (131 A.D.), the 1st Olympiad would answer to Ol. 227, 3, of the Greek era.

Olym'pias, the daughter of Neoptolemus I., king of Epirus, married Philip II. (q. v.) of Macedonia (359 B.C.), and bore to him a son, Alexander the Great (356). Her divorce by Philip (337) she revenged by instigating Pausanias to murder him (336), and by the execution of her rival Cleopatra. After the death of Alexander (323), who had always treated her with chivalrous reverence, O. fled from the hated Antipater (q. v.) to Epirus, but on his death in 317 took the field against Eurydice, Philip's grand-daughter, whom she put to death, with 100 Macedonian nobles. Her triumph was brief. Cassander (q. v.) hastened in to the Peloponnesus, besieged O. in Pydna, and executed her (316). Cruel, passionate, and unscrupulous, O. had yet something of the grandeur and lofty spirit that characterised her son.

Olym'pic Games, held in honour of Zeus on the plain of Olympia (q. v.), were founded, according to tradition, by the Idæan Herakles, and revived by Iphitos, king of Elis (884 B.C.). They took place every fifth year on the first full moon after the summer solstice, and extended over five days. The competitors—who up to the time of the Roman conquest must prove their pure Hellenic descent—had to undergo ten months of preparatory training, the last in the gymnasium at Elis. The victors (*Olympionikoi*) received simple chaplets of wild olive (ἔλαιον),

but were rewarded by their fellow-citizens with statues, processions, immunity from taxes, and at Athens with a prize of 500 drachmæ and public entertainment in the Prytaneion. The twenty-four contests, six of which were for boys, included foot and chariot races, wrestling, boxing, &c. So far as we can gather from ancient writers, the performances at the O. G. have been frequently surpassed by modern athletes, and the longest foot-race did not by the highest computation exceed 2¾ miles. The judges (*Hellanodikai*) were chosen, except on three occasions, from the Eleans. Subordinate to them were the *alytai* (a kind of stewards of the course), and various other minor officials. Sacrifices opened and closed the games, at which no women might be present, with the single exception of the priestess of Demeter. But men flocked to them from every part of the Hellenic world; and writers were in the habit of reciting, artists of exhibiting, their works to the assembled multitudes. Thus the masterpieces of Herodotus, Anaximenes, and Dion Chrysostom are said to have been first given to an Olympic audience. Poetry, too, was called upon to celebrate the victors, and fourteen of Pindar's hymns are devoted to their praises. See Krause, *Olympia, oder Darstellung der grossen Olympischen Spiele* (Vien. 1838), and the Histories of Thirlwall and Grote.

Olymplodo'rus, the last philosopher of the Alexandrian school of Neo-Platonists of any note, flourished in the reign of Justinian (527–565 A.D.). Nothing certain is known of his life, though Creuzer has inferred from a passage in his scholia to the *Alcibiades* that he taught before the final suppression of the Athenian school by the Emperor (529). His style is pure for the age in which he wrote, and his works have preserved many fragments of the lost writings of Iamblichus, Damascius, and other philosophers. We have by him a *Life of Plato* (Lond. 1771), a polemic against Strato (in MS. at Munich), and scholia on the *Phædo, Gorgias, Philebus*, and *Alcibiades Prior* of Plato.—**O.**, an Aristotelian philosopher of the latter half of the 6th c. A.D., wrote a commentary on the *Meteorologica* of Aristotle (Ven. 1551).

Olym'pus (mod. *Elymbo*), a mountain of Thessaly, separated from Ossa by the Vale of Tempe, and stretching northwards far into Pieria, has an elevation of 9749 and a snow-line of 9000 feet. The base of the mountain is clothed with oaks, chestnuts, beeches, &c., and the upper slopes with vast pine woods. Its broad summit was regarded by the poets from Homer downwards as the home of Zeus and the other divinities, who passed, they fancied, to heaven through the cloud that constantly caps the highest peak. Other mountains of the same name were the Mysian O. (mod. *Anadoli Dagh*), attaining in Keshish Dagh ('monk's mountain') an altitude of 3531 feet; the Cyprian O. (*Troodos*) of 6655 feet; and the O. of Lycia, Elis, and Laconia.

Om, or **Aum** = so be it. A mystic word of uncertain derivation that figures prominently in both the Hindu and Buddhist religions. In the Vedas or early Sanskrit Scriptures, it appears as an exclamation of solemn assent. Later on it formed the auspicious word with which the Brahmin had to begin and end every sacred duty, and finally it came to be regarded as an abbreviated symbol representing the names of the three gods of the Hindu Trinity. In one branch of Hindu philosophy, called the Yoga, the repetition of O. is supposed to be all-efficacious in giving knowledge of the supreme deity. Similarly among the Thibetan Buddhists *om mani padme hum*, or the 'formula of six syllables,' constitutes the repeated invocation which sums up their whole religious life. It is ground in countless numbers out of the well-known praying machines, and is emblazoned on silk flags whose every flutter is a prayer. Its meaning is variously interpreted to be, 'Oh! the jewel is in the lotus! oh!' *i.e.*, the self-creative force is in the Kosmos, or 'salvation is in the jewel-lotus. Amen.'

Omagh' (Ir. Gael. *Oghmaighe*, 'the beautiful field'), the county town of Tyrone, in the N. of Ireland, 109 miles N.N.W. of Dublin, and 19¼ S.S.E. of Strabane, is situated on the river Strule, at the junction of the Camowen and Drumragh. It is connected with Londonderry by railway, and is the head-quarters of the N.W. military district. There is some trade in leather and corn. Pop. (1871) 3724. The history of O. dates from the 15th c., when we hear of it as a stronghold of the O'Niells. It soon fell into the hands of the English, and was burned by James II. in 1689. It was again burned by accident in 1743, which, perhaps, accounts for the regularity of its streets.

Omaha, a city of Nebraska, U.S., on the W. bank of the Missouri, 4 miles W. of Council Bluffs, is a centre of the Union Pacific Railroad, and has numerous churches and schools, a deaf and dumb institution (1869), a public library, and 3 daily and 7 weekly newspapers. There are oilworks, silver-smelting furnaces, pork-packing establishments, foundries, furniture factories, &c. Pop. (1870) 16,083. O. was laid out in 1854, and is now one of the leading railway depots in the N.W.

O'man. See MUSCAT.

O'mar I., Abu Hafsa Ibu al Kettab, second Calif of the Faithful, was born about A.D. 581, of the tribe of Benou Ada. At first a persecutor of the followers of Mohammed, of whom he was a relative, he underwent sudden conversion in 615, after, as the story goes, he had wounded his sister, whom he found reading the Koran. He became the great military captain in the wars of Mohammed, on whose death he acted as the *kajeb* or vizier of the Abu Bekr, the first Calif, whom he succeeded in 634. He now carried out to the full the policy of aggressive religious war and annexation which he had suggested to Mohammed. The fall of Damascus and Jerusalem and the defeat of the Byzantine armies of Heraclius placed Palestine and Syria at his feet. Not long afterwards Persia, Egypt, Khorassan, and Armenia were added to the new empire. To these victories his generals Khaled ('the Sword of God') and Abu Obeidad largely contributed. The fiery valour and military skill of O. were, however, the great makers of Islam as a civil power; while his stern religious sense of justice kept his subjects in discipline. He did not, at first, exterminate the infidel. Thus, in the capitulation of Jerusalem the churches were spared, and the inhabitants were not enforced to teach their children the Koran; they were to wear turbans and shoes and adopt Arabian names, while they were deprived of arms. O. himself worshipped at Bethlehem and built a great mosque beside the Temple. The Persian King Zezdejerd and his general Firusi were finally defeated in 638. In 640 Amru destroyed the library at Alexandria and carried the banner of the Prophet westwards to Tripoli and Barca. In 644 O. was assassinated by a Persian slave, whose fancied wrong he had refused to redress. In private life O. was austere to asceticism, living on bread, dates, and water, sleeping often under a porch or a tree. One Persian historian describes him as riding a sorrel-coloured camel in an old tattered habit of hair-cloth, and carrying within his saddle-bags the food which he used. He ate out of the same dish as his followers, and prohibited the use of wine and silk dresses. He observed the Koran to the letter, was called Al Faruk, 'the divider' or 'the just one,' and is still almost adored by the orthodox sects of Islam. He organised the army on the Persian model of regular wages and pension. See Ockley's *History of the Saracens*, D'Herbelot's *Bibl. Orient.*, Gibbon's *Decline and Fall of the Roman Empire*, and Platen's *Geschichte der Tödtung des Khalifen Omar aus der Chronik des Dijarhekri* (Berl. 1837).—**O. II.**, the 8th Ommiad Calif, and the great-grandson of the first 'Commander of the Faithful,' succeeded Suleiman in A.D. 717. Deeply religious, and resembling his ancestor in sobriety of life and love of justice, O. prohibited the reading of the formal maledictions against the heretical Ali and his descendants, which the Ommiades had introduced into the Mosque service, and restored to his traditional enemies their lands. For these acts of justice he was promptly poisoned by his friends in A.D. 720.

Omar Pasha ('Michael Lattas), a distinguished Turkish general, was born at Plaski, a village in Austrian Croatia, 24th Nov. 1806. He entered the Austrian army, and was employed in the surveying of roads, but for some reason deserted, and, taking a situation as tutor in the house of Hussein Pasha, governor of Widin, became a Mahometan. He next obtained the appointment of writing-master in the military school at Constantinople, and, gaining the favour of Khosrew Pasha, the Seraskier, became in 1833 an adjutant on that officer's personal staff. He assisted in the suppression of the insurrection in Syria (1839), and Albania (1846), and received the title of Pasha (1848), with an important command in Wallachia. In 1852 he was charged with the expedition against Montenegro, and was on the point of occupying Cettinje when Austrian intervention induced the recall of his army. In June 1853 he was appointed commander-in-chief, and in that capacity inflicted several defeats on the Russians, at Oltenitza, 4th November 1853, Kalafat, 6th January 1854,

&c. He entered Bucharest in August 1854 on the withdrawal of the Russians from the Principalities. In February 1855, at Eupatoria, he harassed the Russian rear and brilliantly repulsed a strong attack on the 17th of that month. He was sent in October 1855 to relieve Kars with a force of 35,000 men, but failed to reach that city in time to prevent its surrender. Appointed Governor of Bagdad, he fell for one year (1859) into disgrace. He subdued the Montenegrins in 1862 and occupied Cettinje. His last achievement was the suppression of the Cretan insurrection in 1867. O. died at Constantinople April 18, 1871.

Ombay', an island of Australasia, N. of Timor, is 50 miles long and 30 broad, rises abruptly from the sea in high volcanic masses, and is inhabited by mixed Negro and Malay tribes. At Alor the Dutch have a settlement and carry on some trade in edible birds'-nests, pepper, wax, &c. Estimated pop. 194,000.

O'Mea'ra, Barry Edward, was born in Ireland in 1786, joined the English army as assistant-surgeon in his eighteenth year, was disgraced in 1818, but entered the navy, where he served with credit. Napoleon was attracted to him in the voyage of the *Bellerophon* from Rochefort to Plymouth; and in his exile to St. Helena O. accompanied the emperor as private physician. His sole title to remembrance consists in his book, *A Voice from St. Helena, or Napoleon in Exile* (1822), which gave a record of conversations held with the fallen dictator, while it exposed at the same time the petty tyrannies of Sir Hudson Lowe. O. had already brought a charge against the governor of St. Helena of wishing to make away with Napoleon, and had very properly been dismissed the service, as the charge was both reckless and unfounded. He then lived in the neighbourhood of London, where he died, 3d June 1836.

Ome'lette (Fr. *œufs mêles*, 'mixed eggs'), a dish, the chief constituent of which is eggs. The eggs are whipped into a froth, flavoured, and lightly fried. The variety of omelettes is very great, and, although the dish appears to be simple, the successful cooking of an O. requires great skill and dexterity.

O'mens (akin to Sansk. *avman*, 'protection'), foreshadowings of coming events by casual occurrences, have been observed at all times and in all places. Reginald Scot, writing in 1584, says: 'Many will go to bed again, if they sneeze before their shoes be on their feet; hunters, if they chance to meet a friar or a priest, will couple up their hounds and go home; and he that receiveth a mischance will consider whether he met not a cat or a hare when he went first out of his doors in the morning, or stumbled not at the threshold at his going out, or put not on his shirt the wrong side outwards, or his left shoe on his right foot, which Augustus Cæsar reputed for the worst luck that might befall.' Even to-day there are educated people who at heart believe that the death-tick, the spilling of salt, a dog's howling, &c., are ominous of impending evil. Special families may have their own peculiar omen—in Ireland the wailing of the Banshee; in England the fall of a branch or the flight of a bird against a window. O., as a rule, are shrouded in time-honoured obscurity; only in rare instances can we trace them to their origin. The belief that he who first rises from a party of thirteen will die before the year is out is probably assignable to the Last Supper, where Judas first left the chamber. Friday, the day of the Passion, is unlucky, because on it the fairies vent their spite on mortals in whose redemption they have themselves no share. And it foreboded harm to meet a cat or hare, because these were the forms most frequently assumed by witches. *Prodigies* (Lat. 'exceptional cases,' from *pro*, 'forth,' and *ago*, 'I lead') differed from casual and natural O., in being supernatural and of strictly divine origin, as when dogs spoke at the expulsion of the Tarquins, or trees before the death of Cæsar. See Fallati's *Ueber Begriff und Wesen des Römischen Omen* (Tüb. 1836); Brand's *Popular Antiquities* (new ed. Lond. 1876).

O'merkote (Umarkot), the chief town of the Thur and Parkar Political Superintendency, Scinde, British India, on the confines of the Great Indian desert, 95 miles E. of Hydrabad; pop. (1872) 3999. It has a considerable transit trade, and the neighbourhood is watered by a canal. O. is celebrated as the birthplace of the Mogul emperor, Akbar the Great, whose father, Humayun, had fled here after his defeat by Shere Shah. In 1847, at the time of the acquisition of Scinde, it was ceded to the British by the Rajah of Jodhpore.

Ommiades, a dynasty of fourteen califs, who reigned at Damascus for nearly a century. Their founder, Moawiyah, the son of Mohammed's great adversary, Abu-Sofian, in early youth was dignified with the title of Secretary of the Prophet, and for forty years administered the government of Syria. He claimed the succession on the assassination of Othman (655), but not until Ali had shared his predecessor's fate (661) could he make his claims good. Moawiyah's reign was marked by the disastrous siege of Constantinople (668–675), by the advance of the Saracens in Africa, and by his important change of an elective to an hereditary califate. His son and successor Yezid (680–683) lost Persia to Husein, the son of Ali, and Arabia to the anti-calif Ibn-es-Sobeir. Abdulmelek (685–705) by his arms and policy reunited the Moslem empire, discontinued the tribute claimed by the Byzantine Emperors, and established a national mint. The next thirty-seven years were occupied by the reigns of his four sons, and of Omar, the best of the Ommiade race. Under the indolent Walid I. (705–716) the Arabic numerals were introduced into general use, Saracenic architecture attained a high perfection, and Spain and Transoxiana were conquered by Musa and other able lieutenants. Under the gluttonous Suleiman (716–717) and Omar (717–720) the second siege of Constantinople resulted in a second discomfiture; and under Hesham (723–742) the defeat of the Arabs at Tours by Karl Martel (732) turned the tide of Moslem conquest. Merwan II., the last of the Ommiade califs (744–750), had won in the Georgian wars the title of the Ass of Mesopotamia, an honourable epithet in the East. But in 747 the Abbasides (q. v.) raised the standard of revolt at Meru in Persia. Their first victory on the banks of the Zab was followed by a still greater one at Busir in Egypt (February 10, 750), in which Merwan fell, pierced by a lance. Eighty of his kinsfolk, invited to a banquet at Damascus, were treacherously massacred, two only escaping—one to S.E. Arabia, where he founded a califate that lasted for seven centuries; the other, Abd-ur-Rahman, to Andalusia in Spain. 'Except among the Syrians,' says Gibbon (*Decline and Fall*, ch. lii.), 'the califs of the house of Ommiyah had never been the objects of the public favour. The life of Mohammed recorded their perseverance in idolatry and rebellion; their conversion had been reluctant, their elevation irregular and factious, and their throne was cemented with the most holy and noble blood of Arabia.'

Ommiades of Spain.—Abd-ur-Rahman I. (756–787), Hesham's grandson, was gladly welcomed by the Arabs of Spain, and speedily established himself as Emir of Cordova (q. v.). He secured and extended his domains, which embraced nearly the whole peninsula, in the face of a formidable coalition headed by Karl the Great, whom he defeated at Roncesvalles (q. v.) in 778. He had also, like his two immediate successors, to struggle against the frequent revolts of his own subjects, Christian and renegade, which were first wholly suppressed by Abd-ur-Rahman II. (821–852), a wise and liberal prince, the splendour of whose court rivalled that of Bagdad, and attracted a host of scholars, poets, and artists. During the wars of his son, Mohammed I. (852–880) with Alfonso III. (q. v.), there grew up a spirit of chivalry that honoured women as nowhere else in Islam. But the greatest of all the Spanish O. were Abd-ur-Rahman III. (912–961), the vanquisher of Leon and Asturias, and his son Al-Hakem II. (961–976)—monarchs who 'employed the awful engine of despotism in promoting the happiness and intelligence of their species.' They fostered commerce and agriculture, founded eighty free schools, collected a library of 600,000 volumes, and under them the university of Cordova attained a European fame. Hesham II. (976–1013) was a child of eleven at his accession, and throughout his reign was overshadowed by the Grand Vizier Al Mansor, who, dying in 1002, transmitted his office to his son. By them the Arab army was recruited with Berber and Christian mercenaries, who, after co-operating in the conquest of Leon, Castile, and Barcelona, turned on their masters, and rent the Ommiade empire into a hundred petty principalities, the last of the emirs, Hesham III. (1027–31), dying despised and forgotten at Cordova in 1036. See Dozy's *Histoire des Musulmans d'Espagne* (4 vols. Leyd. 1861); and Weil's *Geschichte der islamitischen Völker* (Stutt. 1866).

Om'nibus (Lat. 'for all'), colloquially '*bus*,' a familiar large vehicle for conveying passengers short distances in cities. Om-

nibuses commenced to run in the streets of Paris in 1827, but were indifferently profitable until Madame de Berry patronised them; thereafter they became the vehicles of the *bourgeoisie* and proved eminently successful. The prototype of the O. was the Parisian 'carriage of the five soldi,' the introduction of which in 1662 is ascribed to Blaise Pascal and several noblemen. In 1829 Mr. Shillibeer ran the first O. in London, which was drawn by three horses and carried twenty-two *inside* passengers. The seat on the roof for outside passengers was added in 1849. The London General Omnibus Company, founded in 1856, possessed in 1876 560 buses and 6000 horses. Each O. is adapted for carrying twenty-eight passengers in all; its weight averages 24 cwts., and the distance travelled daily 60 miles. About 70,000,000 passengers are annually carried by the London buses. In many cities tramway cars have to a large extent superseded the O.

Omsk, the capital of Western Siberia, government of Tobolsk, on the right bank of the Irtish, near its junction with the Om, and more than 2200 miles E.S.E. of St. Petersburg. It is strongly fortified, and is the seat of the governor-general of Siberia, of the courts of justice, and the Siberian corps of cadets. Among the inhabitants are many who have been banished from Europe for political offences. A considerable trade is carried on with the Khirgiz in cattle, and there are also some manufactories and mining works. Pop. (1867) 26,722.

O'mul (*Salmo migratorius*), a species of *Salmonidæ* or Salmon (q. v.) found in Lake Baikal, and attaining a length of from 12 to 15 inches. Its flesh is palatable, and like the common salmon it ascends rivers to spawn.

Onagra'ceæ, a natural order of dicotyledonous herbs or shrubs, with simple, opposite, or alternate leaves, flowers regular, usually axillary, with parts as a rule in fours. The fruit is a round or oblong, many-seeded, fleshy berry, or a dry, four-valved capsule; the seeds are numerous, naked, or with a feathery appendage. The species are widely distributed, the annuals being generally found in temperate countries, and the shrubby members in Mexico, S. America, and New Zealand. A few yield minor edible products, and a good number have been brought into cultivation as ornamental plants. Chief among these are the *Fuchsia* (q. v.) genus. The N. American representatives are also favourites for out-door purposes, as *Œnothera*, *Clarkia*, and *Godetia*. See CIRCÆA and TRAPA.

One'ga, next to Ladoga the largest lake in Europe, lies in the Russian government of Olonetz, and has an area of 4855 sq. miles. Its length is about 140 miles, breadth 59, and its depth varies from 590 to 738 feet. The banks are generally low, but in the S.W. they rise to about 300 feet, and it appears that the elevation of the lake must once have been much greater than it is now. In the N. end it divides itself into three bays, of which the most easterly is the widest. The lake abounds with fish, and its banks are cultivated with the exception of the swampy places. Fed by the Wodla, the Wytegra, and the Schuja, it connects itself by the Swir with Ladoga, and by the Kumsa with Segosero, and thus it forms a communication between the White and the Baltic Seas. The Swir and the Wytegra are connected by the Onega Canal. The chief island in the lake is Klimezkoi (44 sq. miles), and the chief town on its banks Petrosawodsk.

One'ga, a town of Russia, at the mouth of a river and on a gulf of the same name, with a pop. (1870) of 2329. In 1873 there entered 32 ships, carrying chiefly salt and fish to the value of £8200, and the exports of timber amounted to £36,000. The River O., 262 miles in length, flows from the Latscha Lake, receives on the right the waters of the Moscha, and joins the Gulf of O., a part of the White Sea.

Oneglia, a town of Italy, province of Porto Maurizio, on the sea-coast, midway between Genoa and Nice. It is beautifully situated, has a good harbour, constructed in 1825, and receiving yearly some 100,000 tons of shipping. O. is the birthplace of Andrea Doria (q. v.). Pop. (1874) 8047.

O'Neill. See TYRCONNEL.

On'erous Cause, in Scotch law, means *on account of valuable consideration.*

Onic'olo. See NICOLO.

On'ion (Lat. *unio*, Fr. *oignon*) is one of the prominent members of the genus *Allium* (q. v.). The O. itself is *A. Cepa*. Its native country is unknown, but its culture is as old as the history of the human race. The uses to which it is applied are very numerous; when young, in salads; when mature, in soups or stews, or alone, raw, boiled, or roasted; the smaller sized bulbs are also prized for preserving in vinegar as a pickle. Many varieties have been established by care and selection, and of these the Spanish or Portugal O., from its large size and mild flavour, is in much request. The underground or potato O. (var. *aggregatum*) multiplies by young bulbs on the parent root, they having all the properties of the common form. In the tree or bulb-bearing O. (var. *viviparum*) the stem produces bulbs instead of flowers, which, when planted, produce underground onions of extra-strong flavour. The so-called Welsh (Ger. *välsch*, 'foreign') O., or ciboule (*A. fistulosum*), a native of Siberia, from whence it was introduced into Britain early in the 17th c. through Germany, never forms a bulb, but being very hardy, is sown in autumn for spring salads. The strong taste and smell of the O. are due to a volatile oil rich in sulphur, said to induce sleep. The O. stimulates expectoration.

Onion-Fly (*Anthosmyia ceparum*), a species of fly belonging to the *Muscidæ*, and noted for the habits of its larvæ in attacking the onion. The larvæ cause the affected plants to turn yellow and to die. The young flies become pupæ in two weeks, undergo their transformation in the root, and a fortnight later appear as perfect flies.

Onis'cus. See WOODLOUSE.

Onk'elos, called the Proselyte, mentioned in certain Jewish writings (*Josifthah* and the *Babylonian Talmud*), is the supposed author of the Chaldee paraphrase of the Pentateuch called Targum O. He is said to have been the contemporary and pupil of Gamaliel; but as this may have been Gamaliel the Elder or Gamaliel II., he has been placed in the half c. before Christ, and about 40–120 A.D. By the best Hebrew scholars, however, he is now identified with Aquila (q. v.) or Akilas (at Babylon, Ankelos O.), owing to the great similarity between the incidents recorded of both. Unless O. be the same as Aquila, the two were contemporaries, both relatives of the reigning emperor, proselytes to Judaism, disciples of R. Eliezer and R. Joshua, and translators of the Bible under the auspices of these two rabbis. It is not supposed, however, that Aquila was the author of the Targum, but that it was made in the School of Babylonia to counteract the corruptions of the LXX., like the translation of Aquila, and was hence called a Targum in the manner of Aquila, an *Aquila Targum*. See Deutsch in Smith's *Dict. of the Bible* (1863), art. 'Versions.'

Onomac'ritus, a Greek poet who was banished from Athens (*circa* 516 B.C.) for interpolating his own verses in the oracles of Musæus, with the collecting of which he had been charged by Hipparchus. Fleeing to Persia, he incited Xerxes to undertake the invasion of Greece, by reciting to him those ancient prophecies that seemed to favour his design. Pausanias tells us that in his day certain poems were attributed to O., to whom the Orphic Hymns and the institution of the Dionysiac orgies have also been ascribed. See Eichhoff, *De Onomacrito Atheniensi* (1840).

Onomatopœ'ia (Gr. *onoma*, 'name,' and *poieō*, 'I make'), a principle of word-formation by which words are made to imitate or represent a sound characteristic of the objects they are intended to designate, as cuckoo, peewit, whizz, purr, &c. Such words are commonest in the language of children and of uncivilised races. Thus the Gallas from *djeda*, 'to say,' and *geda*, 'to make,' form *cakak-djeda*, 'to say *cakak*' = to crack, and *dadada-geda*, 'to make *dadada*' = to beat; whilst the child speaks of a dog as a *bow-wow* and a train as a *puff-puff*. Herder (q. v.), with many philosophers of the 18th c. and some few philologists of our own time, found in O. the origin of language. 'Man,' he supposes, 'sees a lamb, and looks for a distinguishing mark. The lamb bleats—the mark is found. "Ah, thou art the bleating animal," the soul says within herself, and the sound of bleating becomes the name of the lamb.' But, as a matter of fact, few animate, fewer inanimate, objects, and hardly any abstract ideas, have been named on the onomatopœic system. We may fancy, from force of association, that in *thunder* and

raven we hear an imitation of rumbling and croaking, till we find that *thunder* is from the same root (*tan*, 'to stretch') as *thin* and *tender*, and that the *ru* of *raven*, reappearing in *rune* and *rumour*, simply means 'to cry,' and would be equally applicable to the note of the nightingale or turtle-dove. See LANGUAGE; Steinthal's *Der Ursprung der Sprache* (Berl. 1858); the introduction to Wedgwood's *Dictionary of English Etymology* (Lond. 1859); and Max Müller's *Science of Languages* (Lond. 5th ed. 1866).

Onta'rio, the most populous though not the largest province in the Dominion of Canada, and formerly called Upper Canada or Canada West, is bounded N. by Rupert's Land, E. by the River Ottawa, which separates it from Quebec, and the St. Lawrence, which separates it from New York, S. and W. by the lakes Ontario, Erie, Huron, and Superior. Area 121,260 sq. miles; pop. (1871) 1,620,847. Surrounded on three sides by navigable water, it has a shoreline of several thousand miles in extent, everywhere broken by inlets, and affording excellent facilities for commerce, which have been further increased by the construction of numerous canals. The northern part of O. is hilly, containing rocks chiefly of the Huronian and Laurentian formations, and is valuable on account of its immense supplies of timber and great wealth in minerals, while it also includes some rich valley land. Among the mineral products are gypsum, lime-phospates, marble, iron, copper, and silver ores. S. of this district lies the Great Plain of Canada West, consisting of beds of clay and gravel resting upon Silurian and Devonian limestones, sandstones, and shales. This is the most fertile portion of the province, that on which the greater part of the cereal crops are raised, and containing also forests of hard-wood trees. A large amount of petroleum is obtained annually from the lower Devonian limestones in the S. W. The timber trade still takes the first place among the industries of O., though agriculture has of late years been making very rapid progress. The most valuable wood supplied by O. is that known as the white or Weymouth pine, which grows in the valley of the Ottawa. The fisheries are now of considerable importance. The mineral resources of the country are not yet properly developed. The chief exports to Great Britain are wood and wheat; the chief imports, woollen and cotton goods. Separate statistics, however, on the trade and manufactures of O. are not to be obtained from the official returns, in which it and Quebec are taken as one province. In 1876 there were 825 ships with a total tonnage of 114,990 belonging to O. In 1871 there were 330,965 Episcopalians, 356,442 other Protestants, and 274,162 Roman Catholics.—Lake O. was visited by Champlain in 1615 and Lake Superior by traders in 1660. In 1671 Perrot took possession of the territory near Lake Huron, and eight years afterward Niagara was founded by La Salle, when the lakes were explored as far as Michigan. The fort at Toronto was founded in 1749. In 1760 O., which formed part of French Canada, came with the rest of that province into the hands of the British, and was the field of several engagements during the war of 1812–15. In 1840 the provinces of Upper and Lower Canada were united, to be separated again in 1867 as provinces, but formed along with New Brunswick and Nova Scotia into the new Dominion of Canada. The internal affairs of O. are under the management of a lieutenant-governor, appointed by the Governor-General of the Dominion, and a house of 82 elective members, who together appoint the 24 senators by whom the province is represented in the Dominion Parliament.

Onta'rio, Lake, the smallest and most easterly of the five great lakes of N. America which are connected with the River St. Lawrence, is bounded on the N. and N.W. by the province of the same name, and on the S. and E. by the State of New York. It is 190 miles long, with an area of 7300 sq. miles, and an average depth of 490 feet. Its surface level is 334 feet below that of Lake Erie, and 231 above tide-water. The Niagara river enters it at the S.W.; the St. Lawrence issues from its N.E. extremity. Among the other streams received by the lake are the Trent and Humber on the N., and the Black, Genesee, and Oswego on the S. It has connection by the Genesee river and Oswego Canal with the Erie Canal, and consequently with the Hudson river and New York city. The most important towns on the Canadian shore are Toronto, Hamilton, Coburg, and Kingston; on the U. S. shore, Oswego, Sackett Harbour, and Port Genesee. Lake O. is the centre of an extensive commerce, its great depth rendering it navigable throughout its whole extent for vessels of the largest size, and preventing it from freezing except close to the shore.

Ontol'ogy is that branch of Metaphysics which deals with inferences of unknown being, drawn from observed phenomena. Its prime object becomes the Supreme Being, and thus it may be termed scientific or rational theology. Yet its restriction to recognition of one Being is not necessary; for it may acknowledge a plurality of fundamental principles, and, unless when pantheistic, admits as distinct (1) Man, (2) the Universe, (3) God. The science of metaphysics was in ancient times almost entirely ontological; and although in modern history it has become psychological mainly, the systems of Spinoza, Leibnitz, Fichte, Schelling, Hegel, Herbart, widely as their principles differ, may be mentioned as distinctly ontological.

On'us Proban'di, a legal phrase denoting *Burden of Proving* (q. v.).

On'yx (Gr. *onyx*, 'a finger-nail,' the markings of which those of the mineral were supposed to resemble), a chalcedonic variety of quartz which, like agate, consists of bands or layers of different colours; but in the case of O. the layers are superimposed in even planes, while in agate they are arranged concentrically. The various bands in good O. are sharply defined, and consist of white and black, or white, brown, and black layers. When layers of sard occur, the stone is called Sardonyx (q. v.). O. and sardonyx are the stones from which cameos are principally cut.

Onyx Marble, a fine translucent stalagmitic limestone obtained in the province of Oran, Algeria, and at Técali, near the city of Mexico. It is used as a decorative material, and is also made into small ornamental objects. It is the same substance, in part at least, called by Pliny and other classical authorities *alabastrites*, *onyx*, and *onychites*. O. M. is also known by the name of Oriental alabaster.

Oodeypoor' (*Udaipur*), the capital of the native state of the same name in Rajputana, India, 70 miles W. of Neemuch, and 395 N. of Bombay, lies in a basin about 2000 feet above the sea. It was founded in 1568 by Udai Singh, after the sack of Chittor, the former capital, by the Moguls, and contains the most celebrated examples of modern Hindu architecture, which have been elaborately described and illustrated by Fergusson. The palace of the Rana is of granite, overlooking an artificial lake, 5 miles in circumference. The dam which forms this lake is faced with marble and adorned throughout with sculptures and temples.—The *state* of O., more properly called Meywar, occupies the S.E. of Rajputana, and has an area of about 11,614 sq. miles. Its pop. (according to an old estimate) is 1,161,400; the gross revenue is £640,000, of which £240,000 is in the hands of feudatory barons, and £130,000 has been assigned to Brahmins; the tribute is £20,000. The country is hilly and possesses some mineral wealth. Sheep and goats are abundant, and the cattle are good. The crops are millets, barley, wheat, sugar-cane, and cotton. Some suffering and emigration were caused by the drought of 1877. The ruler, whose title is Rana, represents the solar family of Rajputs, and is universally regarded as the head of the entire caste. The dynasty dates from 144 A.D., being descended from the ancient Hindu kings of Oude. In history they are celebrated for the heroic and continued resistance they offered to the Mohammedans, and for their works of public utility. They ever refused to ally themselves in marriage with the imperial house of Delhi. They fought against each succeeding Mogul emperor; and at the capture of Chittor by Akbar, 30,000 Rajputs and 1700 of the royal family are said to have perished. One Rana, in 1661, built a marble embankment, at a cost of £960,000, to employ labour during a famine; his successor constructed the Deybur lake, the largest in India, 30 miles round. Mahratta and Pindaree invasions, combined with internal dissensions, impoverished the state at the beginning of this century. Being much reduced in area, the protection of the British was accepted in 1818. In 1821 the district of Mairwara (q. v.) was temporarily placed under British administration, an arrangement which still continues. The inordinate claims of the feudal barons, who are mostly descendants of former Ranas, still cause trouble; and it is only in tradition that O. is the first Hindu state in India. The present Rana, who is eighteen years of age, succeeded his uncle

in 1874. See Tod's *Annals of Rajasthan*, Fergusson's *History of Indian Architecture*, and Rousselet's *India and its Native Princes* (Lond. 2d ed. 1878).

Oojain' (*Ujain*), an ancient city of Hindustan. now in the territory of Scindiah, the Mahratta Rajah of Gwalior, on the right bank of the Seepra river, 1698 feet above the sea, 260 miles S.W. of Gwalior and 598 S.W. of Allahabad. O. is one of the seven sacred cities of the Hindus, and the first meridian of their geographers. It is mentioned by Ptolemy, but its chief grandeur dates from the reign of the mythical Vikramaditya, whose era (57 B.C.) is still universally used through Hindustan. In Mohammedan times it was the capital of an independent Rajah of Malwa. The city is surrounded by a stone wall 6 miles in circumference, and is still densely populated. Most of the houses are built of brick, with a framework of wood; and there are many temples. The chief buildings are the palace of Scindiah, and the observatory of the Rajput astronomer, Jey Sing; around are numerous groves and gardens. The deserted ruins of the ancient city lie a mile to the N. A considerable trade is carried on in cotton and silk fabrics, precious stones, and Malwa opium.

Oolite. See LIMESTONE.

Oolit'ic or **Jurass'ic Syst'em** is the middle member of the Mesozoic or Secondary Formations, lying intermediate in position to the Trias and Cretaceous. It is divided into four great divisions—the Lias, the Lower Oolite, the Middle Oolite, and the Upper Oolite. The name Oolite was given to the series by Dr. William Smith, when he tabulated the Secondary Formations of England, from the occurrence in it of many beds of O. limestone. The name Jurassic is derived from the Jura Mountains, whose chalk beds seem to be strictly contemporaneous with the Oxford or Middle Oolite. The Lias consists essentially of clay with numerous bands of argillaceous limestone in its lower parts, and an arenaceous and calcareous deposit near the middle. It is divided into the Lower Lias, the Marlstone, and Upper Lias, each of which has an assemblage of characteristic fossils, embracing cephalopods, lamellibranchs, crustacea, insects, fish, reptiles, &c. (see LIAS). The Bath or Lower Oolite is subdivided into five sections—Inferior Oolite, Fuller's Earth, Great Oolite, Forest Marble, and Cornbrash. The first of these, composed of beds of shelly limestone, brown marl, and arenaceous limestone rich in fossils, is separated from the Upper Lias by a loose sandy deposit. The whole group consists of alternating layers of clays, sands, and limestones, and contains many characteristic fossils. The Stonefield Slate and the Bath Oolite, a valuable building stone, belong to the Great Oolite, which is remarkable for the remains of terrestrial reptiles and mammals. The other sections are considered under their respective headings. The Oxford or Middle Oolite consists also of clays, marly sandstones and limestone, and comprises the Oxford Clay (q. v.) with its beautifully preserved Ammonites and Belemnites, and the Coral Rag (q. v.), so rich in corals. The Portland or Upper Oolite is divided into three groups—the Kimmeridge Clay (q. v.), the Portland Beds (q. v.), and the Purbeck Beds (q. v.). The last two occur only in the S. of England, and their fossil characters indicate the gradual elevation of the land above the sea, and its subsequent submersion by fresh water.

Oomrawutt'ee (*Amraoti*), the chief town of the district of the same name in Berar, one of the assigned districts of the Nizam of Hyderabad, India, 417 miles E. of Bombay by rail, and 1338 W. of Calcutta. Pop. (1867) 23,410. It contains an ancient Hindu temple; but the city was founded in the middle of last century by the Mahrattas, who built the present wall, 26 feet high and 2½ miles in circumference. The civil station, containing the headquarters of the province, is 2 miles distant. O. is one of the centres of the Berar cotton trade. In 1870 it contained 6 full presses and 4 half presses; and 42,000 bales, each weighing 3½ cwt., were despatched to Bombay. There is also a large trade in spices, piece-goods, salt, sugar, and country cloth. —The *district* of O., which is divided from the Central Provinces by the Wardha river, has an area of 2767 sq. miles. Pop. (1867) 407,276. Cotton occupies 300,000 acres, other crops are rice, millets, and wheat.

Oona'o (*Unao*), the chief town of a district of the same name, in the Province of Oude, British India, 10 miles N.E. of Cawnpore, and 33 S.W. of Lucknow. Pop. (1869) 7,277. It is a station on the Oude and Rohilcund Railway.—The *district* of O., which is bordered S. W. by the Ganges, has an area of 1349 sq. miles. Pop. (1869) 724,949. The crops are rice, wheat, barley, millets, oil seeds and sugar-cane. In 1874 the exports were valued at £456,000, the imports at £1,312,000.

Oond'wa Null'ah (*Udha nala*), a village in the district of the Sonthal Pergunnahs, Bengal, British India, near the right bank of the Ganges, 6 miles S. of Rajmehal, and 188 N. of Calcutta. Here was fought a battle in September 1763, in which Major Adams completely defeated the forces of Cossim Ali, the Nawaub of Bengal, and opened the road into Behar. The remains of the Mahommedan camp, which was protected by a marsh and defended by 100 guns, are still visible.

Oo'ri or **Ou'ri.** See LIMPOPO.

Oos'terhout ('east holt or wood'), a town in the province of North Brabant, Netherlands, 6 miles N.E. of Breda, contains several large breweries, tanneries, and brick-works, and carries on a thriving trade in corn and cattle. The inhabitants are almost all Roman Catholics. Pop. (1870) 8472.

Oot'acamund (*Utakamand*, familiarly known as Ooty), the chief town of the Neilgherry district, and the hill sanitarium of the Madras Presidency, British India, 7400 feet above the sea, 330 miles S.W. by rail from Madras, and 70 miles S. of Mysore. Pop. (1871) 9982. The first house was built here in 1820. It is now the permanent residence of many Europeans, as well as a summer resort. The railway station is at Mettapollium. A convalescent depot for 1300 soldiers is in course of erection (1877) at Wellington. In the neighbourhood is the Lawrence Asylum for the children of soldiers, which has 380 inmates and an income of £10,000. The Botanical Gardens were the first scene of the successful introduction of the cinchona plant into India. The beautiful mountain landscape has been yet further adorned by an artificial lake, 3 miles in circumference, formed by damming up a valley. Coffee and potatoes are largely grown, as well as cinchona, and a little tea. See *Primitive Tribes of the Nilagiris*, by J. W. Breeks (London, India Museum, 1873); also art. NEILGHERRY HILLS.

Oot'rum the Indian name for the fibre of *Dæmia extensa*.

O'pah (*Lampris luna*), a curious fish, belonging to the order Teleostei, and to the family *Scomberidæ*, or Mackerels. It is cast up occasionally on the British coasts. The O. inhabits the warmer seas, and may attain a length of 5 feet and a weight of 120 lbs. Its flesh is red-coloured and palatable. It has a single dorsal fin, and is gorgeously coloured, its sides and back being bright green, and the fins and eyes scarlet. Pale golden spots are scattered over its sides. The O. is also named the 'King-fish.'

O'pal, a modified form of quartz, from which it differs in being less hard, from 5·5 to 6·5, as against 7; of lower specific gravity, from 1·9 to 2·3, against 2·5 to 2·8; and also in being uncrystallisable. O. has a vitreous lustre, inclining to resinous, and sometimes pearly. Its colour varies from white to grey and yellow, but it is frequently dark-coloured owing to impurities. There are many varieties of O., the most important and valuable being the precious O. This much-prized jewel-stone exhibits a most remarkable and brilliant play of colours, the cause of which is not satisfactorily known, although it has been ascribed to internal cracks and fissures of a uniform shape. Precious O. of a size greater than a small nut is very rarely found; but in Vienna Museum there is an example, not, however, wholly free from matrix, of the size of a man's fist, weighing 17 ounces, and estimated to be worth £70,000. Precious O. is found in veins in porphyritic rocks near Kashan in Hungary, at Frankfort, at Gracias-a-Dios in Honduras, in Ceylon, and a few other places. The other principal varieties of O. are the Fire O., Common O., Hyalite, Wood O., Floatstone, and Tripolite, the last consisting of the silicious shells of infusorial animals, consisting essentially of O.-silica.

O'pen-Bill (*Anastmus*), a genus of Grallatorial or Wading Birds, belonging to the Heron family (*Ardeidæ*). Species occur in Africa and E. Indies. The bill is of a remarkable shape, its halves coming close together at the tip, but being separated by a wide interval in the middle.

Open Doors, Letters of. These are writs in Scotch law which are requisite when goods in lockfast places are to be *poinded* (see POINDING). They authorise the *messenger* (see MESSENGER-AT-ARMS) to break open the doors where the goods of the debtor are stowed.

Op'era, a musical entertainment of a dramatic kind. Rousseau has defined an O. as a musical, poetical, and spectacular work, but in modern operas the excellence of the music is the all-essential feature. Upon it, and not upon the interest of the drama, the skill of the libretto, or the art of the scene-painter, success depends. Few leading operas have words at all worthy of the music; hardly one shows extraordinary literary ability; and even in Richard Wagner's latest works, ostensibly produced as dramas primarily and as musical dramas subordinately, we are charmed by the music in a far higher degree than we are fascinated by the play. Thus the fine theory of a union of the highest form of musical, poetical, and scenic art can hardly be said to have been yet realised. Operas have been divided into many different classes, the principal being the Grand O. or O. Seria, which is of a grave and stately character; the Comic O. or O. Buffa, and the Romantic O., which holds an intermediate place between the Seria and the Buffa. In grand and romantic operas the portion of the dialogue not expressed in solos, duets, trios, concerted pieces, and choruses, takes the form of recitative. In the comic O. as well as in the German Singspiel, and in English Ballad O. it is spoken. An overture usually proceeds an O. and sometimes certain of the acts, which vary from two to five in number. For adequate representation a chorus of 60 or 80 voices, and a band of 50 or 60 performers, with occasionally a military band, is required.

The dramatic art of the Greeks had somewhat of an operatic character, their declamation being akin to our recitative. Modern O. had its birth in Italy, where dramas with music were produced so long ago as the 13th c. Sir John Hawkins ranks *Il Satiro* and *La Disperazione del Fileno* by Emilio del Cavaliere, two pastoral dramas produced in 1590, as the first real operas; but the honour of originator has been generally ascribed to Jacopo Peri, the introducer of recitative, who brought out *Dafne* privately in 1597, and *Euridice* publicly in 1600 with great approval. The first opera-house was built in Venice in 1637. The crude state of the orchestra and of musical art in the 17th and earlier part of the 18th c. has doomed to extinction the multitude of operas produced during that period in such cities as Naples, Rome, Venice, and Bologna; and the works of Monteverde, Cavalla, Porpora, and Pergolesi, &c., which obtained tumultuous applause at the time, are now never heard. Cimarosa's *Matrimonio Segretto* is the oldest work which keeps the stage. The brightest name among Italian operatic composers before the time of Rossini is that of Cherubini, whose *Medea* and *Deux Journées* are evergreen. Rossini threw new life into the Italian school, his works, *Tancredi, Semiramide, Il Barbiere di Siviglia, Guillaume Tell*, &c., being full of voluptuous airs, rich harmonies, force, fire, and originality. Bellini's operas are weaker, but the delicious melodies of *Norma* and *Sonnambula* have never ceased to charm. The prolific Donizetti had a graceful and flowing style; his *L'Elisir d'Amore* and *Don Pasquale* are admirable specimens of opera-buffa, while in the popular and more ambitious *Lucia di Lammermoor, Lucrezia Borgia*, and *La Favorita* there are many effective passages, though their composer wrote too much and too carelessly. The modern Italian school has again sunk to the level from which Rossini raised it; its recent productions are feeble and frivolous, and the orchestral accompaniments in particular weak and commonplace. Verdi is the only living Italian composer of much originality, and in his later works, such as *Don Carlos* and *Aida*, he has inclined towards the modern German school. His *Rigoletto, Trovatore*, and *Traviata* are immensely popular. He excels in passionate and declamatory writing.

If opera was born in Italy it was perfected in Germany. Glück's *Alcestis, Orpheus and Euridice*, and *Iphigenia in Aulis* were a great step in advance in scientific treatment and dramatic expression. Mozart attained the highest pinnacle which has yet been reached in lyrical composition, and his art is so perfect that while it charms the uneducated it delights the educated ear. *Don Giovanni, Nozze di Figaro*, and *Zauberflöte* are glorious products of constructive skill, profound knowledge, and splendid imagination. Beethoven's only opera, *Fidelio*, is worthy of its great composer, whose genius was, however, more symphonic than operatic. The operas of Weber are purely German in character, and the romantic *Der Freischütz, Oberon*, and *Euryanthe* are characterised by mingled strength and sweetness. The laboured works of Meyerbeer (who was as often Italian and French as German in style), *Robert le Diable, Les Huguenots*, and *Le Prophète* are masterpieces of musical learning and dramatic effect. He was content to accept the form of opera as it existed, and to depict passion and express sentiment through the media of arias, concerted pieces, and choruses. Richard Wagner has taken a wholly different ground. His theory (as expressed in his essays *Oper und das Drama*) is that music should be the handmaid and not the mistress of poetry. He has accordingly in his later works cast aside the aria and substituted the *melos* or 'endless melody'—continuous and appropriate declamation. After a long and uphill fight against prejudice, he has become the hero of the day in Germany, and his ideas are certain to have a great effect upon the future history of O. There is indeed just a danger that they may be carried too far, and that some of his less gifted successors may commit themselves to as great absurdities as any in the old school. It is still an open question whether Wagner's earlier and less wayward works—*Der Fliegende Holländer, Lohengrin, Tannhäuser*, &c., will not be valued by posterity more than his *Tristan und Isolde* and the *Nibelungen Trilogy*: and it is certain that the 'Music of the future' will never wholly supersede that of *Don Giovanni* and *Fidelio*.

Cardinal Mazarin introduced the Italian O. into France about the year 1645, and not long afterwards the national French O. was established, since which Court patronage and encouragement have been lavishly extended to the art in Paris. In this city many of the great masters' works have seen birth, and if Lully, Glück, Cherubini, Rossini, and Meyerbeer were foreigners, it cannot be denied that they drew some of their inspiration from France, and that they helped to mould the French school of writing, which combines the sentiment and mysticism of Germany with the gaiety and exuberance of Italy. France has produced many fine operatic composers from its own soil, especially during the present century. Auber's *Fra Diavolo* and *Masaniello*, Halévy's *La Juive*, Gounod's *Faust* and *Romeo and Juliet*, and Ambroise Thomas' *Mignon* and *Hamlet* are works of which any nation might be proud. Since the death of Auber, Gounod has been the most illustrious representative of music in France. The ballet has always been an important feature in French O.

Henry Purcell set many dramas (*The Indian Queen, King Arthur, Dido and Æneas*) to admirable music, but Handel was the father of Italian O., as of oratorio, in England. Not one of the 44 operas which this great composer wrote, many of which were produced in London (beginning with *Rinaldo* in 1711) is now performed, and the very names of most of them are forgotten. Buononcini's *Almahide* (1720) is said to have been the first O. sang entirely in Italian in London. The contemporary works of Dr. Arne (*Rosamond* and *Artaxerxes*) were equal to almost anything of their time. The taste for O., which was an aristocratic luxury a century ago, has now extended to all classes in England: in no other country is so much operatic talent gathered together at one time as in London during the season, and although no state support is given to music, the English capital is the only one which keeps two immense Italian O. Houses open at once. Here, however, English self-congratulation must end. English O. has never met with much encouragement, and a national school can scarcely be said to exist. Nor is there much hope for its institution in the future. A recent attempt to start a National O. House in the metropolis, at which during a portion of the year at least native works should be given in native dress, has ended in a lamentable fiasco. The most successful operatic composers England can boast of are Sir Henry Bishop, M. W. Balfe, and W. Vincent Wallace. Balfe's *Bohemian Girl* and *Rose of Castille*, and Wallace's *Maritana* and *Lurline* are among the few English works that have obtained any world-wide reputation. See *Memoirs of the Musical Drama* by George Hogarth (1851), and *History of the O.* by Sutherland Edwards (1862).

Opera-Bouffe, an exaggerated form of opera buffa, is a farcical comedy usually in three or more acts, enriched by numerous sprightly airs and rattling choruses, and frequently enlivened by dances. Eccentric situations, ridiculous characters,

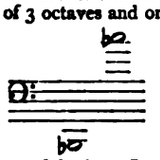
bizarre costumes, and burlesque subjects are features of such pieces, while the music is often of a mock-heroic style designed to caricature that of the regular opera. Offenbach may be said to have created this species of entertainment, which has become almost as popular in England and Germany as in France. His most successful imitators and rivals are Lecocq, Hervé, and Johann Strauss.

Opera-Glass (Fr. *lorgnette*, Ger. *theater-perspectiv*) is a small binocular telescope, which gives a clear, sharply defined, but not greatly magnified image. It is useful for looking at near objects, such as the performers at a theatre or opera—hence its name. The field-glass is similar in construction, but larger in dimensions, and is useful for viewing scenery and buildings. The principle of its construction is the same as that of the telescope invented by Galileo. There are two lenses, a convex object-lens and a concave eye-lens. The rays from the object after passing through the object-glass converge to a focus; but before they reach the focus they are intercepted by the eye-glass, which restores them to parallelism or renders them divergent. The image is thus erect, and the magnifying power increases with increase of focal distance of the object-glass, and with diminution of focal distance of the eye-piece. See TELESCOPE.

Oper'culum (Lat. 'a cover'), in *Botany* denotes the covering of the capsular theca of Mosses (q. v.), but the word, or its adj. *operculate*, is also used when speaking, for instance, of the lid of the pitcher of *Nepenthes*, or of seed-vessels of the *Henbane* and *Anagallis*, in which the upper part or O. is thrown off in order that the seeds may be discharged.—In *Zoology* the name is given to the gill-cover of fishes, and also to the horny or limy plate borne on the foot of *Gasteropodous* Mollusca, which is used to close the aperture of the shell when the animal has withdrawn into its abode. By the movements of the O. the gill-cavity is enlarged and contracted, and water is admitted and expelled in the act of breathing.

Ophiceph'alus, or **Ohpiocoeph'alus** ('snake-headed'), a peculiar genus of *Teleostean* fishes found in the fresh waters of India, and containing species which are able to leave their native waters for longer or shorter periods and to move about on the land. Of this genus the *O. gachua*, or *Cora-mota*, is a good example. It is essentially eel-like or snake-like in form, and is very tenacious of life. Its colour is brown, banded with darker colour, and its length is about 12 or 13 inches. The *O. barca* is another and larger species, of a violet hue spotted with black. Its average length is 3 feet. These fishes are allied to the mullets. Dr. Andrew Wilson, in his work entitled *Sketches of Animal Life and Habits* (Chambers, 1877), says (p. 131):—'It would appear, from some recent observations on these fishes, that they are enabled not only to live, like the climbing perch, out of water, but that they die if kept below the surface of the water even for a comparatively short time. Thus when an O. and a carp were placed together in a vessel of water, a net being placed about two inches from the surface, the carp swam, as might be expected, freely and continuously below the surface; whilst the O. made vigorous efforts to attain the surface, for the purpose of inhaling air directly from the atmosphere.' When not allowed to reach the surface, the ophiocephali die, suffocated, in periods varying from twenty minutes to two hours.

Ophicleï'de (Gr. *ophis* and *kleis*, 'a keyed serpent'), a brass wind-instrument of modern invention, of great compass and power, the largest of the trumpet species. It is similar in shape to the serpent, which it has almost superseded in the orchestra, and is fitted with keys. There are two kinds of ophicleides in use, each having a compass of 3 octaves and one note.



The above is the compass of the bass O. The range of the alto O., which is little used, is one octave higher. From the overpowering strength of the instrument it requires to be carefully dealt with by a composer.

Ophid'ia. See SERPENTS.

Ophiocō'ma. See OPHIUROIDEA.

Ophiogloss'eæ is, according to all but the most recent authors, a tribe or division of *Filices*, separated from the bulk of ferns by wanting the elastic ring girding the spore cases, and from the *Marattia* group by having a straight instead of a circinate vernation. Those who raise O. to a distinct and separate order, base their proposition on differences of the prothallus mode of development from the sporangia, and the stem never branching. There are three genera, two of which are represented in Britain. See ADDER'S TONGUE and BOTRYCHIUM.

Ophiomor'pha, Owen's name for a division or order of the class *Amphibia* (*Batrachia*), including the *Cæciliadæ* or 'blind worms' of tropical climates, which were long supposed to be reptiles like our common 'slow' or 'blind worms,' but which were clearly proved to be amphibia by the discovery that the young breathe by gills. The vertebræ are biconcave, and the skin contains small horny scales. The teeth are numerous. No limbs are developed. The adult breathes by lungs, one of which is smaller than its neighbour. Ribs are developed, but there is no breast-bone. The eyes are rudimentary or altogether absent. *Siphonops* is a familiar genus.

O'phir (Malay, *Gunong Pasaman*), a well-known volcanic mountain in Sumatra, and the highest summit in the island, is situated near the centre of the great range that skirts the W. coast, and almost under the equator. It splits into two peaks, the highest of which, Telaman, has an elevation of 9940 feet. The mountain, which is cultivated from base to peak, sends down many foaming streams, and opens in romantic far-reaching valleys.

O'phir was a seaport or region accessible by sea from Ezion-geber on the Red Sea, from which gold, almug-wood, and precious stones were brought by Tyrian and Hebrew sailors (1 Kings ix. 26–28, x. 11, xxii. 48). The above is all the information regarding it to be gathered from the Bible (1 Kings x. 22 does not necessarily apply to it); and its exact geographical position has been a subject of great doubt and discussion, having been placed by various authorities in Arabia, India, and Africa. It is evident from Gen. x. 29 that the writer understood O. to be in Arabia. Josephus says it was the golden Chersonesus, *i.e.*, the Malay Peninsula (*Ants.* viii. 6, 4). See Karl Ritter's *Erdkunde* (vol. xiv.).

Ophisau'rus, a genus of Lizards (q. v.), represented by the *O. ventralis*, or 'glass snake' of N. America. This creature is essentially snake-like in its form, no limbs being developed. It inhabits plantations in which the sweet potato grows, and derives its name of 'glass-snake' from the brittleness of its tail, this member becoming readily detached from the body owing to the peculiar conformation of the muscles. The O. attains a length varying from 2 to 3 feet. Its colour is black, green, and yellow above, and the belly is bright yellow; but it varies much. It is innocuous.

Ophisu'rus. See SNAKE-EEL.

O'phites (Gr. *ophitai*, 'serpent-worshippers'), a sect of the Gnostics, who are said to have regarded the Jehovah of the Old Testament as an enemy, and the serpent who tempted Eve with the promise of knowledge as a benefactor of mankind. No trustworthy information concerning their tenets exists. Though never numerous, they are believed to have lingered on till the 6th c.

Ophiu'ra. See OPHIUROIDEA.

Ophiuroï'dea, an order of *Echinodermata* (q. v.), including the 'brittle stars' (*Ophiocoma*), the 'sand-stars' (*Ophiura*), &c. In this group the body is discoid in shape and contains the viscera, whilst the arms are mere appendages, and are not (as in the *Asteroidea* or true starfishes) definite parts of the body containing portions of the viscera. The body is covered with scales and spicules, each arm being invested by four rows of plates. The mouth is inferior and central, and has tentacles and a dental apparatus. The stomach gives off no offshoots, and the reproductive organs exist near the bases of the arms. The *ambulacral system* is rudimentary. *Ophiura texturata*, the common sand-star, is a familiar example of the order; as also

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The dramatic ar operatic character citative. Moder with music v John Hawki by Emilio 1590, as been g tive, pub br

did imagination. Beetho stor-oil, should be applied. its great composer, wh a the anterior layers of the than operatic. The , or in the central layers, pro- character, and the formed, the object is to facilitate *anthe* are chara possible injury to the cornea, and the laboured wor d without delay. Ulceration of the French as d by cicatrisation, or by a protrusion and *Le P* sed by the pressure of the ocular muscles. tic effe various affections, the most important of exist v.). The structure next to the iris is the crys- m naturally of brilliant transparency, but which, ons of nutrition, may become more or less turbu- ue, constituting the various forms of *Cataract* (q. v.). e diseases which involve the deeper parts of the eye, important is *Glaucoma* (q. v.). A great number of mor- onditions, in the deeper parts of the eye, can be detected means of the Ophthalmoscope (q. v.).

Ophthal'moscope, The, is an optical instrument by means of which the deep-seated structures of the eye may be examined. Without such an instrument it is impossible to see the deeper chambers of the eye, as the rays of light can only return from an eye by the same track along which they enter it, and the head of an observer intercepts the entering rays, and throws what he wishes to see into darkness. The O. is a small mirror, with a central perforation, and it acts by reflecting the light of a lamp, which is placed at the side of and a little behind the head of the patient, into the eye under examination. The returning light comes back to the mirror, and some of it passes through the central perforation into the eye of the observer. There are two methods of using the O.—the direct and the indirect. In the *direct* method, the eye of the observer is brought close to that of the patient, the mirror only intervening, so that the deep structures within are seen in their natural positions, magnified by their own crystalline lens. If either the patient or the observer be near-sighted or the reverse, the defect must be corrected by a concave or a convex lens of proper strength. In the *indirect* method the observer places himself at some distance from the patient, and holds up near the eye of the latter, and in the track of the light, a strong convex lens, which produces between itself and the observer an inverted, aerial, illuminated image of the fundus of the eye looked at, the image and not the fundus itself being the object of vision. By placing another convex lens behind the mirror, the image may be magnified and rendered more distinct. The art of using the O. consists in keeping the eye of the observer in a line with that of the patient, in maintaining a steady illumination, and in finding the correct distance. The O. is essential in the diagnosis of diseases of the deep-seated parts of the eye.

O'pie, John, an English painter, was born at St. Agnes, near Truro, Cornwall, in May 1761. The son of a carpenter, he decorated the walls of his father's workshop and the boards he planed with likenesses of his friends and comic sketches. Dr. Wolcott took him to London in 1781, and in less than a year the 'Cornish Wonder' had painted the portraits of most of the nobility. His popularity vanished almost as speedily as it had risen; but O. was not in the least daunted, and started on a career of 'high art,' then much in vogue. He also began a systematic study of English literature by way of amending defective education, and pushed himself into the society of his social superiors in order to gain address, all the while bestowing the closest attention on the technique of his profession. On the resignation of Fuseli he was appointed Professor of Painting at the Royal Academy. He only delivered four lectures, which were published by his wife, with a memoir, in 1809. O. died April 9, 1807. Among his best historical paintings are 'The Death of David Rizzio,' 'Prince Arthur and Hubert,' 'Belisarius,' and 'The Murder of James I. of Scotland.'—**Amelia O.,** wife of the preceding, was the daughter of Dr. Alderson of Norwich, and was born there in 1769. In 1798 she married, and in 1801 produced a novel entitled *Father and Daughter*, gushingly sentimental, but with few signs of artistic skill. In 1802 appeared a volume of poems, many of them characterised by true and tender poetic beauty, and by which she is now better remembered than by her novels, *Adeline Mowbray* (1804); *Simple Tales* (1806); *Temper* (1812); *Tales of Real Life* (1813); *Valentine's Eve* (1816); *Tales of the Heart* (1818); *Madeline* (1822); *Illustrations of Lying in all its Branches* (1825). In 1825 Mrs.

…s, and nothing else proceeded from her …itled *Detraction Displayed*, *Lays for the* …azine papers. She died at Norwich, 2d …*moirs*, by Miss Brightwell (1854).

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…erm for the written …'aw, advocate) re… …. as laid before …cts is in Eng… framing this, …oncisely to state …n of counsel to the …se. Counsel incurs no …however erroneous it may

…cal German poet, born at Bunzlau, …, 1597, passed from the Gymnasia of …en to the Universities of Frankfurt and …d on the outbreak of the Thirty Years' War …al years in travel, visiting Leyden in 1620, acting as …sor of Philosophy at Weissenburg in Transylvania, in 1622, appearing in 1623 at Liegnitz and in 1625 at Vienna, where he was crowned with laurel by the Emperor Ferdinand II., it being the first time this honour had been awarded for German verses. Soon after this he became secretary to the Burggraf of Dohna, and was ennobled, though a Protestant, by Ferdinand II. as O. von Boberfield. In 1630 at Paris he made the acquaintance of Hugo Grotius (q. v.), and subsequently settling in Danzig was appointed Historiographer to Ladislaus IV., King of Poland. Here he died of the plague, 20th August 1639. Regarded alike by his contemporaries and the succeeding generation as the 'Father of German poetry,' O. exerted a great influence on German literature, and did much to fix the form of the German language. His most important work, *Buch von der Deutschen Poeterei* (1624), passed through nine editions before 1668. O. was the first to insist on the importance of both metre and rhythm, and this, added to his careful purity of language, made his rules of prosody to be observed long after his own verses had ceased to be examples. He has little elevation of thought or wealth of imagination; but his verses are tasteful, and his love of nature sincere. Among his works are *Zlatna oder von Ruhe des Gemüths* (1622); *Vesuv*, the first German descriptive poem; *Trostgedicht in Widerwärtigkeiten des Kriegs* (1632); his best work, *Judith*, a drama; translations of the *Antigone* of Sophocles, and of the Psalms, and an edition of the *Annolied*, a German poem of the 12th c. Complete editions of O.'s works were published at Breslau in 1690 and Frankfort in 1724, and a selection by Müller in his *Bibliothek Deutscher Dichter des 17 Jahrh.* (Leips. 1822 *et seq.*). Biographies of O. have been published by Strehlke (Leips. 1856); Weinhold (Kiel, 1862); and Palm (Breslau, 1862).

Opium (Lat., from the Gr. *opion*, 'poppy-juice'), is the concrete milky juice obtained from the capsules of a variety of the common poppy, *Papaver somniferum*. The drug is frequently mentioned by classical writers, and is specially described by Pliny, who also details its medicinal use. It appears to have been first prepared in Asia Minor, whence a knowledge of the drug and its manufacture gradually spread eastward; but there is no record of it as an Indian product before the beginning of the 16th c. At that time, however, it was not only manufactured in various parts of India, but also imported from Egypt, and it moreover formed an important article of trade with Cochin and other Eastern communities. It is supposed to have been carried to China by Arab traders as early as the 9th c.; but the trade thither from all parts continued to be of insignificant dimensions till the latter half of the 18th c., when the practice of opium-smoking began to take root among the Chinese populace, and was ministered to first by the Portuguese, and next by the British East India Company. The efforts of the Chinese to circumscribe the pernicious habit led to the prohibition of the import of O. in 1820, whereupon a regular smuggling trade was established by the East India Company with the connivance of Chinese officials. The complications which arose out of this state of matters culminated in the O. war and the treaty of 1842, under which the introduction of O. into the five ports opened to British commerce under the treaty was legalised. From that time the quantity of Indian O. imported into China has steadily increased, and the profit on the Government monopoly in the trade is now the principal source of Indian revenue. In the 15th c. O. was regarded in Western Europe as a valuable drug, and presents of it were frequently made by the potentates of Egypt to the Doges of Venice, with whom they had intimate commercial relations. At the present day O. is prepared on a commercial scale in Asia Minor, Egypt, Persia, East Indies, and in China.

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is the *O. alba*, or white sand-star. To this group also belong the genera *Euryale* and *Astrophyton*.

Ophthal'miae (Gr. *ophthalmos*, 'the eye'), or **Inflammatory Diseases of the Eyeball and Conjunctiva.** The various textures of the eye are subject to inflammation, and the variety of the disease receives its designation from the tissue specially affected. The conjunctiva, as the external covering of the eye, is peculiarly exposed to irritation from atmospheric dust, noxious vapours, and to the lodgment of foreign bodies upon its surface. Inflammation of the membrane or *conjunctivitis*, may be simple and catarrhal, or purulent. In *simple catarrhal* O. the membrane is congested and somewhat tumid, and the mucous secretion readily dries into crust upon the eyelashes and the margins of the lids; but the congestion is limited to the conjunctiva, and neither extends to the cornea, nor to the sclerotic vessels which surround the corneal margin. For this form of O. a solution of nitrate of silver, or of sulphate or chloride of zinc, of about two grains to the ounce of distilled water will prove efficacious. *Purulent* O. is described under three forms, viz., infantile, gonorrhœal, and epidemic. *Infantile purulent* O. commences at about the third day after birth, and is generally due to inoculation with the vaginal secretions of the mother. The inflammation rapidly gains in intensity, and in severe cases the swollen conjunctiva overlaps the corneal margin, producing the condition called *chemosis*. The treatment required is cleanliness. The lids being separated by the fingers, a stream of warm water from a sponge should be allowed to trickle between them until all the discharge is washed away, and after being wiped dry a few drops of nitrate of silver solution should be allowed to fall between them, and the margin of the lids should then be anointed with spermaceti ointment, or with almond oil. *Gonorrhœal* O. is much less amenable to treatment, the cornea being more apt to slough. The disease, which is highly contagious, is treated by a solution of nitrate of silver, of about a scruple to the ounce, or by a solid stick of a compound made by fusing one part of nitrate of silver with three parts of nitrate of potash, but the application requires great care. Sloughing of the cornea may terminate in collapse of the eyeball, or complete staphyloma, with loss of vision. The term *contagious* O. is used, almost exclusively, to denote an epidemic form of conjunctivitis extremely prevalent in Egypt, and said to have been introduced into Europe by the French army in the beginning of this century. When the disease appears in large communities living under insanitary conditions, as in large schools, and especially schools for pauper children, it spreads with great rapidity and is highly dangerous. The treatment of *epidemic* O. consists in perfect cleanliness, and the employment of metallic astringents such as the sulphate of copper, or the sulphate or chloride of zinc, or the nitrate of silver. In very severe cases Von Graefe recommends the application of liquor chlori, which also destroys the infective quality of the secretions, but its application requires the greatest care. All mild forms of O. bear metallic astringents from the beginning, and may be cured by them; but the more acute forms must be treated first by the local use of atrophine and hot fomentations. *Corneitis*, or inflammation of the cornea, may appear as a distinct disease, or as the result of conjunctivitis, and the forms of the disease are divided into the vascular, the interstitial, and the suppurative, each form being attended at the onset by hyperæmia of the conjunctiva. *Vascular* O. appears first by the development of two fine crescents of vessels, one at the superior and the other at the inferior margin of the cornea, which gradually push before them a belt of turbidity which may cover the whole of the pupil, and thus destroy vision. The object of treatment is to arrest the progress of the disease before it reaches the centre of the cornea, so that all irritants, such as those recommended in the former class of cases, must be avoided. The appropriate local application is a solution of atropine of two grains to the ounce, two or three times a day, and the movements of the eyelids over the affected surface should be restrained by means of a compress of carded cotton wool, retained by a bandage. In the early stages the closed lids may be bathed with cold or iced water. *Interstitial* O. occurs most frequently in young children, in connection with hereditary syphilis, and usually commences as a diffuse haziness near the centre of the cornea of one eye. The general treatment is that of a chronic syphilitic affection, and the local must be entirely of a soothing character. Atropine, in watery solution, or dissolved in castor-oil, should be applied. *Suppurative* O. may commence in the anterior layers of the membrane, producing an ulcer, or in the central layers, producing abscess. When pus is formed, the object is to facilitate its discharge with the least possible injury to the cornea, and the abscess should be opened without delay. Ulceration of the cornea may be followed by cicatrisation, or by a protrusion called *staphyloma*, caused by the pressure of the ocular muscles. The iris is liable to various affections, the most important of which is *Iritis* (q. v.). The structure next to the iris is the crystalline, which is naturally of brilliant transparency, but which, from perversions of nutrition, may become more or less turbulent or opaque, constituting the various forms of *Cataract* (q. v.). Among the diseases which involve the deeper parts of the eye, the most important is *Glaucoma* (q. v.). A great number of morbid conditions, in the deeper parts of the eye, can be detected by means of the Ophthalmoscope (q. v.).

Ophthal'moscope, The, is an optical instrument by means of which the deep-seated structures of the eye may be examined. Without such an instrument it is impossible to see the deeper chambers of the eye, as the rays of light can only return from an eye by the same track along which they enter it, and the head of an observer intercepts the entering rays, and throws what he wishes to see into darkness. The O. is a small mirror, with a central perforation, and it acts by reflecting the light of a lamp, which is placed at the side of and a little behind the head of the patient, into the eye under examination. The returning light comes back to the mirror, and some of it passes through the central perforation into the eye of the observer. There are two methods of using the O.—the direct and the indirect. In the *direct* method, the eye of the observer is brought close to that of the patient, the mirror only intervening, so that the deep structures within are seen in their natural positions, magnified by their own crystalline lens. If either the patient or the observer be near-sighted or the reverse, the defect must be corrected by a concave or a convex lens of proper strength. In the *indirect* method the observer places himself at some distance from the patient, and holds up near the eye of the latter, and in the track of the light, a strong convex lens, which produces between itself and the observer an inverted, aerial, illuminated image of the fundus of the eye looked at, the image and not the fundus itself being the object of vision. By placing another convex lens behind the mirror, the image may be magnified and rendered more distinct. The art of using the O. consists in keeping the eye of the observer in a line with that of the patient, in maintaining a steady illumination, and in finding the correct distance. The O. is essential in the diagnosis of diseases of the deep-seated parts of the eye.

O'pie, John, an English painter, was born at St. Agnes, near Truro, Cornwall, in May 1761. The son of a carpenter, he decorated the walls of his father's workshop and the boards he planed with likenesses of his friends and comic sketches. Dr. Wolcott took him to London in 1781, and in less than a year the 'Cornish Wonder' had painted the portraits of most of the nobility. His popularity vanished almost as speedily as it had risen; but O. was not in the least daunted, and started on a career of 'high art,' then much in vogue. He also began a systematic study of English literature by way of amending defective education, and pushed himself into the society of his social superiors in order to gain address, all the while bestowing the closest attention on the technique of his profession. On the resignation of Fuseli he was appointed Professor of Painting at the Royal Academy. He only delivered four lectures, which were published by his wife, with a memoir, in 1809. O. died April 9, 1807. Among his best historical paintings are 'The Death of David Rizzio,' 'Prince Arthur and Hubert,' 'Belisarius,' and 'The Murder of James I. of Scotland.'—**Amelia O.**, wife of the preceding, was the daughter of Dr. Alderson of Norwich, and was born there in 1769. In 1798 she married, and in 1801 produced a novel entitled *Father and Daughter*, quaintly sentimental, but with few signs of artistic skill. In 1802 appeared a volume of poems, many of them characterised by true and tender poetic beauty, and by which she is now better remembered than by her novels, *Adeline Mowbray* (1804); *Simple Tales* (1806); *Temper* (1812); *Tales of Real Life* (1813); *Valentine's Eve* (1816); *Tales of the Heart* (1818); *Madeline* (1822); *Illustrations of Lying in all its Branches* (1825). In 1825 Mrs.

O. became a Quakeress, and nothing else proceeded from her pen except a volume entitled *Detraction Displayed*, *Lays for the Dead* (1834), and a few magazine papers. She died at Norwich, 2d December 1853. See her *Memoirs*, by Miss Brightwell (1854).

Opin'ion, Oath of. In some cases mercantile men, or men of science, are required to swear to their opinion, not as regards a fact, but as regards their belief in mercantile custom, or in regard to the result of scientific research incapable of demonstration. In this case, to prove perjury, it must be proved that the deponent did not believe his own testimony.

Opinion of Counsel, is the technical term for the written statement of the view of a barrister (Scotch law, advocate) regarding the law applicable to the facts of a case, as laid before him in writing by a solicitor. This statement of facts is in England called 'a case,' in Scotland 'a memorial.' In framing this, it is the duty of the solicitor not only fully and concisely to state the facts of his case, but to direct the attention of counsel to the legal possibilities in connection with these. Counsel incurs no legal liability in giving his opinion, however erroneous it may be.

O'pitz, Martin, a classical German poet, born at Bunzlau, in Silesia, December 23, 1597, passed from the Gymnasia of Breslau and Beuthen to the Universities of Frankfurt and Heidelberg, and on the outbreak of the Thirty Years' War spent several years in travel, visiting Leyden in 1620, acting as Professor of Philosophy at Weissenburg in Transylvania, in 1622, appearing in 1623 at Liegnitz and in 1625 at Vienna, where he was crowned with laurel by the Emperor Ferdinand II., it being the first time this honour had been awarded for German verses. Soon after this he became secretary to the Burggraf of Dohna, and was ennobled, though a Protestant, by Ferdinand II. as O. von Boberfield. In 1630 at Paris he made the acquaintance of Hugo Grotius (q. v.), and subsequently settling in Danzig was appointed Historiographer to Ladislaus IV., King of Poland. Here he died of the plague, 20th August 1639. Regarded alike by his contemporaries and the succeeding generation as the 'Father of German poetry,' O. exerted a great influence on German literature, and did much to fix the form of the German language. His most important work, *Buch von der Deutschen Poeterei* (1624), passed through nine editions before 1668. O. was the first to insist on the importance of both metre and rhythm, and this, added to his careful purity of language, made his rules of prosody to be observed long after his own verses had ceased to be examples. He has little elevation of thought or wealth of imagination; but his verses are tasteful, and his love of nature sincere. Among his works are *Zlatna oder von Ruhe des Gemüths* (1622); *Vesuv*, the first German descriptive poem; *Trostgedicht in Widerwärtigkeiten des Kriegs* (1632); his best work, *Judith*, a drama; translations of the *Antigone* of Sophocles, and of the Psalms, and an edition of the *Annolied*, a German poem of the 12th c. Complete editions of O.'s works were published at Breslau in 1690 and Frankfort in 1724, and a selection by Müller in his *Bibliothek Deutscher Dichter des 17 Jahrh.* (Leips. 1822 *et seq.*). Biographies of O. have been published by Strehlke (Leips. 1856); Weinhold (Kiel, 1862); and Palm (Breslau, 1862).

O'pium (Lat., from the Gr. *opion*, 'poppy-juice'), is the concrete milky juice obtained from the capsules of a variety of the common poppy, *Papaver somniferum*. The drug is frequently mentioned by classical writers, and is specially described by Pliny, who also details its medicinal use. It appears to have been first prepared in Asia Minor, whence a knowledge of the drug and its manufacture gradually spread eastward; but there is no record of it as an Indian product before the beginning of the 16th c. At that time, however, it was not only manufactured in various parts of India, but also imported from Egypt, and it moreover formed an important article of trade with Cochin and other Eastern communities. It is supposed to have been carried to China by Arab traders as early as the 9th c.; but the trade thither from all parts continued to be of insignificant dimensions till the latter half of the 18th c., when the practice of opium-smoking began to take root among the Chinese populace, and was ministered to first by the Portuguese, and next by the British East India Company. The efforts of the Chinese to circumscribe the pernicious habit led to the prohibition of the import of O. in 1820, whereupon a regular smuggling trade was established by the East India Company with the connivance of Chinese officials. The complications which arose out of this state of matters culminated in the O. war and the treaty of 1842, under which the introduction of O. into the five ports opened to British commerce under the treaty was legalised. From that time the quantity of Indian O. imported into China has steadily increased, and the profit on the Government monopoly in the trade is now the principal source of Indian revenue. In the 15th c. O. was regarded in Western Europe as a valuable drug, and presents of it were frequently made by the potentates of Egypt to the Doges of Venice, with whom they had intimate commercial relations. At the present day O. is prepared on a commercial scale in Asia Minor, Egypt, Persia, East Indies, and in China.

O. as it comes into the market varies in appearance, shape, and chemical composition, owing to modifications in the method of preparation and to variations in the composition of the juice. The cultivation of O. in Asia Minor, whence the chief part of the supply of Western Europe for pharmaceutical purposes is drawn, extends over a wide area. The sowing of seed extends from November to March, and the plants are in flower from May till July. A short time after the petals have fallen away, and when the capsule has swollen to a diameter of about an inch and a half, the plant is in a condition to yield its juice. A careful incision is made with a knife round the capsule, the operator requiring to guard against allowing his instrument to pierce through it, as in that case the juice would run into the interior and be lost. The incisions are made generally in the afternoon, and next morning the juice which has exuded is collected by scraping with a knife. The pasty mass is kneaded into cakes of varying size, wrapped in poppy leaves, and exposed for some time to dry. In this still soft and pasty condition it is packed in baskets and forwarded to Smyrna or other ports of shipment, where it is examined and assorted into different qualities. In Bengal, where the cultivation has become an industry of great importance, and is conducted under official superintendence as a state monopoly, great care is exercised in the manufacture. The capsules at the proper stage of advancement are scored vertically by a rough three-pointed small instrument called a *nustchur*, and the scarification is repeated on different occasions, the juice being always collected in earthenware vessels the morning after the incision is made. In the bottom of these vessels there gathers a dark-coloured thick liquid called *pasewa*, which is drained off from the soft O. paste. The pasty lumps are laid aside to dry, and when ready are taken by the cultivator to the government factory, where they are made up into round cakes of uniform size and weight, covered externally with an envelope of poppy petals agglutinated with *lewa*—a composition consisting chiefly of *pasewa* and inferior O. The finished cakes are exposed several months on racks to dry, being during that time frequently turned and carefully examined to prevent moulding. They are then packed into cases of forty each, in which condition they are sent into the Chinese market. Each cake weighs about 4 lbs. 3½ oz., and contains about 3 lbs. 8 oz. of O. The price in the Chinese market varies, having in 1871–72 reached £139 per chest, upon which price the government profit was £90. Nearly the whole of the O. produced in India goes to China, or to settlements in which the Chinese inhabitants are numerous. The total amount exported from India in 1872 was 93,369 chests, valued at £13,365,228. This total was exceeded in 1875, when 94,746 chests were exported, but the value of which was only £11,956,972. In 1876 the exports were 88,350 chests, valued at £11,148,426, of which 46,768 chests went from Calcutta, and 41,582 chests from Bombay, the latter consisting of Malwa O. The O. entered at Chinese ports during 1875 amounted to 66,461 peculs (133⅓ lbs. = 1 pecul), a quantity only exceeded in 1874, when 67,468 peculs were imported. O. cultivation is prohibited in China, notwithstanding which it is becoming increasingly an object of attention in many parts, especially Szechuen, Newchang, Tientsin, Chefoo, and Hankow, and its shipment from one port to another has become a considerable item. The amount imported into Great Britain during 1876 was 400,303 lbs., of a value of £394,034, the greater part of which was derived from Turkey. The use of O. in some civilized countries is largely increasing. According to the *New York Times* (January 1878) over 6,125,000 grains are daily used as a narcotic drug in the United States.

Chemical and Medicinal Properties of O.—O. has a peculiar narcotic odour, and an astringent bitter taste. It is an exceedingly complex substance, containing, in addition to mucilaginous and gummy bodies, various acid constituents; and no less than sixteen distinct alkaloids, besides numerous derivatives of these, have been obtained from it. The natural alkaloids are hydrocotarnine, morphine, pseudomorphine, codeine, thebaine, protopine, laudanine, codamine, papaverine, rhœadine, meconidine, cryptopine, laudanosine, narcotine, lanthopine, and narceine. Of these the only two isolated for commercial purposes are the morphine and codeine, but it is chiefly on account of its richness in morphine that the commercial value of O. is based. The proportion of that constituent is found to vary enormously in different varieties of O., being generally very high in Turkish and lowest in E. Indian kinds. As much as 21·46 per cent. of morphine has been found in Turkish O., and good qualities should yield from 12 to 15 per cent., Benares O. giving only from 2·2 to 3·2 per cent., and other Indian varieties ranging from 3 up to about 8 per cent. Codeine is found only in the minute proportions of from 0·2 to 0·4 per cent. Narcotine is an abundant constituent of some varieties of O., reaching to even 10 per cent., and E. Indian O. always contains more narcotine than morphine.

The valuable stimulant, sedative, and narcotic properties of O. are universally recognised, so that it is justly esteemed the most important of all medicinal substances. It is principally employed in the form of a tincture under the name of laudanum, but it enters into the preparation of numerous patent and other medicines. Both for internal use and subcutaneous injection the hydrochlorate of morphine, being a definite chemical compound, is preferable to preparations of O., the strength of which is subject to great variation. O. is a substance, like most other narcotics, liable to peculiarly disastrous abuse, and it has been well said that it has been the source by its judicious employment of more happiness, and by its abuse of more misery, than any other drug employed by mankind.

The two forms under which the vice of habitual use of O. is practised consist in *O.-eating* and *O.-smoking*, to the first of which may be added morphia eating. The effects of habitual O.-eating have been brilliantly described by Thomas De Quincey, and its influence on the Turkish and Persian populations, where it is a prevailing vice, have been minutely described. A withered body, yellow countenance, crooked spine, radical disturbance of the digestive organs, and gradual destruction of all bodily and mental powers, constitute the penalty of habitual indulgence in a vice which, once acquired, holds its victim with peculiar tenacity. O.-smoking is the form which the indulgence takes among the Chinese, and while it is equally alluring it is only in a less degree disastrous. The form in which O. is smoked consists of an aqueous extract called by the Chinese *chandoo*. A pellet of this extract, about the size of a pea, is placed in the bowl of the small O. pipe and consumed at a single whiff. While the habitual use of O. in either way is so detrimental, it at first produces a pleasurable feeling of exhilaration, increased muscular power, and superiority to either mental or bodily fatigue, but it is followed by a corresponding feeling of depression when the influence of the drug has passed away.

In the case of poisoning with O., it is of the first importance to have recourse to the use of the stomach-pump, or other means of emptying the stomach, such as tickling the throat with the fingers or with a feather dipped in oil, or by means of the usual emetics. A marked antagonism between O. and theine, and less distinctly the Calabar bean has been established, and infusion of galls is recommended as a chemical antidote. The sufferer should be kept in active motion, and muscular and nervous vitality sustained by such stimuli as cold water, irritant applications like mustard, the use of strong coffee, ammonia, camphor, &c. Vegetable acids, as vinegar, lime juice, and tartaric acid are administered with great advantage only after the stomach has been emptied, and in the last extremity artificial respiration has been resorted to with success.

Opobal'samum. See BALSAM and GUM.

Opodel'doc, or Soap Lin'iment, is prepared by digesting at a temperature not exceeding 70° F. for seven days, 2½ oz. of hard soap, 1½ oz. camphor, 3 drms. oil of rosemary, 18 oz. rectified spirit, and 2 oz. distilled water. O. is contained in *Linimentum opii*, and is much used as an embrocation. *Arnica* O. is prepared by dissolving by heat, and straining 4 parts of white soap, 10 of rectified spirit, 5 of tincture of arnica, and 1 of camphor. *Steer's* O. is similarly prepared, substituting spirit of rosemary for tincture of arnica.

Opop'onax, a gum resin obtained by puncturing the roots of *Pastinaca opoponax*, a species of parsnip which grows throughout Southern Europe. O. was much employed by Hippocrates, Theophrastus, Dioscorides, and the ancient physicians, as an antispasmodic, but it is now seldom used in medicine.

Opor'to ('the harbour'), next to Lisbon, the most important harbour and commercial city of Portugal, in the province of Entre Douro e Minho, 195 miles N.N.E. from Lisbon on the right bank of the Douro, about 2½ miles from its mouth. The harbour is defended by the fort São João da Foz, and has a bar of sandbanks, the position of which has been considerably altered of late years by certain works at the mouth of the river, completed in 1872. O. lies on two high hills steep towards the Douro, and is connected with Villanova on the opposite side of the river by a fine iron bridge. The town extends for 2½ miles along the river, and presents with its lofty towers, monasteries, and gardens an imposing spectacle. Remains of its old Moorish walls still exist. It is very irregularly built, with steep and narrow streets, which are, however, well built, and have many houses ornamented with balconies of very various styles of architecture. Of its fifty-two principal streets and eleven squares the chief are Rua Nova dos Inglezes, the broadest and most frequented street; Rua Nova de San João, the most regular; and Rua das Flores, the seat of jewellers and goldsmiths; the Praça de San Ovidio, on the heights, with fine buildings, and terraces planted with flowers, having a grand outlook to the sea, is the largest square. Others are the Praça Corduaria, in the neighbourhood of the famous Passeo das Virtudes, a terrace planted with lindens; Praça de San Lázaro, with fine gardens and fountains, extending from a narrow street of the Passeo das Fountainhas along the river and overhanging it with steep rocks; Largo da Torre da Marva, underneath the hills, on the site of the ancient Cale, which (Porto Cale) gave its name to Portugal. On the high cliffs of the S. bank stands Da Serra, which was one of the richest of the monasteries, while the finest is the former Benedictine monastery of San Bento, now converted into barracks, and the oldest that of San Francisco, now the exchange. O. formerly had eighty monasteries and chapels. The cathedral stands near the bishop's palace, which, in the middle of the town and on its highest part, is one of the most imposing buildings. Near it is the old Gothic Cedofeita, the oldest church, founded 559 by the Visigothic King Theodomir. The Torre dos Clerigos ('tower of the clergy'), the highest tower in Portugal, was founded in 1748. Among the four hospitals, the largest is the excellently regulated De la Misericordia. The English factory, with a library, reading-room, and ball-room, is one of the largest buildings. O. possesses several good secondary schools, an opera-house and theatre, club-houses, an arsenal, and a house of correction. Several newspapers appear daily. The industries, employing upwards of 6000 people, are the most important in Portugal, and include linen, silk, wool, and cotton weaving, silk and cotton hosiery, gold brocade, lace, and button making, cutlery, earthenware, furniture, glue, glass, paper, hat and sail manufactures. In 1872 there entered O. 236 British vessels of 167,593 tons, and cleared 237 of 67,345 tons. In 1874 O. exported 6,628,820 imp. gallons of wine, chiefly red wine, known in England as Port Wine (q. v.), of which $\frac{1}{11}$ths came to England. In 1877 the quantity exported to the United Kingdom was 7,721,028 gallons, being the largest quantity exported since 1801.—O. was occasionally the residence of the ancient kings of Portugal, was taken by the French in 1808, and retaken by Wellington in 1809. It was in 1831–33 the scene of the contest for the throne of Portugal between Don Pedro, the ex-emperor of Brazil, and Don Miguel. The *Almanach de Gotha* for 1878 gives the pop. of O. at 89,194.

Oposs'um, the name given to various species of Marsupials allied to the Kangaroos, &c., and which represent the only Marsupialia outside the Australian province, the O. being found in N. and S. America. It probably belonged originally to S. America, and has extended its distribution northwards. It forms the family *Didelphidæ*, in which the great toe is nailless, and can be brought into opposition to the tips of the other digits,

so as to convert the foot into a kind of 'hand.' The 'pouch,' or *marsupium*, is imperfectly developed in many opossums, and may be represented merely by folds of the abdomen, within which the nipples are concealed. Marsupial bones are, however, invariably present. The young of those opossums in which the pouch is unrepresented attach themselves (as in *Didelphys dorsigera*) to the mother by twining their tails round that of their parent. The O. has 10 upper and 8 lower incisors. Each jaw has, in addition, 2 canines, 6 premolars, and 8 molars, making a total of 50 teeth in all. The animal is carnivorous, and feeds on small quadrupeds, birds, and even crabs, but it is fond of fruits in addition. It is cunning, simulating death when caught, and the expression 'playing 'possum' has become proverbial in N. America, where O.-hunting is greatly relished as a sport. The skin is highly valued, and largely imported into Britain. The Common or Virginian O. (*D. Virginiania*) was the first marsupial known to science. It is found in N. America, attains a length of 3 feet inclusive of the tail, and is of a greyish-white hue, tinted with brown. The tail is prehensile and scaly. This animal is very destructive in poultry-yards. The crab-eating O. (*D. cancrivora*) measures 30 inches in length. Its colour is a dark brown marked with lighter hues, and its tail is singularly prehensile. This O. occurs in tropical America, and subsists on the crustaceans it obtains in the rivers and on the coasts. The Yapock (*Cheironectes Yapock*) has webbed hind feet, and attains a length of 2 feet. It is aquatic in its habits, and feeds largely on fish. The Yapock is a comparatively rare animal. Its colour is a pale grey variegated with four black bands running across the body.



Opossum.

Opp'eln, a town in the province of Silesia, Prussia, on the right bank of the Oder, 50 miles S.E. of Breslau by rail. It contains a castle, five churches, a synagogue, and a theatre. Tobacco, wadding, and cement are extensively manufactured, and there is a large trade in the transit of timber, &c. Pop. (1875) 12,489, of whom four-fifths were Roman Catholic.

Opp'enheim, a town in the province of Rhein-Hessen, Germany, on the left bank of the Rhine, 10 miles S.S.E. of Mainz, and a station on the Mainz-Worms Railway. It is surrounded by vine-clad hills, and contains the old *Katharinenkirche* (13th c.), a fine Gothic pile of red stone. The eastern half was restored in 1838–43. Near it is the ruined castle of Landskron, built in the 11th c., and destroyed by the French in 1689. The inhabitants are chiefly engaged in the cultivation of the grape. O., which stands upon the site of the Roman castellum *Bauconia*, was an important town during the Middle Ages, but suffered severely in the Thirty Years' War, and was laid waste in 1689 by the French. Pop. (1871) 3085.

Op'tical Illu'sions. The phenomena of O. I. may be referred to the insensibility of the eye to direct impressions of faint light, or to disorder in the nervous optic apparatus, or in that part of the brain with which it is connected. Sir David Brewster explains that when the eye is steadily directed to objects illuminated by a feeble gleam of light, it is thrown into a state nearly as painful as that produced by an excess of light. A remission takes places in the conveyance of the impressions; the object actually disappears, and the eye is agitated by the recurrence of impressions too feeble for the performance of its functions. 'These facts,' he says, 'may serve to explain some of those phenomena of the disappearance and reappearance of objects, and of the change of shape of inanimate objects which have been ascribed by the vulgar to supernatural causes, and by philosophers to the activity of the imagination. If, in a dark night for example, we unexpectedly gain a glimpse of any object, either in motion or at rest, we are naturally anxious to ascertain what it is, and our curiosity calls forth all our powers of vision. This anxiety, however, serves only to baffle us in our attempts. Excited by a feeble illumination of the object, the retina is not capable of affording a permanent vision of the object, and while we are straining our eyes to discover its nature, it will entirely disappear, and afterwards reappear and vanish alternately.' O. I. may occur in cases where the light is sufficient and the state of the general health is unimpaired, and the origin of such impressions may be referred to the renewal of actual impressions formerly made on the sensorium. In certain diseased conditions of the brain, and in cerebral disturbance depending upon fevers, delirium tremens, or *mania à potu*, O. I. are common. In all such cases a morbid sensation is experienced, and the sensation is referred to an adequate exciting cause, the sensation being identical with that experienced when an external cause really exists.

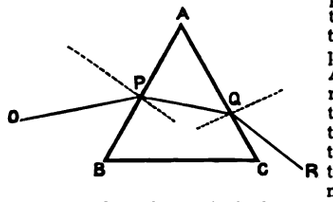
Op'tic Nerve, Diseases of. The optic nerve may become swollen and prominent in some forms of intercranial disease, as in intercranial tumours, this condition being sometimes called *optic neuritis*. It may be entirely confined to the connective-tissue which unites the fibres, and may lead to atrophy of the nerve and Amaurosis (q. v.). Injury to the head may cause extravasation of blood in the sheath of the optic nerve, or absolute laceration of the nerve.

Op'tics is the science which treats of the phenomena of light and the laws which regulate these phenomena. The nature and properties of light, considered as a branch of physics, constitute what is known as *physical O.*, and are discussed under such headings as DIFFRACTION, INTERFERENCE, LIGHT, POLARISATION, REFLECTION, REFRACTION, UNDULATORY THEORY, &c. Here we shall limit ourselves to *geometrical O.*, which establishes theorems purely mathematical, but based upon the primary facts of the science. These are, that light travels in straight lines through a homogeneous medium; that when it suffers reflection at a given surface, the reflected and incident rays make equal angles with the normal at the point of incidence but on opposite sides of it; and that, when passing through a given surface from a rarer to a denser medium, the ray is refracted or bent inwards nearer the normal. In all such cases, the sine of the angle which the incident ray makes with the normal bears to the sine of the corresponding angle of the refracted ray a ratio which is constant for the same two media. When the first medium is the physical *vacuum*, this ratio is termed the refractive index of the other medium, air, water, glass, or whatever it may be.

If the reflecting surface is plane, incident rays, parallel, convergent, or divergent, will continue parallel, convergent, or divergent respectively after reflection; and similarly after successive reflections from a number of planes. If a plane mirror, from which an incident ray is reflected, be rotated round the axis in it which is perpendicular to the incident ray, the reflected ray will rotate also, but at twice the rate at which the mirror rotates. A ray is reflected from a curved surface exactly as it would be reflected from the tangent plane at the point of incidence. From consideration then of the tangent plane we can determine the direction of the reflected ray. In passing from any one point of the surface to another and contiguous one, the tangent plane suffers rotation through a definite angle round a definite instantaneous axis; and hence if two parallel rays are reflected at these contiguous points, the angle made by the reflected rays with one another is double the angle through which the tangent plane has been rotated in passing from the one point to the other. Hence these reflected rays, or the direction of these reflected rays, if produced, in general intersect. When the reflecting surface is concave, the contiguous reflected rays themselves intersect, and as we pass along any line on the surface, say the line of intersection by a given plane, the reflected rays by their ultimate intersections form a plane curve. By varying the plane of section an indefinite number of such curves results, and these all lie upon a surface known as the *caustic*, to which every reflected ray is a tangent. For the case of parallel rays reflected from the inner surface of a spherical segment, the caustic is similar in form to the surface of an apple round the point where the stalk is. The apex of the small conical depression lies upon that ray which passes through the centre of the sphere; and the reflections of all rays near to this one pass very close to the apex, which consequently appears to be much brighter than any other portion of the surface. This point is known as the principal focus, and is practically the point at which the reflected rays condense, since ordinarily a spherical reflector is but a small segment compared to the radius of the sphere of which it is a part. The focus in such a case bisects the distance between the reflector and the centre of the related sphere. If the incident rays diverge from a luminous point in the axis of the reflector, the focus is formed at a distance from the reflector greater than in the case of parallel rays. When the luminous point is at the

centre, the caustic shrinks, so to speak, into the same point—source and focus coincide. As the source is carried nearer and nearer, the focus is thrown further and further, until when it reaches the *principal focus* the reflected rays are parallel. If the luminous source is carried still nearer, the reflected rays become divergent and there is no caustic and therefore no focus. If convergent rays are thrown upon the spherical surface, the result is evidently the formation of a caustic nearer the reflector than the caustic for parallel rays. Every different form of reflector has a different form of caustic. The caustic for parallel rays falling upon a paraboloid of revolution is reduced to a single point, which is the geometrical focus of the surface. For an ellipsoid of revolution, rays diverging from its one geometrical focus meet after reflection in the other focus—the caustic being again reduced to a point.

Refracted rays give rise to caustics exactly as reflected rays do. Before touching upon these, however, it will be advisable to consider the refraction of a single ray. If there are two media, M and N, whose refractive indices, as defined above, are respectively m and n; then, in passing from M the rarer into N the denser medium, the ray is bent in towards the normal at the point of incidence, and the sine of the angle of incidence bears to the sign of the angle of refraction the ratio $m : n$. In passing *through* a medium bounded by parallel surfaces, the ray suffers refraction twice; but the second refraction just undoes what the first refraction did, and the ray proceeds in a direction parallel but not generally coincident with its original direction. Should the bounding surfaces not be parallel, the ultimate direction of the twice refracted ray necessarily differs from the original direction. To study the phenomenon more closely, consider the path of the ray OPQR through the prism whose transverse section is represented by the triangle ABC. The dotted lines represent the normals at the points P, Q, where the ray enters and leaves the prism. In passing through P, the ray is bent nearer the normal; and in passing through Q, it is bent further from the normal. Accordingly, in passing through a prism of greater density than the surrounding medium, a ray of light is refracted away from the line of intersection of the sides—represented by A in the figure. The refraction of a ray at a curved surface separating two media, is determined by the tangent plane at the point of incidence. Parallel rays falling upon the convex surface of a denser medium are refracted so as to form by their ultimate intersections a caustic. If the denser medium is bounded by two such surfaces, the rays are still more refracted from their original direction upon emergence. This is exactly the case of a double convex lens (see LENS), which, it is well known, converges rays originally parallel which have passed through it. The reason of this is at once apparent if tangent planes are drawn at the points of immergence and emergence, for the ray of light is refracted through the lens exactly as it would be through a triangular prism having these planes for sides. Considered in the same way, a concave lens must of necessity render originally parallel rays divergent. The bounding surfaces of lenses are ordinarily plane or spherical, one at least being always curved. For greater generality, we shall regard them as being doubly concave or convex—the radii of the two spherical surfaces being r and s. The principal focus of the convex lens is the point at which the rays, which pass through the lens near and parallel to its axis, converge. It is the brightest point of the caustic, and is indeed the same *kind* of geometrical point which forms the principal focus of a reflecting spherical surface. The concave lens has no real focus, but it has an apparent focus—the point namely from which the divergent refracted rays appear to diverge. The distance of the focus from the lens is given in both cases by the formula (where f is the focal distance and μ the refractive index)



$$f^{-1} = (\mu - 1)(r^{-1} + s^{-1}).$$

Rays which diverge from a point distant u from the lens are refracted so as to converge to or apparently diverge from a focus not coincident with the principal focus. Calling the distance of this particular focus v, the formula connecting the different quantities becomes

$$u^{-1} + v^{-1} = (\mu - 1)(r^{-1} + s^{-1}).$$

This is reduced to the first formula when $u = \infty$, or $u^{-1} = 0$. When the lens is plano-convex or plano-concave, the above formulæ are made applicable by putting $s = \infty$, or $s^{-1} = 0$. The combination of lenses for optical purposes is studied under MICROSCOPE and TELESCOPE. See also REFLECTION, REFRACTION, SPECTRUM ANALYSIS, &c.

Op'timism (from Lat. *optimum*, 'what is best') is that philosophical doctrine which affirms the world to be the best of all possible worlds, because God himself is absolutely perfect. The theory is as old as philosophy, but in its modern form, as embodied by Leibniz in his *Théodicée*, it differs from that of Plato and other ancients in considering the mind as a spiritual machine predetermined in all its actions. In all former ages the perfection of Deity stood side by side with the freedom of man. The arguments for and against O. are now perceived to be as baseless as those of the scholastic philosophy, and no longer interest mankind. See *Pessimism: a History and a Criticism*, by Jas. Sully (Lond. 1877).

Opun'tia. See PRICKLY PEAR.

Op'us Operan'tis (Lat. 'the act of the performer') and **Opus Operatum** (Lat. 'the thing done') are two phrases which began to be used in the Middle Ages to express the way in which the sacraments of the Church were to be regarded. Thomas Aquinas and others of the Schoolmen taught that in consequence of the death of Christ, the Sacraments of the New Testament have an instrumental and effectual virtue which those of the Old Testament had not. The latter were effectual only by the faith and piety of the recipient ('ex opere operantis'); the former in virtue of their inherent character as an ordinance of Christ appointed for our salvation ('ex opere operato a Christo,' from what was done by Christ). The error of the Schoolmen, of denying altogether the *O. O.*, was condemned by the Augsburg Confession (1531), and their phraseology was modified in the decrees of Trent. The doctrine of the Church of Rome as expressed in the decrees of that Council and expounded by her ablest writers (*e.g.*, Bellarmin), is as follows:—There is an inherent, supernatural virtue in the sacraments (*ex opere operato*); but willingness, faith, and penitence are also necessary in the recipients, not to the efficacy of the sacraments themselves, but because the want of faith would be an obstacle to the efficacy of the sacrament being exercised. The Reformed Churches hold the *opus operatum* to be nothing, and the *opus operantis* to be everything (*cf.* Westminster Confession and Catechism). The Lutherans agree with Roman Catholics in holding that there is a certain supernatural virtue in the sacraments; they differ from them in insisting on the presence of a different kind or degree of faith in the recipient. See Hodge's *Syst. Theol.* (Edin. 1873).

Or. See METALS, in Heraldry.

Orache, a word of doubtful derivation that was early applied to one of the species of *Atriplex*, and has now become attached to the genus. There are about 60 species in all, consisting of herbs or shrubs, with mealy or scaly stems and leaves and inconspicuous unisexual flowers. Many are weeds of cultivated and waste ground, others are peculiar to sea-shores, and like *Chenopodiaceæ* in general they are in a botanical sense 'critical' plants. Of the seven species inhabiting Britain there is no occasion to remark. The garden O. or mountain spinach or French spinach (above referred to) is *A. hortensis*, a native of Turkey. It is a hardy annual about 3 feet high, with large hastate leaves varying from light green to red, which are used as a substitute for spinach. In France it is cultivated under the name *arroche*. Though introduced into England as far back as 1548, it is not much grown.

Or'acles (Lat. *oraculum*, from *os*, 'a mouth;' Gr. *manteion* and *chrēstērion*), among the ancients signified, first, the responses given by the gods to such as came to consult them, whether concerning the future or in a case of moral difficulty; and, secondly, the places where these responses were delivered. The gods were believed to manifest their will in different ways—through a human medium, or by signs, such as the rustling of the oak-groves of Dodona, which were then interpreted by appointed priests. Zeus, though the primary source of all oracular revelations, was so far exalted above petty cares as to require Apollo and other lesser divinities, or even heroes, to interpose between himself and mankind. Hence there were only three O. directly consecrated to him, at Dodona (q. v.), Olympia, and

in the Libyan oasis of Sivah, against Apollo's twenty-three O. of Delphi (q. v.), Abæ, Ismenion, &c. Other famous Greek O. were those of Demeter at Patræ, of Hermes at Pharæ, Trophonius at Lebadeia, and Æsculapius at Epidaurus. The Romans resorted chiefly to Divination (q. v.), and in Italy we only meet with two O. of Faunus, one of Mars, and a few of Fortuna. The oracular responses were often enigmatical and ambiguous (Herod. i. 53, 62, 67); often based on a calculation of probabilities (Herod. i. 174; iv. 154); occasionally extorted by outer political influences (Herod. v. 63). Many again, recorded by the classic authors, were undoubtedly *ex post facto* predictions, *e.g.*, those relating to Crœsus and Leonidas. See Götte, *Das Delphische Orakel in seinem Politischen, Religiösen und Sittlichen Einfluss auf die Alte Welt* (Leips. 1839).

Oran' (Arab. *Waran*), a fortified seaport and capital of a province of the same name, in Algeria, is situated at the foot of a high mountain, 220 miles W. by S. of Algiers by rail. It is defended by several forts, and has many fine modern French buildings and boulevards. The harbour, Mers-el-Keber, has been greatly improved since 1864. There are extensive exports of esparto grass, feathers, tobacco, gums, &c., and imports of French cottons and hardware. In 1877 the esparto grass and other vegetable fibres exported to Great Britain for paper manufacture amounted to 40,000 tons. Pop. (1872) 40,674. Built on the site of the Roman *Unica Colonia* by the Moors, O. was taken by the Spaniards in 1509, by the Turks in 1708, and again in 1732 by the Spaniards. It fell to the French in 1831.—The *province* lies on the W. frontier of Algeria, and is partly included in the Tell, producing in considerable quantity wheat, maize, cotton, wine, tobacco, &c. Area, 33,246 sq. miles. Pop. (1875) 540,564, of whom 436,931 are Mohammedans, and only 41,191 French. The province is divided into the communes of O., Mostaganem, Mascara, and Sidi-bel-Abbés.

Orang' (*Pithecus* or *Simia Satyrus*) or 'Mias,' one of the four kinds of *Anthropoid* or man-like apes. It inhabits Borneo and Sumatra, and attains a height of from 4 to 4½ feet. The arms are very long, and measure in their outstretched span nearly twice the length of the animal. The arm and forearm are nearly equal in length, and the foot is very narrow and longer than the hand. The sole of the foot in the O. cannot be placed flat on the ground, the animal resting on the outer side of the foot when standing erect. The latter posture is not the natural position of the O., and is less easily assumed by it than by other apes. Both the thumb and the toe are short, and the great toe frequently wants the nail. The animal has twelve pairs of ribs; and the vertebræ of the back and loins (*dorso-lumbar vertebræ*) form a curve, which, as Huxley remarks, 'is nearly as much concave forwards as in a new-born child.' The brow-ridges in the O. are not markedly developed, and the jaws are largest in proportion to the cranium in the O. and gorilla. The bones of the nose are flat, and the hyoid or tongue-bone and the shoulder-blade are very like that of man. The female O. is smaller than the male. The volume of the brain in the O. is shaped at 26 or 27 cubic inches; about half the minimum size of the normal human brain (Huxley). The O. of all the apes 'come nearest to man in the number of the ribs, the form of the cerebral hemispheres, the diminution of the occipito-temporal sulcus of the brain, and the ossified styloid process; but it differs from him much more widely in other respects, and especially in the limbs, than the gorilla and chimpanzee do.' It is notable that in the young O. the head bears a remarkable likeness to that of the human infant; the subsequent lengthening of the face, and protrusion of the muzzle, however, completely altering and destroying this likeness. The O. spends its life almost exclusively on trees. Its hair is coarse, and of a reddish chestnut colour. It is long on the breast, face, and back. Although more than one species of O. is alleged to exist, the differences are probably merely *varietal* and not specific. When captured young, the O. may be readily domesticated, but even then does not lose all its natural ferocity.



Orang-Outang.

Orange is the well-known, delicious, and wholesome fruit of a species of *Citrus* (q. v.) to which Linnæus gave the name of *C. Aurantium*. Some botanists hold it, the citron, the lemon, the lime, and the shaddock to be all the offspring of one species, while others divide it into three or more. We shall here consider it as a species consisting of four sub-species. (1) The *Bitter* or *Seville O.*, marked by the petiole being generally winged, large and strongly scented flowers, a very aromatic rind, and a pulp bitter or austere. No O. is mentioned by Greek or Roman authors. The first notice is in Arab books of the 10th c., and it is highly probable that the fruit was brought from India to Arabia, Syria, and Egypt about the 9th c., and that by Arab conquest westward, the Crusaders, and Mediterranean trade it was distributed in S. Europe. It was extensively cultivated in Sicily and Spain in the 12th c. It is now grown in large orchards in Spain, &c., principally for the flowers, from which the essential oil of O. is distilled. The rind is used for candied O.-peel, and makes the best marmalade. (2) *Sweet* or *Common O.* has the leaf petiole naked or winged, sweet pulp, sometimes red, and a more or less adhesive rind. It was introduced into Europe at a much later date than the above; and it cannot yet be considered finally decided whether it came by way of Syria—which, however, seems probable—or whether the Portuguese imported it by sea from India or China. So much is certain, that on landing in India the Portuguese found it in abundance, a fact specially noted in the account of Vasco di Gama's voyage. At the present time it is grown all through the Mediterranean region, and is largely exported from Portugal, Spain, the Balearic Islands, Sardinia, Sicily, the Azores, &c. It is also cultivated to a large extent in the W. Indies, and within recent years has been exported from Florida and California. Two varieties of this deserving note are the St. Michael's O., with thin yellow rind and very sweet seedless pulp, and the blood or Malta O., with rough, round, reddish fruit, and pulp streaked with crimson. (3) *Mandarin O.*, a recent introduction from China. In this the fruit is small and flattened, and when ripe the thin skin readily separates from the delicious pulp. It is now grown in Malta, the Levant, and the Azores. (4) *Bermagot O.*, the flowers of which are small and very sweet-scented, the fruit globose or pear-shaped, the smooth rind pale yellow, with a pleasant-smelling acidulous pulp. Oil is obtained from the rind and flowers. The scientific names for the above-described four forms are *C. Bigaradia*, *C. Aurantium*, *C. nobilis*, and *C. Bergamia*. An orchard of O.-trees, with their rich glossy-green leaves and masses of golden fruit, is a very beautiful sight; and it is only when the fruit is plucked ripe from the tree that it can be perfectly enjoyed. Those exported are always gathered in an unripe state, to mature on the voyage. When grown near the coast, as in the Azores, a protection of high walls and belts of trees is required against the hurricane blasts that sweep up from the ocean. In Portugal, however, instead of high protection the trees are kept dwarfed. At ten years old a tree will bear from 1000 to 1500 oranges, and when in full vigour from 7000 to 8000; indeed as many as 20,000 have been gathered in a season from a single tree at St. Michael's. The O.-tree is, moreover, naturally long-lived, 100 to 150 years being the average; one existing at Rome is said to have been planted 1200 A. D., and some at Cordova are equally ancient. It is certain that a celebrated tree which died at Versailles in 1876 was raised from a seed given by the Queen of Navarre to her gardener at Pampeluna in 1421, as its existence all through the intervening period had been watched with historic interest. Under very suitable climatal conditions the O. attains a height of 50 feet, as, for instance, at Nice. In England it will not stand the winter, and is now generally grown simply as a conservatory ornament. The first essay at its cultivation was by Raleigh's relatives at Beddington, in Surrey, about the end of the 16th c. The trees then planted, after attaining 16 feet, were killed by the great frost of 1739-40. The consumption of the O. for food in various shapes is incalculable. That of the blossoms for perfumery purposes is also immense; at Nice alone amounting to nearly 200 tons yearly. The wood is yellowish, close and even grained, and hard; it is used for turning, engraving, inlaid and cabinet work, and excellent walking-sticks are made from the shoots and branches. The Native O. of Australia (*C. Planchoni*) is described as a noble tree of fully 40 feet high, with globular fruits about the size of a walnut.

Medicinal Properties.—The outer part of the rind of the ripe fruit of the *bitter* O., *C. Bigaradia*, fresh and dried, is used in

medicine as a mild tonic, carminative, and stomachic, bu principally as an addition to infusions and decoctions. The pharmaceutical preparations are the *infusion* (dose, 1 to 2 oz.), a *syrup*, and a *tincture* (dose, 1 to 2 drs.). O. wine, made in Britain, contains about 12 per cent. of alcohol and some free acid.

Orange, a colour, is composed of two of the primary colours, red and yellow. Among pigments the nearest colour to pure O. is cadmium yellow, but O. chrome (a sub-chromate of lead), O. vermilion, and other substances, are chiefly used in painting for O. In dyeing and calico-printing, O. colours are produced from red and yellow colouring matters applied together or separately.

Orange, a town of France, department of Vaucluse, on the Aigues, 4½ miles above its confluence with the Rhone, and 16 miles N. of Avignon by rail, has manufactures of silk and gloves, and carries on a trade in wine, truffles, honey, fruits, &c. Pop. (1872) 6290. The *Arausio* of the Romans, O. has remains of the triumphal arch of Marius (60 feet high), of an amphitheatre (capable of holding 7000 spectators), and of a cathedral (founded 529, and rebuilt 1176). From the 11th to the 16th c. O. was the capital of a small independent principality, which, on the death of its last sovereign, Philibert de Châlons, without issue (1531), passed to a younger branch of the house of Nassau (q. v.). Held by the Dutch stadtholders down to the death of William III. of England in 1702, it was then contested by Friedrich I. of Prussia and the Prince of Nassau-Siegen, but was ceded to France by the Peace of Utrecht (1713). The heir-presumptive to the throne of the Netherlands still bears the title Prince of O.

Orange, a town of New Jersey, U.S., 13 miles W. of New York, is picturesquely situated in an undulating country. Its chief industry is hatting, which is extensively carried on. O. has 4 weekly newspapers. Pop. (1870) 9348.

Orange Institution, a politico-religious association which arose towards the close of the last century among the Protestants of northern Ireland. The first lodge was opened at Loughgall, in the county of Armagh, September 21, 1795, and the movement spread quickly, not only among the peasantry, but among the landowners, its objects being the promotion of the Union, and an organised opposition to the removal of Catholic disabilities. The rebellion of '98 was mainly due to the excesses of the English soldiers and Orange yeomanry, who in 1796 and 1797 marched over the country torturing the 'Croppies,' robbing, ravishing, and murdering—excesses that were sanctioned by the Insurrection Act and Bill of Indemnity. A grand lodge was founded at Dublin in November 1798, and at Manchester in 1808, whence it was transferred to London in 1821. From 1813 Orangeism declined, till it was roused to fresh action by the question of Catholic Emancipation (q. v.). Its propagation extended to the army (1824) and to the colonies, and in 1827 the Duke of Cumberland (afterwards King of Hanover) accepted the grand-mastership. The celebration of the battle of the Boyne (July 1) was prohibited in 1832, as well as the assembling of any political association during the debates of Parliament. Since then the O. I. has assumed the character of a secret society, its clubs being formally suppressed by Government in 1836, when, according to Parliamentary Reports, they numbered 145,000 members in England, and 125,000 in Ireland. The repeal movement of 1848, and the Fenianism of recent years, have been warmly opposed by the Orangemen, who abroad have signalised themselves by their attempt to extort recognition from the Prince of Wales, on the occasion of his visit to Canada (1860), and by the New York riots, excited by a Boyne celebration, in which 50 persons were killed and 160 wounded, July 12, 1871.

Orange River or **Gariep**, the largest river in S. Africa, rises in the Mont aux Sources, near 29° S. lat. and 30° E. long., and after a westerly course of nearly 1200 miles, during which it drains an area of 400,000 sq. miles, falls into the Atlantic in 28° 35′ S. lat., and 16° 12′ E. long. Its principal affluent is the Vaal River (q. v.), which is longer than the O. R. itself. The latter flows through a beautiful country in the upper part of its course, but after its junction with the Vaal traverses a region arid and dreary in the extreme, in its passage through which the volume of the river is considerably diminished by evaporation. Near its mouth the O. R. flows between gloomy, precipitous walls of rock. Frequent rapids and cataracts, and a sand-bar at its mouth, render it useless for purposes of navigation.

Orange River Free State, a region in S. Africa, lying between Cape Colony, the Transvaal, and Natal, and enclosed by the Orange and Vaal rivers, and the Maluti and Drakenberg mountains. It is of a roughly oval shape, and has an area of about 55,000 sq. miles. Its surface consists of wide, treeless plains, dotted in some parts by small rocky hills called 'kopjes,' and gradually slopes to the edge of the great rim or wall of rock which shuts in Natal from the N.W. The average height of the country is 5000 feet above the sea-level, but the Montaux Sources, on the E. frontier, rises to 10,000 feet. The plains are clothed with grass, on which feed large herds of antelopes and other game, whose numbers however are being much reduced as settlement advances. Besides the two great streams of the Orange and Vaal rivers, the Free State is drained by a number of smaller ones, of which the Caledon is the most important. Deep and rapid in winter, they are reduced to small dimensions in the dry season. The climate is very dry, but healthy, and especially suited to persons suffering from pulmonary ailments. In winter the cold is often severe, and in summer thunderstorms are frequent. The scarcity of water is the chief drawback, and renders it necessary for each farm to have its reservoir. Large numbers of sheep are pastured, but as the Free State is 150 miles from the sea at its nearest point, the wool grown within it is shipped from ports in Natal or Cape Colony, and is included in their returns. Grain and fruits of all kinds are also largely grown. Diamonds and garnets are found near the western extremity of the Free State, but otherwise its mineral wealth is small.

The O. R. F. S. is a republic, and the only part of S. Africa where the Boers (q. v.) continue to maintain their independence. In 1836 a number of them migrated from Cape Colony into the Free State, from whence some went on to Natal. In 1842 the Free State was annexed to Cape Colony by one of the Judges of the latter, but the Governor disallowed the act a few weeks later. In 1845 the Boers went to war with the Griquas, who were allies of the British, and in 1848, after fighting, the Queen's sovereignty was proclaimed over the Free State, whereupon many of the Boers crossed the Vaal and founded the Transvaal Republic. In 1854 the Free State was restored to representatives of its inhabitants, and again became a republic. In 1868 its territory was extended to the S. by conquests in Basutoland, but in 1871 a large portion of Griqualand West was taken from it and proclaimed British territory, giving rise to a dispute which was not settled till 1876, when the President of the Free State came to London and arranged the matter with the Secretary of State for the Colonies. The Free State is divided into thirteen districts, and is governed by a President, who is elected every four years, and a Legislature termed the Volksraad. Dutch is the official language, and the prevailing religious denomination is the Dutch Reformed Church. Education is well cared for, but railways and telegraphs are still unknown. The Boers' mode of life is patriarchal in many of its leading features. The capital of the State is Bloemfontein, a well-built and thriving town, 680 miles N.E. of Cape Town. The revenue in 1874–75 was £100,958; the expenditure, £98,242; and the public debt, £58,915. The population was estimated in 1876 at 75,000, of whom about one-half are of European descent, chiefly Dutch. The natives are a mixture of many different tribes, the principal being Basutos, Koranas, and Bechuans (q. v.). See Hall's *South African Geography* (Lond. 2d ed. 1872); *Handbook to South Africa* (Lond. 2d ed. 1876); Noble's *South Africa, Past and Present* (Lond. 1877).

Orato'rio, a composition for voices and instruments, consisting of a series of airs, recitatives, duets, choruses, &c., illustrating a Scriptural or sacred subject, and cast in a narrative or dramatic form. The Italian form of O. probably sprung from the Mystery Plays of the Middle Ages, and was originally produced with scenery and dramatic action. Filippo Neri, founder of the *Congregatione dell' O.* (whence probably the name O. is derived), under the direction of Giovanni Animuccia, his Maestro di Capella, introduced settings of psalms and hymns in the madrigal style into the Church services, a collection of these *Laudi Spirituali* being published in 1571. Afterwards Scripture songs and incidents were formed into dramatic poems, and sung before and after the sermon. The earliest elaborate O. we know of is *La Rappresentazione di Animo e di Corpo*, the music by Emilio del Cavaliere, and the recitatives by Jacopo Peri, which was performed on a stage in the oratory of Santa Maria della Vallicella at Rome, with scenery, costumes, and dances, in the year 1600. The instruments were a double lyre, double guitar, harpsichord, and two flutes. Madrigals commenced and concluded the O. A con-

siderable number of such works were afterwards produced. Stradella's *San Giovanni Battista* (1670) was a great improvement on former sacred compositions, particularly in scoring. Carissimi also did much to advance this form of music, using stringed accompaniments, and introducing an improved form of recitative, upon which Handel modelled his style. Scarlatti, Leonardo Leo, Caldara, Hasse, Pergolesi, and Jomelli were among the leading composers of the Italian school of O., which gave way about the middle of the 18th c. to that of Germany. In the Lutheran Church, cantatas with instrumental accompaniments were sung, containing chorales for the entire congregation to join in. All Johann Sebastian Bach's great sacred works were of this nature, his *Passions-Musik nach den Heil-Matthaeus* being probably the most magnificent example. Handel's first O., *La Resurrezione*, was produced in Italy in 1706. Twenty-seven years later his first English O., *Esther*, was brought out (without stage-action) at the King's Theatre in the Haymarket. Among his many glorious and immortal works, *Israel in Egypt* (1738) excels in choruses; while the *Messiah* (1741) has a sublimity, grandeur, and completeness worthy of its transcendent subject. Broad choral writing was this grand composer's forte; and, though some of his arias are borrowed from Italian sources, many of his own have rare sweetness and beauty. In his day the orchestra was in a primitive state, and in the modern performance of his works additional instrumental accompaniments are used. What Mozart did in this way for the *Messiah* has been attempted by Macfarren, Costa, Sullivan, &c., for other works. Four of Haydn's works have been described as oratorios, of which *The Creation* (1798) excels in brightness and power. Beethoven's only O., *The Mount of Olives*, is cast in a dramatic form, requiring stage accessories for adequate representation. Spohr's *Crucifixion*, *Last Judgment*, and *Fall of Babylon* abound in beautiful melodies. By far the grandest modern specimens of this work are Mendelssohn's *Elijah* (1836), and *St. Paul* (1846). The former is full of dramatic fire, the latter of noble and effective harmonies. Sir Michael Costa's *Eli* and *Naaman*, Sir W. Sterndale Bennett's *Woman of Samaria*, Professor Macfarren's *St. John the Baptist*, and *Joseph*, and Dr. Arthur Sullivan's *Prodigal Son*, are among the most popular of recent sacred compositions produced in Britain, where the O. has taken deeper root than in any other country. It is the one form of music of which we can justly be proud as a nation. Nowhere is it produced with such completeness or success as in England. The Handel Triennial Festivals, which originated in 1857, and of which seven have been held at the Crystal Palace, are unequalled in choral splendour. They extend over four days, the audience nearly always approaching, and sometimes exceeding, 20,000 people. At the last performance (1877) the chorus numbered 2921 selected singers from choirs from all parts of the country (748 sopranos, 799 altos, 674 tenors, and 700 basses), and the orchestra 447 performers.

Orato'rium (Lat. 'house or place of prayer,' *cf.* Matt. xxi. 13, Is. lvi. 7) was a name anciently given to Christian churches. At a later time the name was restricted to private chapels, differing from parochial churches in being only places of prayer, in which the Eucharist could not be celebrated; or if that was allowed to be done at ordinary times, the worshippers were to attend the parochial church on the great festivals. See Bingham's *Ecl. Ants.*

Ora'tory, Fathers of the, were an order or congregation of priests founded at Rome by Filippo Neri (q. v.), which was sanctioned by the Pope, 1577. Their first work was to provide shelter for the numerous pilgrims who flocked to Rome, which they did in hospitals. They derive their name from the circumstance that their religious exercises consisted of prayer, without the sacrament of the Eucharist (see ORATORIUM), and instruction in Church history and practical religion and morality. In short, the fraternities were of the nature of schools for pastoral theology. The order has accordingly produced a number of celebrated Church historians—*e.g.*, Baronius (who succeeded Neri as general), Olderic, Rainaldi, Laderchi, &c. Another congregation, called the Fathers of the Oratory of the Holy Jesus, was established in France by Pierre de Berulle, and sanctioned by the Pope, 1613. They differed from the Italian congregation in not giving their attention specially to Church history, but to all branches of learning. This religious order was introduced into England by John Henry Newman in 1847.

Or'bit, in Astronomy, is the path of a heavenly body round its primary, such as planets and comets round the sun, and satellites round their planets. Such an orbit is in every case a conic section, ordinarily an ellipse, which, however, presents irregularities of form due to perturbing influences of other bodies. To fix an orbit, it is necessary to know first the plane in which it lies. For this two numbers are requisite—its inclination to a fixed plane (the ecliptic, for instance), and the line of intersection of the two planes or line of nodes. This line is known if the longitude or position on the ecliptic line of one node (the ascending is universally used) is known. (See NODES.) Next, we must know the position and size of the orbit on the plane. For this three other numbers are necessary—the heliocentric longitude of the perihelion, *i.e.*, the position of the nearer extremity of the major to the sun, the length of the major axis, and the eccentricity. Knowing these, with the time of perihelion passage, and the orbital velocity, a planet's motion is completely determined.

Orbuli'na, a simple form of *Foraminifera* (q. v.), occurring both in existing seas and as a fossil organism. The shell of the O. is a simple sphere of lime, through *foramina* or apertures in the wall of which, the prolongations of the soft protoplasmic body of the living animal are protruded.

Or'ceine is the principal colouring matter present in Archil (q. v.) and Cudbear (q. v.). It is formed during the preparation of these from lichens, and has a composition represented by the formula $C_7H_7NO_3$. The white gelatinous precipitate obtained by neutralising with hydrochloric acid the filtered solution of the lichens digested with lime and water consists of one or more acids, which, if boiled in excess of lime or baryta, are decomposed, yielding ultimately prismatic crystals of *orcin* ($C_7H_8O_2$); and this colourless substance, when exposed to the joint action of ammonia and air, is converted into O., which is of a beautiful red colour.

Or'chard (Old Eng. *ortgárd*, lit. 'a *yard* or enclosure for *roots*;' comp. Old Ger. *wurzgarte*), the name given to a tract of ground specially set apart for the cultivation of hardy fruit-trees. Three things must be considered in the selection—climate, soil, and aspect. Thus, though apple-trees will endure a winter of greater severity than is generally experienced in any part of the British Islands, yet to bring the fruit to maturity requires a warm summer, and, therefore, the S. and W. counties are more favourable to apple orchards than the N. and E. As to soils, the apple has a predilection, so to speak, for such as abound in clays and marls; the pear will grow and produce great crops of fruit in dry, light, sandy soils that are not favourable for apple; while plums and cherries are less choice than either as to the soil upon which they grow. With regard to aspect, districts are favourable to orchards which have more or less an undulating surface, and therefore present numerous localities whose sheltered, and, at the same time, sunny aspects are favourable both for the setting and the ripening of the fruit. Very open or elevated and exposed situations, and the bottoms of deep-sunk valleys, are almost equally unfavourable; the first, from the violence of the winds and low temperature; and the latter from their liability to cold fogs and late frosts while the trees are in blossom. A situation much surrounded, or closely hemmed in by woods or plantations, is almost equally objectionable, as fogs dissipate much more slowly than over open ground. In the purchase of young trees or in grafting, in order to form a productive and profitable O., care must be taken to select good sorts, which are either new or in the vigour of their bearing. The trees should be planted at a distance of from 40 to 60 feet apart, according to the richness of the soil; for it should always be remembered that the roots extend far beyond the branches. The rows should run N. to S., in order that the trees may derive the greatest benefit from the sun. If it be indispensable to stock the O. occasionally with large cattle, the trees must be fenced, and when the fences are no longer deemed necessary for the support and protection of the young trees, it is proper to guard against injury from cattle by smearing the stems with lime and cow-dung. The bearing capabilities of aged trees may be much improved by judicious pruning. A return for 1877 gives the acreage of orchards in Britain as 165,003.

Stealing from Orchards—The law applicable to this offence is the same as that regarding stealing from gardens (see GARDENS,

STEALING FROM). In Scotland, the offence is against the Acts for Planting and Inclosing (q. v.) and is cognizable by the sheriff.

Orchard House is the name given to glass structures designed for the cultivation of various superior table fruits, and may be either erected against a wall with roof sloping to the sun, or be an elegant movable structure of glass, with iron supports and a double sloping roof. The fruit trees, be they peaches, nectarines, plums, pears, &c., are all grown in pots (15 in. inner diameter is a good size), with a hole sufficiently large in the bottom for the roots to work their way into a carefully prepared sub-stratum. By judicious attention to the setting of the fruit, pruning, ventilation, and temperature, a long succession of crops may be maintained, if the earliest and the latest kind are kept under cultivation. After the fruit is gathered the exserted roots are cut off level with the base of the pot, and the tree is then set aside for its winter rest. Shelves to grow early strawberries upon are a useful adjunct. The O. H. is a comparatively modern idea or invention, first suggested by the late Mr. Rivers (died 1877), in his pamphlet *The Orchard House*, and is now a favourite with many amateurs.

Or'chardson, William Quiller, R.A., was born at Edinburgh in 1835, studied at the Academy there, and, after having gained a reputation as a painter of popular figure subjects, proceeded to London in 1863. His best-known works are 'An Old English Song,' 'Flowers of the Forest,' 'Hamlet and Ophelia,' 'The Challenger,' 'Christopher Sly,' 'Day Dreams,' 'Toilers of the Sea,' 'A Hundred Years Ago,' 'On the Grand Canal, Venice' (1871), 'The Casus Belli' (1872), 'The Protector and Cinderella' (1873), 'Hamlet and the King,' and 'Ophelia' (1874), 'Too Good to be True,' and 'Moonlight on the Lagoons' (1875). O. was elected an A.R.A. in 1868, and an R.A. in December 1877.

Orches'tra (lit. 'the dancing place' in the Greek theatre) now denotes (1) an instrumental band in which stringed instruments predominate, (2) the space set apart in theatres and concert-rooms for the accommodation of the band and chorus.

(1) Modern orchestras are of all kinds of sizes and combinations according to the resources at command, the scale of performance, and the character of the works attempted. An idea of the ordinary proportions of musical instruments employed may be gathered from the article Music (q. v.). As a general rule the first and second violins are nearly equal in number, and it is usual to have about two-thirds of that number of violas, violoncellos, and double basses. The various wind instruments are in much smaller proportion, and still less so are the instruments of percussion. In a musical score a complete harmony is written for the strings alone, the occasional substitution or accompaniment of the other instruments opening a wide field to the composer's ingenuity. In a grand O. the first violins are arrayed to the right of the conductor, the second violins to his left, the flutes, clarionets, and wooden wind instruments behind him, the position of the violas is variable, the double basses and violoncellos are at the extremities of the right and left and at the centre, and the brass instruments at one of the extremities, having behind them the battery, or instruments of percussion. In a small O. the sizes of the wind instruments should be proportionate to the reduced number of strings. The elaborateness of the modern O. is the growth of the last century. In Claude Monteverde's opera of *Orfeo* (1604) 17 violins and 12 wind instruments were employed, and a particular instrument accompanied each person of the drama—the bass, Orpheus, the trombone, Pluto, &c.—an idea to some extent revived by Richard Wagner. Handel employed 4 oboes to 6 violins, but after his time the use of wind instruments in an O. fell out of fashion. In opera, strings and an organ were used for accompaniments, and the harpsichord for recitatives, the musician at the latter instrument acting as conductor, instead of the present independent timebeater. Glück revived the use of wind instruments, and made improvements in the treatment of others. Under the three representative composers, Haydn, Mozart, and Beethoven, orchestral music attained its highest splendour. The introduction of new instruments has been hindered by the difficulty of finding skilled players, as few musicians care to learn a speculative branch of the art. Meyerbeer was perhaps most successful in obtaining such enthusiasts. Many composers have shown in their orchestral writings a partiality for particular instruments, as Weber for the horn and Spohr for the violin. The excessive use of cymbals, drums, &c., made by many modern writers, is to be condemned as detracting from the beauty and delicacy of the other instruments.

(2) The O. in a theatre is in front, or, as in some modern London houses, under the stage. Wagner adopted the latter position in the Bayreuth festival in 1876, in order to preserve more perfectly the stage illusion. In a concert room the O. is a raised platform, ascending by steps at the end of the hall. The chorus range themselves behind the band, the female voices being usually in the centre and the male voices on either side.

Orchida'ceæ or **Orchid'eæ** is a large, diversified, and remarkable order of monocotyledons, represented throughout the world, excepting where frost and aridity are supreme, and found in all situations but maritime and aquatic. The number of described species is considerably over 3000. The term ORCHID is popularly applied to the whole. In temperate countries they are of terrestrial habit; in warmer latitudes, where they flourish in the greatest variety and profusion, they no longer seek their nutriment from the soil, but grow on trees or attach themselves to rocks and stones. The British species (numbering 42 in 18 genera) have a tuberous root and annual herbaceous stem. The tropical species on the contrary have often a perennial, and some of them a climbing stem, or peculiar aërial *pseudo-bulbs*. The amplexicaul or sheathing leaves are always entire, fleshy, or succulent, rarely scale-like. Flowers usually in spikes, racemes, or panicles, consisting of two whorls, each of three parts. The inner of these is always irregular, its lower segment—the *lip* or *labellum*—being usually larger and often spurred. The stamens are confluent with the style into an unsymmetrical column, upon which the anthers are so placed as to stand above the viscid stigma. Only a few have pollen grains perfectly distinct, usually they are united together in fours, and these again into granular masses, or the grains are combined into a stalked club-like mass (*pollinium*) within each anther lobe. The fruit is a three-valved capsule, the valves separating from the septa, and the innumerable minute seeds have a netted, membranous outer covering. The flowers of many of the O. assume such unusual figures that there is scarcely a common reptile or insect to which some of them have not been likened. This fantastic form of the flower, their exquisite perfume (in many species), the blending of gorgeous colours of a great number, the curious irritability of the labellum, the marvellous contrivances to obtain fertilisation, together with a general appearance so different to other plants, have combined of late years to render their cultivation a supreme attraction to amateurs. The practical knowledge of them may be said to have sprung up in the present century, and to have risen to maturity during the last thirty years. Now there are hothouses specially devoted to their culture, and £100 or more is not an uncommon price to be paid for a single plant of some great rarity. A few are valued for the beauty of their leaves, as, *e.g.*, the Ceylon 'king of the woods' (*Anæctochilus setaceus*), which has them netted with gold as on a groundwork of rich brown velvet. Mr. Darwin says, 'An immense proportion of the species are sterile if insects are excluded' from them. See his fascinating work *On the Fertilisation of Orchids*.

Or'chis is the type genus of *Orchidaceæ* (q. v.). There are about 70 species, all belonging to the northern hemisphere. Of these, 12 are natives of Britain, 4 of which are common plants, at the same time sufficiently handsome and curious to attract general attention in the spring and summer months. They are called the green-winged O., purple O., marsh O., and spotted O. The others are very rare, being restricted to chalk soil, and one, named *O. hircina* or lizard O., has been met with only sparingly and at long intervals in Kent. When Linnæus defined the genus O. he included in it many plants now divided into separate genera, so that the fragrant O. has become *Gymnadenia*, the butterfly and frog O. are *Habenaria*, the musk O. is *Herminium*, the man O. is *Aceras*, and the bee, fly, and spider O. belong to *Ophrys*. All the animal names have been given to the plants from a resemblance (more or less correct) of their flowers to the object specified. The four last are in Britain almost confined to the chalk and limestone districts of England. The three first are not uncommon. See SALEP.

Orchi'tis, or, Inflamma'tion of the Tes'ticle, appears first in the intertubular connective tissue, but afterwards the tubuli themselves became loaded with lymph. O. may be

caused by a blow, by metastasis in mumps, gonorrhœa, syphilis, &c. The *acute* form commences with rigors, sickening pain in the back and loins, as also in the testicles, heat and redness of the scrotum, swelling and tenderness of the epididymis, and distension of the tunica vaginalis. The treatment consists of rest in bed with the part supported, warm cataplasms, and leeches followed by warm bathing. Careful strapping of the organ is also beneficial. *Chronic* O. consists in a knotty enlargement of the various lobes of the gland, caused by infiltration of lymph into their connective tissue. It is best treated by keeping the patient in bed, and administering calomel and opium till the gums are slightly tender. This treatment should be followed by inunction of mercurial ointment into the scrotum, and the administration of iodide of potassium internally. *Scrofulous* O. occurs in persons of the strumous diathesis, and consists in the deposit of tubercle in and around the tubular structure, and is usually accompanied with enlargement of the vas deferens. The tubercles generally soften and terminate in the formation of abscess. The constitutional treatment is hygienic and dietetic, and the local treatment is that common to suppurating sores. Phosphorised cod-liver oil should be given. See TESTICLE, DISEASES OF.

Orchom'enos, the name of two ancient Greek cities, of which the **Minyan O.**, in the N. of Bœotia, stood on a hill, overlooking Lake Copais, and with the Cephissus 'winding like a serpent' about its southern base. Within its walls, 2 miles in circumference, were the famous Treasury of Atreus, the Acropolis, and a temple of Dionysus. The seat of the Minyæ and Phlegyæ, O. is celebrated by Homer for its wealth, and by Pindar for its musical contests. In the Peloponnesian War it sided with Thebes, but on that city's adoption of a democracy, O. joined the Spartans, and in 338 B.C. was destroyed by the Thebans, who thenceforth remained its inveterate foes. Twice restored and twice destroyed, O. was finally rebuilt by Philip of Macedon (338 B.C.). Its ruins are still to be seen near the village of Skripu. See K. O. Müller's *O. und die Minyer*, and Colonel Mure's *Tour in Greece*.—The **Arcadian O.**, lying to the N. of Mantinea, near the modern village of Kalpáki, had an acropolis, built on a rock 3000 feet high, and temples of Poseidon and Aphrodite. In ancient times it was one of the chief cities of Arcadia, and it retained its kings down to the Peloponnesian War. It was captured by Cassander (331 B.C.), and later by Cleomenes and Antigonus Doson.

Orcin. See ORCEINE.

Or'deal (Old Eng. *ordâl*, from *or*, 'a beginning' or 'origin,' and *dæl*, a 'separation,' hence a judgment;' a first or primitive mode of 'dealing' out judgment; comp. Dut. *oordeel* and Ger. *urtheil*) is the name given to a mode of trial which was not unknown to the ancients, was familiar in the Middle Ages, and is still practised in many parts of the world. We read in Numbers (v. 19–28) of an O. of bitter water which caused the thigh of the unfaithful wife to rot and her abdomen to swell and burst. Here the accused specially agreed beforehand that the Lord should do these things. Sophocles mentions the use of fire among the Greeks. There were special ordeals of virginity, such as carrying water in a sieve, or the drawing of a ship by the girdle, which *Bona Dea* enabled Clodia to do at Rome. The O. was generally supported by oaths. Sometimes an oath written on a tablet was cast into the water, if it sank, the oath was false. In the Old English laws of Æthelred we find the Church paying special attention to the O. by red hot bars or boiling water, the ceremony being introduced by fasting and an elaborate service, and the limbs being examined after an interval of three days. The water O. is recognised by the assizes of Clarendon and Northampton; it was gradually transferred from the church to a trench or pit outside, and was abolished in 1219. Orthodox priests frequently gained triumphs over heretics and infidels by referring a point of dogma to some such test. In Thibet a black and a white stone were thrown into boiling water, the innocent person was sure to draw out the white one. The *Lex Ripuaria* says that if a serf withdraw his hand from the fire unburned, his master is held guilty of the theft with which the serf is charged. By an ancient Irish custom the chief who offered an expiatory sacrifice walked thrice barefoot over the burning cairn to give the entrails of the victims to the Druids. This may have been a test whether the sacrifice was favourably received. Sometimes the red hot iron was prepared in the form of a glove into which the arm was thrust up to the elbow. Something like the Indian marsh was the Scandinavian earth-trial, the accused lay down beneath a roll of turf, if this fell on them they were perjurers (Müller's *Laxdaela Saga*, and Arnesen's *Islandske Rettergang*). Elsewhere the perjurers' hands were said to blacken at the moment of the oath and the relic to seize them. Thus in the romance Reynard the fox is obliged to swear on the teeth of a saint, and a dog, who plays the saint, tries to bite him; in the Edda, Thor swears with his hand on the throat of the wolf Fenrir. In the same way blood flowed from the dead bodies of murdered persons when the murderer was brought near, after having sworn his innocence. Church rules often prescribed a fast for three days on a handful of barley and some salt and water. By an old French custom when a theft was committed, the local magistrates at a meeting of the inhabitants, after having called forth the thief, held up a stick under which every one must pass, but which the thief never had the courage to pass. This resembled the Dyak custom of hanging up an arch of tigers' teeth. In Madagascar the drinking of the water of the tangena nut is frequently resorted to, but the draught is sometimes administered to two fowls representing the accused and the accuser. Generally in S. Africa if a goblet full of Mbundu juice does not at once act as an emetic the guilt of the accused is proved. This reminds one of the 'corsnaed,' or consecrated bread and cheese, which the Old English priests sometimes administered, and which only the innocent could swallow. If a *priest* were accused, he merely made oath on the 'housel,' or sacramental bread. There are still among the Dravidic races of India nine different kinds of O., poison, fire, water, and the scales, used for thefts of different degrees of gravity; the cold water test, which consisted in keeping the accused between two jets of water while another shot an arrow and went to fetch it; water in which an idol has been washed, rice, boiling oil, red hot iron, the image of iron and silver. Most of these tests simply rely on a supposed divine intervention with natural law in favour of an innocent person. According to Jakob Grimm (*Deutsche Rechtsalterthümer*), the modern duel is simply a relic of the O., or judgment of God; and as Beccaria has pointed out it resembles in principle the practice of torture, the only difference being that in the latter the event depends on the will of the accused, and a man on the rack being as little able to declare the truth as in former times to prevent without fraud the effects of fire or boiling water. Space does not admit of any statement of the numerous frauds which were practised against the O. The practical result was to put justice into the hands of the priests, as compurgation put it into the hands of the friends of the accused. (The only full description of an English O. is the Petyt MSS. in the Inner Temple Library.) For the legal forms of O. in the Middle Ages, see Pez, *Thesaurus Anecdotorum Novissimus*, vol. ii. (1721–28).

Or'der, in *Zoology*, a division used in the classification of animals and plants. It results from the subdivision of a *class*. Thus the class of *Mammalia* or *Quadrupeds* is divided into *orders*, which, while agreeing in the characters of the class, yet present us with modifications of the class-type.

O., in *Botany*. If the resemblances and differences of *genera* are taken into account, those which resemble each other more than they do any other genera are collected together into groups of a higher degree called 'Natural Orders' or *Families*, and to each a common name is given. This name is in Latin an adjective plural, usually taken from some one *typical* genus, generally the best known, the first discovered, as the most marked *Orchidaceæ* from *Orchis*.

Order (Lat. *ordo*) meant originally a set form of prayer, and then the 'rule' or laws of a monastic institution; but secondarily, and in the more popular sense, it means all the monastic institutions, or the aggregate of monks, nuns, &c., who conform to the same rule. Religious orders have generally been classified as monastic, military, and mendicant. See MONACHISM, MENDICANT ORDERS, &c.

Orderi'cus Vita'lis, a Latin chronicler of the 11th c., was born at Attingham, Shropshire, England, 15th February 1075. His father Odelirius was a native of Orleans who, at the time of the Norman Conquest, had followed Roger de Montgomery, afterwards Earl of Shrewsbury, to England. An access of religious fervour induced Odelirius to sacrifice his parental feelings, and, at the age of ten, his son was sent to Normandy that

he might be eternally severed from his father. O. was received into the Benedictine abbey of Ouche, founded by St. Evroult. On the 22d of September 1086, the Feast of St. Maurice, he received the tonsure, exchanging at the same time his English name 'Ordericus' for that of 'Vitalis,' a companion of the saint whose memory was that day celebrated. On the 21st December 1107 he received 'the burden of the priesthood.' Of his subsequent life nothing more is known than that he only thrice quitted his retreat—once to attend a general chapter of the Benedictine order, convoked by the abbot of Cluni, and twice to make journeys, one to Worcester and another to Cambray, for the purpose of procuring information needful for his historical labours. He died in 1141 or 1142—the exact date is unknown. O.'s work entitled *Historica Ecclesiastica* is in thirteen books, the greater part of which are devoted to Norman and English history. 'No work,' says M. Guizot, 'contains so much and so valuable information on the history of the 11th and 12th centuries, on the political state, both civil and religious, of society in the W. of Europe, and on the manners of the times, whether feudal, monastic, or popular.' The first edition was printed at Paris (1619) in Duchesne's *Historiæ Normannorum Scriptores Antiqui*. By far the most accurate edition is that by M. Auguste le Prevost (Par. 1838), based on a laborious collation of the best MSS., and illustrated by a vast number of valuable notes. An English translation in 4 vols. of Le Provost's edition by Thomas Forester is contained in Bohn's *Antiquarian Library*.

Or'derlies. In the army non-commissioned officers who receive the regimental or general orders and communicate them to their respective companies. Commissioned officers charged with the superintendence of barrack arrangements are called orderly officers.

Or'ders, in Architecture, the styles recognised by the ancients for the erection and embellishment of a column (q. v.) were five in number—viz., three Greek, the Doric, Ionian, and Corinthian, and two Roman, the Tuscan and Composite.

Orders, Army, are of three kinds—those issued by the commander-in-chief to the whole army, by the general in charge of a division or brigade to the forces under his command, or by a colonel to his regiment.

Orders, Holy. In the early Christian Church all who had any public employment in the Church were called by the common name of 'clergy' (Lat. *clerici*, from Gr. *klēros*, 'a lot'), 'canons' (Lat. *canonici*, from Gr. *kanōn*, a roll in which their names were entered), 'the holy ones,' 'the holy order,' 'the order of the sanctuary,' &c. The clergy were afterwards distinguished into three orders — the bishops, presbyters or priests, and deacons. Next, in the 3d c., certain minor unconsecrated orders were instituted, to attend upon the ministers in divine service, and serve as a kind of nursery for the sacred O. of the hierarchy. These were sub-deacons, whose original duty was to prepare the sacred vessels and utensils of the altar, and deliver them to the deacon in time of divine service; acolythists or acolyths (Gr. *akolouthos*, 'an attendant'), an order for four centuries peculiar to the Latin Church, whose original duties were to light the candles in the church and bring the cruets of wine and water to the celebrant of the Eucharist; exorcists, to cast out devils from the possessed; readers, whose office was to read the Scriptures, not at the altar, but in the reading-desk; doorkeepers or porters, whose duties were to open and shut the doors under the direction of the deacons or those who had the charge of separating the faithful from the catechumens and the excommunicated.

In the Presbyterian Churches the one order of presbyters is now retained; in the Anglican Church the three, of bishops, priests, and deacons. In both the Greek and the Roman Catholic Churches there is a distinction made between the major or H. O.—bishop, priest, and deacon; and the minor O.—acolyth, exorcist, reader, and doorkeeper. To the former belongs an indelible, sacramental character; 'O.' being one of the seven sacraments of the Church.

Orders in Council. The sovereign of the United Kingdom is authorised by Parliament to issue and enforce executive orders, under defined limits, with the advice of the Privy Council (q. v.). These are called O. in C. Emergencies occur in which, for the welfare of the state, these limits are overstepped, the advisers of the crown relying on Parliament passing an act of indemnity. O. in C. are issued largely in matters connected with the trade of the country, and under international questions. For an instance of the latter, see *International Copyright*, under COPYRIGHT, LAW OF. A *law* cannot be enacted by an O. in C., but power may be delegated by Parliament to the sovereign in council to suspend a law, or to put a law in force, according to circumstances; thus, at the close of the session of 1876, an Act was hastily passed enabling the Queen, with the advice of her council, to adopt most stringent measures to prevent the spread of the Colorado beetle, should it appear in the United Kingdom. Several O. in C. have become historical. Such are the orders of 1807 and 1809, by which Great Britain endeavoured to meet Napoleon's Berlin and Milan decrees, declaring the British Islands and British dominions to be under blockade, and ships trading with them to be, accordingly, liable to capture by the ships of France. The British counter-order declared all neutral vessels trading from one hostile port of Europe to another with property belonging to an enemy, to be liable to seizure. The legality of these O. in C. has been doubted, owing to their being contrary to the international law of *Blockade* (q. v.).

Or'dinal is a book containing the forms observed by the Church in ordaining or consecrating the clergy. The O. of the Anglican Church was drawn up and added to the Book of Common Prayer in the reign of Edward VI., revised in the reign of Elizabeth, and re-revised by the Convocation of 1661.

Or'dinaries, in Heraldry, the charges most commonly in use, of which the simpler forms were regarded as the most ancient and honourable. The Honourable O., composed of straight lines, were nine in number, the chief, pale, bend, bend sinister, fesse, bar, cross, saltire, and chevron, all which are noticed in separate articles.

Or'dinary is an ecclesiastical superior who by right, privilege or custom, exercises authority or jurisdiction, but more particularly a bishop who, in matters of order and special dispensation, has ordinary jurisdiction within his diocese. In matters of jurisdiction the O. is he that has ordinary jurisdiction, as a judge or magistrate. The name thus applies to a chapter as regards the canons, a dean, or an archbishop in visitation. Archdeacons, vicars-general, and chancellors of dioceses are each a local O., as are all officials who, although acting only by commission, have ordinary jurisdiction in their capacity of ecclesiastical judges.

Ordinary, a term of civil law for any judge or bishop who has authority to take cognizance of causes in his own right and not by deputation. The O. of Newgate is the chaplain attendant in *ordinary* upon condemned malefactors in the prison. In Scotland, the Lords O. are certain judges of the Court of Session (q. v.).

Ordinary (navy). Her Majesty's ships are 'in O.' when not in actual service. They usually lie in or near the royal dockyards ready for equipment on an emergency. An O. seaman is one who has not served long enough to be called an able seaman, and who is not considered capable of performing certain of the latter's duties. The pay of an O. seaman in the Royal Navy is 1s. 3d. a day for continuous, and 1s. 1d. for non-continuous service.

Ordina'tion is the ceremony by which the clergy are admitted into any particular order, and consecrated to perform the office of that order. The Jewish priests were consecrated to their office by pouring oil on their head. The essential part of the apostolic ceremony, as described in the New Testament (*cf.* Acts viii. 18), was, as it is yet, the laying on of hands. This act is symbolical of conveying the Holy Spirit from the person or persons ordaining to the ordained, which was done first by Christ breathing upon the Apostles (John xx. 22). In Episcopal churches the deacons are now ordained by the bishop, the priests by the bishop and all the priests present, and the bishops by the archbishop and two or more bishops, or by three or more bishops. The inferior orders were never ordained to their office at the altar, or with the laying on of hands. In Presbyterian churches ministers are ordained by the laying on of the hands of the presbytery. Some Protestant sects have no O. at all.

Ord'nance, a military term usually applied to the larger kinds of guns in use. See ARTILLERY, CANNON, CANNONAIL, HOWITZER, MITRAILLEUSE, MORTAR, RIFLED ARMS, &c.

Ord'nance Depart'ment, an ancient but now obsolete department of the Government, which had control of the artillery and engineers, the furnishing of the entire army with guns, ammunition, &c., and the supervision of fortifications and military works. Since 1855 its functions have been in the hands of the War Office. See BOARD OF ORDNANCE.

Ord'nance Sur'vey is one of the sub-departments of the Board of Works, to which it was transferred by the Survey Act, passed May 12, 1870. It embraces all the operations necessary for a complete trigonometrical survey of Great Britain and Ireland, and the preparation of maps and plans of all parts of the kingdom. The idea of taking a general survey of the country was first proposed after the rebellion of 1745, when the want of anything like an accurate map of the Highlands was severely felt by the Government troops. In 1755 a first map was completed by Major-General Roy, but never published. In 1783 Roy began a similar survey of England, measuring carefully a base-line on Hounslow Heath, near London. The work was continued by General Colby, who remeasured the base-line with great care in 1791. Operations were suspended during the early years of the present century, and the maps, constructed chiefly for military purposes, were, especially the earlier ones, far from accurate. In 1809 the triangulation of Scotland was begun, and continued with several breaks till 1823, when it was suspended for fifteen years. In 1824 the survey of Ireland was begun, and finished in 1840, and six-inch maps, or maps on a scale of six inches to the mile, for the whole country, were published in 1845. The first portions were, however, imperfect, and a revision was deemed necessary. The six-inch county maps are all published, and the one-inch maps are all completed in outline, though nearly one-half of the country, with the hills engraved, has yet to be published. In 1838 the triangulation of Scotland was resumed, and in 1840 surveys for a six-inch map were begun for the northern parts of England. The tardiness displayed by the authorities in reference to the publication of both the one-inch and six-inch maps, roused much dissatisfaction in Scotland. The Committee of the House of Commons proposed stopping the six-inch map, and this led to a discussion of the relative merits of the six-inch and one-inch systems. In 1861 it was decided that counties should be published on the six-inch scale, and the whole kingdom on the one-inch scale. Extensive tracts of moorland and uncultivated land are published only on the one-inch scale, which is very convenient for travelling purposes. In 1877 the six-inch maps of Scotland, with the exception of those of the counties of Caithness, Sutherland, Ross, the Orkney and Shetland Islands, Harris, N. Uist, S. Uist, Skye, Mull, Islay, and other smaller islands, were published, and the one-inch maps are very little behind—a portion of Inverness and the W. portion of Argyleshire being still incomplete. The one-inch maps of England and Wales are all published, but of these only those of the counties of Northumberland, Cumberland, Westmoreland, Durham, and York, have the hills engraved, and only these counties, together with Lancashire, Middlesex, Sussex, and part of Kent, Hampshire, Wiltshire, and Devonshire, are published on the six-inch scale. Parish ordnance maps are also in process of construction. These are on the scale of $\frac{1}{2500}$ or 25·344 inches to the mile. About half of Scotland, a few counties of England, and a small part of Ireland have been so surveyed. Maps of the larger towns to the scale of 5 feet, and 10·58 feet to the mile are also being issued. Other nations of Europe are also busily engaged in the accurate mapping of their country; and the great importance of having accurate maps was clearly demonstrated in the Franco-Prussian war, when much of the success of the Germans was directly attributable to their knowledge of the country obtained solely from charts. The great trigonometrical survey of India is perhaps the most gigantic work of the kind, and in America the coast survey of the United States is in full operation. Surveys of Peru and Chili are also being carried on.

Or'egon, one of the Pacific States of the American Union, is bounded N. by Washington, S. by Nevada and California, W. by the Pacific, and E. by Idaho. Area, 95,274 sq. miles; pop. (1875) 112,000, including 10,960 tribal Indians, 318 Indians paying taxes, 3330 Chinese, and 346 coloured persons. O. extends 360 miles from E. to W., and 275 from N. to S., and has a coast line of 300 miles. It is divided by the Cascade and Blue Mountains into Western, Middle, and Eastern O., and a lesser range, some 50 miles from the coast, traverses the western section, nowhere attaining a height of over 4000 ft., and clad to the summit with forests. The Cascade Mountains, a continuation of the Sierra Nevada, rise in Mount Hood to a height of 11,225 ft.; in Mount Pitt or M'Laughlin to 11,000 ft.; and in Mount Jefferson to 10,200 ft. Middle O. is a rolling tableland, broken by spurs of the Blue Mountains, and the section E. of this range is a rugged region intersected by many fertile and beautiful valleys. The State is mainly confined on the N. by the river Columbia, and on the E. by its great affluent the Snake River. Other rivers of O., all tributaries of the Columbia, are the Willamette, John Day, Des Chutes, Grand Ronde, Malheur, and Owyhee. The Willamette Valley in the N.W. of the State (150 miles long by from 30 to 60 broad) has a soil of unusual productiveness, and contains the principal towns, and nearly two-thirds of the inhabitants. The Columbia is navigable, with two interruptions (the Cascades and Dalles) for 396 miles; the Willamette, during part of the year, for 138 miles. There are numerous lakes, some of them salt, in the S. and S.E. Eastern O. has been the scene of comparatively recent volcanic action, the terrific effects of which are visible in fissures or cañons 1500 feet deep, in mountains of amygdaloid, in heaps of volcanic conglomerate, and in cliffs of columnar basalt lining the river courses. The Blue Mountains and coast range are alike Eozoic; the intermediate Cascade range is volcanic, while Tertiary rocks prevail on the narrow sea-margins. In Middle and Eastern O., gold, silver, and coal are wrought. Among the wild animals are the grizzly bear, the black and cinnamon bear, the large wolf and cayote, the panther, and catamont; several species of deer, antelopes, elks, the racoon, porcupine, beaver, otter, &c. Seals and sturgeons are abundant in the Columbia, and most of the rivers abound with salmon, salmon-trout, &c. The larger birds are the golden and bald-headed eagles, cormorants, hawks, pelicans, buzzards, and vultures. The vegetation W. of the Cascade Mountains is luxuriant, and here grow many giant trees, as the O. cedar, often 15 feet in diameter, the lofty redwood pines, larches, &c. Other trees are the oak, cottonwood, willow, and alder, while the arbutus, cornus, and hazels form a dense undergrowth. Splendid bunch-grass covers millions of acres. In Western O. both winter and summer are tempered by Pacific winds; E. of the Cascade Mountains there are greater extremes of climate, and the protracted winters are accompanied by heavy snows. Ice is rarely thicker than an inch in Western O., and the rainfall is not excessive. The mean annual temperature at Astoria is 52° 13′ F., at Corvallis, 53° F. In 1875 the rainfall at Portland was 43·69 inches. In 1874 O. produced of wheat 4,875,000 bushels; of oats, 2,391,000; of barley, 371,000; of Indian corn, 94,000; of potatoes, 751,000; of flax seed, 25,000; of apples, 500,000; of wool, 2,000,000 lbs.; of butter, 1,800,000; of cheese, 250,000; of bacon and ham, 1,500,000—total value, $8,161,240. In 1875 there were 85,500 horses, 105,000 cattle, 634,600 sheep, and 174,600 swine. In 1874 the export of canned salmon amounted to $1,500,000; of wheat and flour to $4,000,000; of gold, silver, coal, and iron, $1,500,000; of timber, $1,000,000; and of cattle, wool, and hides, $2,000,000. The railways of O. had a stretch in 1877 of 251 miles. The claim of the United States to the territory of O. and Washington as far N. as lat. 54° 40′ was resisted by Great Britain, and a 'treaty of joint occupation' was concluded in 1818. After a renewal of the dispute, which for a time seemed to threaten war, the boundary was settled on the 49th parallel in 1846. O. was organised as a territory in 1848, and as a State in 1859. There have been occasional troubles with the Indians, the latest being the 'Modoc War' in 1872.

Orel (pron. *Aryol*), a government of Middle Russia, lying S.W. of Smolensk, has an area of 1,804,100 sq. miles, and pop. (1870) of 1,596,881. The surface is mostly flat. Within the limits of O. rises the Oka, a tributary of the Volga, and through it flow the Desna and Sosna, whose waters swell the volume of the Dnieper and the Don. The soil is very fertile, but only five-eighths of the surface is under cultivation, while fully one-fourth is covered with forest. Great quantities of corn, hemp, hops, and fruit are raised, and tallow-boiling, glassmaking, linen-weaving, and tanning are actively carried on.—O., capital of the government of the same name, is situated at the confluence of the Oka and the Orlik, 198 miles S.S.W. of Moscow, and is a station on the great railway from St. Petersburg to Odessa. It has also

direct communication with Riga. O. is the seat of a bishop, has 24 churches, but the houses are nearly all built of wood. It has manufactures of rope, yarns, and leather, and is a great emporium for the grain trade of the interior of Russia. Pop. (1870) 44,281.

Orell'i, Johann Kaspar von, a Swiss philologist, born at Zürich, February 13, 1787, entered the Zürich *Carolinum* (1799), was ordained (1806), spent some months in Pestalozzi's institute at Yverdun, and held the post of Reformed pastor at Bergamo (1807–13). He became professor at Chur (1814), in the *Carolinum* of his native city (1819), and in its newly-founded university (1833). O. supported the Greeks in their struggle for independence by purse and pen, opposed the revolutionary movement of 1830, but was a warm advocate of reform in state and school. He died at Zürich, January 6, 1849. Among O.'s works were editions of Cicero (1826), Horace (1837), and Tacitus (1846), his *Inscriptionum Latinarum Collectio* (2 vols. Zür. 1828); and *Onomasticon Tullianum* (3 vols. Zür. 1836–38). See *Lebensabriss von J. K. von O.* (Zür. 1851).

Orenburg, a government in the S.E. of Russia, traversed throughout by the southern chains of the Ural mountains, on the Asiatic side of which most of the province lies, is partly bounded on the S. by the Ural River, and on the E. partly by the Tobol. Area, 73,890 sq. miles. Pop. (1873) 900,547, more than one half of whom are Bashkirs, Mescherjäks, and Teptjars. Where the land is not mountainous it consists of extensive steppes, which in the lower levels are admirably adapted and much used for grazing purposes, O. possessing a larger number of horses than any other Russian government. Agriculture is carried on in the river valleys to some extent; but the mineral wealth of the district constitutes its chief importance. Rich gold deposits are found near Mijaskoi, besides large quantities of copper and iron ore. This territory, known in the 16th c. as Bashkirei, submitted in 1556 to the Czar, and was formed into the government of O. in 1744. The Bashkirs are slowly giving up a nomadic or pastoral life, and taking to agriculture, for which a great part of the soil is well suited. See Mackenzie Wallace's *Russia* (2 vols. Lond. 1877).—**O.**, capital of the Russian government of the same name, upwards of 1390 miles S.E. of St. Petersburg, on the Ural River, in the midst of a barren steppe. It is the chief fortress on the O. frontier, the last important town on the great highway to Central Asia, and one of the principal markets for caravans coming from the Kirghis and Turkestan. The railway from Samara was extended to O. in 1877, thus connecting the town more closely with Moscow and Western Europe. The streets of O. are broad and unpaved; the houses lie far apart, being often separated from one another by fields. The great market-place has both an Asiatic and a European gate. O. possesses a cathedral, five Greek churches, a Lutheran meeting-house, and a gymnasium. Pop. (1873) 35,623.

Oren'se (Lat. *Aquæ Originis*) a town of Galicia, in Spain, capital of a province of the same name, 56 miles S.S.W. of Lugo by rail, on the left bank of the Miño, which is here spanned by a seven-arched bridge, 147 feet high and 1398 feet long. It is the seat of a bishop, has a stately cathedral and two churches, and since the time of the Romans has been celebrated for its sulphurous hot springs, Las Burgas. There are manufactures of linen and chocolate, and a trade in wine and hams. Pop. 6872.—The *province* of O. has an area of 2737 sq. miles, and a pop. (1870) of 402,796.

Oreodaph'ne, a genus of the natural order *Lauraceæ*, and of which some of the species were formerly placed to *Laurus*. They inhabit tropical America principally, and form as a rule large trees. *O. Californica*, of the mountainous parts of California, has leaves pungently aromatic, which are locally used as a condiment. It has a variety of names, such as mountain laurel, spice-bush, &c. *O. opifera*, of the Orinoco district, yields oils that are used in rheumatism, &c., and as an application to tumours. *O. bullata*, of the Cape of Good Hope, gives a fine-grained, dark-coloured wood, much used for cabinet work. Its name of stink-wood denotes the offensive smell of the fresh-sawed timber.

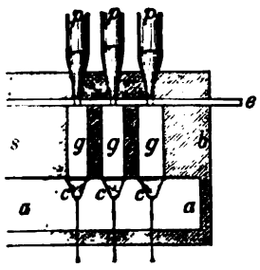
Ores. By the general name ore (Dan. *aare*, 'a vein') is meant the combination or condition in which the metallic substances extracted by metallurgical processes are found in nature. Few metals are obtained in their pure or metallic state, but gold, silver, mercury, and occasionally copper are so found; not unfrequently natural alloys of two or more of these metals are obtained. As a rule, however, metals are found in combination with non-metallic elements, oxygen and sulphur being the most frequent mineralising agents. More rarely arsenic and chlorine are found combined with the metallic elements, and many ores consist of complex mixtures of various compounds; oxide, sulphide, and chloride, of more than one metal being present in one ore. The method of preparing O., and extracting metals from them is described under METALLURGY, and under the names of the various metals. For the way in which they are mined see MINING.

Orfi'la, Mateo José Bonaventura, a famous physician and chemist, and the recognised founder of toxicology, was born at Mahon in the island of Minorca, April 24, 1787. From 1805 he studied medicine and the natural sciences successively at Valencia, Barcelona, Madrid, and finally at Paris, where in 1811 he began to practise, at the same time opening a course of lectures on chemistry, anatomy, and botany, which soon secured for him a wide reputation. He devoted himself chiefly to the study of poisons; and was elected professor of medicine and toxicology in the University of Paris in 1818, and Physician to the king in 1823. O. was a Grand Officer of the Legion of Honour, Dean of the Faculty of Medicine, and Member of the General Council of the Hospitals and of other authoritative bodies. At the revolution of 1848, he was deprived of his position; and soon after fell into ill-health, dying at Paris, March 12, 1853. His chief works are *Traité des Poisons ou Toxicologie générale* (2 vols. 1813; new edition under the title *Traité de Toxicologie* 1831), *Elémens de Chimie Médicale* (2 vols. 1817; 8th ed. 1851), *Secours à donner aux Personnes empoisonnées* (1818), *Leçons de Médecine légale* (2 vols. 1828; 4th ed. 1847), *Leçons de Chimie legale* (4 vols. 1846). O. bequeathed his scientific collections to the town of Angers, and 120,000 francs to the Académie de Médecine for prizes.

Or'gan, a compound wind-instrument composed of a large number of pipes of different forms, sizes, and materials, supplied with compressed air from bellows, and so attached to a keyboard that they may be made to emit musical sounds at the will of a performer. The term O. is derived from the Greek *organon*, and like it originally meant an instrument of any kind; afterwards it came to signify a musical instrument, and still later was restricted to the grandest of wind instruments. In the Old Testament the word O. is used in the sense of pandean-pipes (the Greek *syrinx*, and Hebrew *ugab*), and that instrument combined with a wind-chest, as seen in the bagpipes, is believed to have been the precursor of the O. The invention of the O. is ascribed to Ctesibuis about 200 B.C. Early organs were blown by the fall of water, hence the name *Hydraulic* O. Nothing certain is known regarding the use of the O. in Europe before the 8th c., when the church of St. Corneille at Compeigne was provided with one. Organs were common in England in the 10th c. They were, however, rude in construction, with a small compass of harsh notes. Pedals or foot-keys were devised by Bernardo at Venice in 1470, and gradually other improvements were effected, till at the close of the 16th c. the principal features of the O. differed little from those of the most modern instrument.

The most majestic development of the O. is found in a large instrument, such as used in churches, which is composed of several small organs, differing in quality of tone, and each having its separate wind-chest, sound-board, and distinct row of keys. The parts which make up a large church O. are called the great O., choir O., swell O., solo O., and pedal O. 'Horizonal' bellows supply the air-tight chambers, termed *wind-chests*, with compressed air through wooden pipes named *wind-trunks*. Over the wind-chest, *a a* (see Fig.) is the sound-board *s b*, which contains parallel air passages, *g g g*. These air passages or *grooves* convey through holes in their upper side compressed air to the pipes, *p p p*, arranged in rows above. The valves or *pallets*, *c c c*, are pressed tightly by springs against the openings from the wind-chest into the grooves, but are drawn down by pressure upon the keys with which they are connected. On the upper side of the sound-board, and at right angles to the grooves, channels are formed, and in every one a strip of wood *e* slides backwards and forwards. Each slider is

perforated with holes corresponding to those in the sound-board, and unless the two sets of holes are directly over each other the pipes above cannot 'speak,' even though the groove below be full of air. There is a separate slider for each row of pipes ranged behind *p p p*. The series of pipes over one slider have the same quality of tone, and constitute a 'stop.' The sliders are *drawn out* by draw stop-handles or *registers* when the pipes are to speak. Since every key of a clavier has its own pallet and groove, it is obvious that the pipes over that groove must necessarily belong to one note. The rows of keys are called the *keyboards* or *claviers*, and according as the hands and feet are used in playing them they are termed *manuals* or *pedals*.



O. pipes are differently disposed over the sound-board. A common arrangement is to place the largest on the outside and the smallest towards the centre. The pipes are made of pewter, technically 'metal,' or of wood, as deal, pine, and cedar, and there are two distinct kinds—*flue-pipes* and *reed-pipes*. Metal flue-pipes are cylindrical in the *body*, and terminate at the *foot* in an inverted cone; wooden flue-pipes are four-sided in the body, and stand on a narrow tube. The tone of a flue-pipe is produced by the vibration of the column of air in the body of the pipe. The annexed cut shows the sectional arrangement for producing sound in a wooden flue-pipe. The air is admitted by the foot *f*, and passes through the *wind-way* between the *block b* and the *cap c*, and in escaping impinges forcibly upon the sharp edge or *lip l*, the air in the body is thereby set in vibration, resulting in a musical note. In metal flue-pipes a plate of metal called the *language* takes the place of the block, and by slightly indenting the pipe over and under the mouth to form lips, a thin stream of air is directed against the upper lip and causes the resonance of the enclosed air as before. On the length of the body depends the pitch of the note, the longest pipes producing the gravest notes. Flue-pipes are either open or closed at the top, and a closed pipe speaks an octave lower than an open one of the same length.



Reed-pipes differ from flue-pipes in construction, and the sound emitted by them results from the vibration of a metallic tongue, whose length and thickness determine the pitch. The quality of the note is influenced by the form of the tube above. The *reed*, from which the pipes take their name, is a cylindrical or slightly conical brass tube, closed at the bottom, having a longitudinal slit covered by a strip of the same metal, called the *tongue*. The tongue is firmly held against the reed at the top, but is free at its lower end. A solid block of metal is fixed in the *boot* of the pipe, and through it the open end of the reed passes into a tube either of metal or wood. The air, entering by the boot of the pipe, passes through the reed, and causes the tongue to beat against the walls of the opening, with the production of a musical note. A bent piece of wire, passed through the block in front of the tube, presses against the tongue; by raising or depressing the wire, more or less of the tongue is allowed to vibrate, and the note is grave or acute accordingly. In the *free* reed of M. Grenié, the tongue oscillates freely within the longitudinal opening; it is much used in Continental organs.

The usual compass of a large O. is 4½ octaves on the manual claviers, beginning from C (8-feet stop), and 2½ octaves on the pedal clavier.

Several modern improvements on the O. are noteworthy. The *pneumatic lever* of Mr. Barker is an ingenious contrivance for lessening the fatigue of the performer in pressing down the keys. It is a little bellows, and acts by depressing the wires which open the valves. *Couplers* are employed to secure at pleasure the combined action of different sets of keys, and *composition-pedals*, worked by the feet, effect the movement of certain combinations of the sliders, without removing the hands from the keyboard. Manual labour for the supply of wind from the bellows has been dispensed with by the recent introduction of gas and hydraulic engines adapted to the end in view. Electricity has also been utilised in playing the O. In the *Electric* O. each key of the keyboards, which may be at any distance from the pipes, is connected with its pallet by an insulated wire, and on depressing a key electro-magnetic action is induced which draws down the pallet. The Royal Albert Hall in London possesses one of the largest and most powerful organs in the world. It has 111 stops, and 9000 pipes, ranging from 40 feet in length (30 ins. diameter) to the size of a small key. Of five claviers, four manuals have a compass from C C to C in altissimo, and a pedal extends from C C C to G. The entire O. is 70 feet high and 60 feet wide. See Rimbault & Hopkins, *The O., its History and Construction;* and *The O.*, by Dr. Stainer (series of Music Primers by Messrs. Novello, Ewer, & Co., Lond. 1878).

Organ'ic Anal'ysis is chemical manipulation which aims at determining the composition and constitution of organic compounds. A complex organic compound is ordinarily made up of several distinct simpler compounds; and these are first determined by what is known as *proximate* analysis. This is effected in various ways by mechanical disintegration, by the action of solvents (water, alcohol, ether, &c.), by precipitation, distillation, and crystallisation. The next step is to determine the composition, qualitative and quantitative of the proximate constituents; and the processes necessary to effect this form what is called *ultimate* organic analysis. The ultimate constituents of organic compounds are, as a rule, carbon, hydrogen, oxygen, and nitrogen. Carbon and hydrogen are detected by burning the compound in the presence of an oxidising agent, such as oxide of copper. The hydrogen combines with oxygen to form water; and the carbon to form carbonic acid, which is readily recognised by its action upon solution of baryta, resulting in the formation of the white precipitate of the carbonate of baryta. Heated with excess of caustic potash, a nitrogenous substance yields ammonia. Should sulphur, phosphorus, or arsenic be present, they can be detected by igniting the substance with caustic potash and nitre, when the corresponding acids result. Having thus determined what elements enter into the composition of the compound, the next step is to find the percentage quantities present. The first attempts at quantitative analysis were made by Gay-Lussac and Thenard; and their processes have been modified and improved by subsequent chemists. Liebig especially has introduced many simplifications, and has done more than any other to raise analysis to the high position it now holds. An accurately weighed quantity of the compound to be analysed is intimately mixed with oxide of copper or other strongly oxidising agent in excess. The mixture is placed in a combustion tube of hard German glass, which is connected with potash bulbs through a U-tube containing chloride of calcium. As the compound is heated, the carbon and hydrogen are driven off and become oxidised. The resulting water is absorbed by the chloride of calcium; and its quantity is measured by the increase in weight of the U-tube. The carbonic acid combines with the potash to form the carbonate, and its quantity is obtained similarly. The process is continued till no more gas passes over; the different portions of the apparatus are then weighed, and the quantities of carbon and hydrogen obtained. Should the compound only contain carbon, hydrogen, and oxygen, the quantity of oxygen is found by subtracting the sum of the quantities of the carbon and hydrogen from the whole quantity of the substance. The development of accurate methods of quantitative analysis has, by making chemistry an exact science, led to the great progress of recent years—a progress most marked among organic substances.

Organ'ic Chem'istry, in its original signification, was that branch of chemistry which treated of substances derived from vegetable and animal matter. This definition is now, however, unsatisfactory, since many of the compounds are derived from other sources than organic tissues, and can be formed synthetically by the chemist. At present O. C. is conveniently defined as the 'chemistry of the carbon compounds.' As a general rule organic compounds are composed of hydrogen, oxygen, nitrogen, and carbon, combined in various proportions. A large and most important group of compounds is the hydro-carbon group (see HYDRO-CARBONS), each member of which contains carbon united with hydrogen and oxygen in the same proportion as water. It

embraces the sugars, starch, gum, inulin, cellulose, which are described under their respective headings. The fermentation of these in presence of organic matters results in the formation of alcohols, and introduces us to a wide field of chemical research, embracing the alcohols, aldehyds, ethers, and their derivatives. It is impossible here to do more than refer to the other important groups of compounds—such as the fats and oils, the soaps, the organic acids, succinic, malic, tartaric, citric, benzoic, &c., and the interesting series of cyanogen compounds. The compounds of ammonia, and the closely-allied subject of organic bases, also merit notice. These organic bases are combinations of molecules which enter into the constitution of salts exactly like hydrated bases or metallic oxides. They are also known as alkaloids, are soluble in water, and have an alkaline reaction. Many poisons and drugs, nux vomica, strychnia, atropia, nicotine, conia, &c., owe their action to the alkaloids contained in them. Chemically, these organic bases may be considered as ammonia, in which the hydrogen has been wholly or partially replaced by organic radicals. Trimethylamine, a base occurring in herring brine, is an example, and has a formula $N(CH_3)_3$.

Organ'ic Rad'icals are combinations of several elements, which in organic compounds play the same part as the simple elements in inorganic compounds. The non-metallic elements, chlorine, bromine, sulphur, &c., have their organic representatives in cyanogen, acetyl, formyl, &c.; while hydrogen and the metals have theirs in ethyl, methyl, amyl, phenyl, &c. Certain of these O. R. have been obtained in a separate state, but the majority only exist in their compounds. A single example of the manner in which their compounds are formed will suffice. The compounds of potassium may be compared with those of ethyl, which has the composition C_2H_5. K_2O corresponds to $(C_2H_5)_2O$ or ether; KOH to C_2H_5OH or alcohol; $KHSO_4$ to $C_2H_5HSO_4$ or sulphurinic acid.

Organ'ic Struc'ture and **Or'ganised Bod'ies.** See ORGANISATION.

Organ'ic Sub'stances, in Chemistry, were originally those compounds which are obtained from vegetable or animal matter, and upon which the physical operations of life depend. Now, however, this definition is too limited; and indeed it is impossible to draw a distinct line of demarcation between organic and inorganic chemistry. Nevertheless it may be accepted as a general rule that organic substances are for the most part composed of hydrogen, oxygen, nitrogen, and carbon, combined in various proportions. Many of these substances, at first only obtainable from vegetable or animal matter, can now be formed synthetically by the chemist.

Organisa'tion, a name given to the peculiarity of structure in animals and plants in virtue of which living beings have a number of *organs* or *parts* related to each other in *structure* or *functions*. The possession of such parts constitutes what is known as O. It is the possession of dissimilar structures or parts which sharply distinguishes *organic* or living from *inorganic* or lifeless bodies. Dissimilarity or heterogeneousness in structure is as striking a characteristic of organic bodies as similarity of particles or *homogeneousness* is of inorganic things. The possession of life and the play of vital acts relates the different organs of a living body in their working, and evolves a harmonious whole out of the dissimilar materials of which the organised being consists.

In the earlier definitions which were framed regarding the nature of 'life,' that mysterious force was said to be dependent on the presence of O. That this mechanical method of determining what are living beings is erroneous, may be seen if we consider that there are many organisms which live perfectly as regards themselves, and which nevertheless do not show the slightest traces of O. An *Amœba* (q. v.) or a *Foraminifer* (q. v.) are simply specks of protoplasm devoid of all structure or O., yet each not only lives, but the latter even manufactures an elaborate shell. Thus O. is the *result* and not the *cause* of life. Animals and plants live, not because they are organised; they are organised because they live.

Or'ganism, the term used to denote the collective structure which belongs to a living being. Any animal or plant of whatever rank, and whether of simple or compound nature is an O. See ORGANISATION.

Organis'ta, a genus of Insessorial birds of small size, inhabiting South America, and represented amongst others by the *Trogolodytes leucophrys*, a Peruvian O. These birds derive their popular name from the clear musical nature of their song-notes.

Orga'no-metall'ic Bod'ies, in Chemistry, are an interesting group of substances, in which an organic radical is directly united with a metal without the intervention of oxygen. Organic salts, with metallic *oxides* as bases, such as the metallic acetates, are therefore not included. The members of the series are moulded on the type of the chlorides—the organic radical replacing the chlorine. The corresponding formulæ of the two series, the organic and the inorganic, are exactly similar—one molecule of such radicals as ethyl, methyl, amyl, &c., replacing each atom of chlorine in the chlorides of potassium, sodium, tin, zinc, magnesium, &c. The characteristic property of many of these remarkable substances, especially when the metal is highly electro-positive, is their powerful attraction for oxygen—so powerful in certain cases as to result in spontaneous combustion.

Or'gan Points or **Pe'dal Points.** In some passages of music for the organ, frequently towards the end of fugues, the tonic or dominant is sustained through various changing of harmony, constituting a pedal bass. The parts proceed quite independently of the pedal sustained note, the changes being taken on the manuals.

Or'gan Pos'itive, a small organ without pedals.

Organzine, a variety of thrown silk. Reel threads of silk twisted are called *singles*, and two or more of these singles twisted together in a contrary direction constitute O.

Or'geat (Fr. from *orge*, Lat. *hordeum*, 'barley'), a pleasant beverage made from barley-water and blanched sweet almonds, sweetened with sugar and flavoured with orange-flower water. It is commonly sold in the restaurants of Belgium and France.

Or'gies (Gr. *orgiai*, probably from the same root as *ergon*, 'work') were, among the Greeks, sacrifices accompanied by certain secret rites, as in the worship of Demeter at Eleusis, of Dionysus, and of the Cabiri. These were often marked by drunken revelry, for which the modern word 'orgy' has become a synonym.

Orgues (Fr., from Lat. *organum*, in Suetonius, 'a machine'), in military art, long pieces of timber, pointed and shod with iron, suspended over a gateway ready to descend to close it. In the 15th and 16th centuries a machine—the precursor of the modern *mitrailleuse*—composed of a large number of guns bound together, which could be fired simultaneously or one by one, was termed an O.

O'riel (Low Lat. *oriolum*, variously regarded as a diminutive of *os*, 'a mouth,' or *area*), in architecture, denotes a projection from or recess within a building, as a penthouse, minstrels' gallery, closet, bower, &c. The modern term 'O. window' corresponds to the Bay Window (q. v.) of ancient writers, and Scott is therefore wrong in applying it to the east window of Melrose Abbey.

O'riel Coll'ege, Ox'ford, was founded in 1326 by Edward II., at the suggestion of his almoner, Adam de Brome, for a provost and ten fellows. By 17 and 18 Vict. c. 81, the present foundation consists of a provost, 17 fellows (including the Regius Professor of modern history), 10 scholars, 18 exhibitioners, and 2 Bible clerks. The 10 scholarships, and 4 of the exhibitions (called the Exhibitions of Adam de Brome) are tenable for five years, and are of an annual value of £80. O. C. presents to fourteen livings, and in 1876 had 227 members of convocation, 83 undergraduates, and 434 members on the books.

O'riental Alabas'ter. See ONYX MARBLE.

Orienta'tion, in Archæology, the eastward position of the chancel end of a church, so that the worshippers might face the quarter whence they looked for the second advent of Christ.

Or'iflamme (from Lat. *aure flamma*, 'a flame of gold'), the great national standard of France, only unfurled on important occasions. It was the banner of the abbey of St. Denis, under

the protection of the Counts of Vexin. When the lands of Vexin were annexed to the Crown by Philip I. the banner changed hands also. Some say it was lost at Agincourt, others that it last appeared on the battle-field in the reign of Charles VII.

Origen, the greatest of the Alexandrian divines, was born in 185 A.D. He received an excellent education, first under his father Leonidas, a learned and pious man, who suffered martyrdom when O. was seventeen years of age (202), and then under Clement of Alexandria, the head of the Catechetical school, and the pagan philosopher Ammonius Saccas. Such were his learning, piety, and industry, that at the age of eighteen he was appointed by the Patriarch Demetrius successor to Clement, in which office he earned a great reputation. Owing to the persecution under Caracalla, he paid a visit to Cæsarea (215), where he was received with great distinction. On a subsequent visit to Cæsarea (228), he was ordained a presbyter by the bishops of Cæsarea and Jerusalem. This seems to have given offence to the Patriarch of Alexandria, who in 230 summoned two councils on the subject, the first of which banished O. from Alexandria, and the second deposed him (232) from his sacred office. O. now retired to Cæsarea, where he continued to fill the office of presbyter, giving public instruction, and writing expositions of the Scriptures. He was twice invited to councils held in Arabia against heretics, both of whom (Beryllus of Bostra, 244, Arabici, 248) he convicted of their errors. O. escaped from the persecution of Maximin the Thracian by fleeing to Cæsarea in Cappadocia, but in the Decian persecution he suffered so much ill-usage in Tyre that he died there soon after (254). The writings of O. were very numerous, the principal being expositions of Scripture, which were the model and source for all succeeding Greek commentators, but most of which are unfortunately lost. They were in the threefold form of Homilies, or popular lectures, Commentaries, and *Scholia*, or short notes, specially intended for the learned. He wrote also eight books against Celsus in defence of Christianity, still extant; four on First Principles, only extant in a Latin translation; a Hexapla (q. v.) and Tetrapla, or editions of the Old Testament, on which he laboured for twenty-eight years, but of which only fragments remain; ten books, entitled Stromata, which are lost, besides epistles, tracts, &c. In the field of Biblical criticism the chief merit of O. lay in reforming the Alexandrian system of interpretation, which was the allegorical pushed to extreme, by introducing a more accurate distinction between the *literal*, the *moral*, and the *mystical* sense. When O. was deposed by the Council of Alexandria, he was charged with heretical opinions, as well as uncanonical conduct, and his heretical opinions were afterwards refuted by Jerome and Epiphanius. But his writings were so much corrupted, and so many of them are lost, that it is difficult to tell how far the opinions fathered upon him were actually his. The following are the chief of the peculiar tenets which may with probability be ascribed to him, as being principles of the Alexandrian philosophy generally:—(1) The present world is only one of an infinite series, extending both before and after it. (2) It was created to be the dwelling-place of fallen intellectual beings (angels, stars, men, and demons), who were all created alike in a former state of existence, and may all regain their lost estate; the punishment of the condemned, even of Satan himself, not being eternal. (3) The Logos, as a ray of the Divine glory, was begotten from all eternity, but the Holy Ghost, like all other things, was created by the Son. (4) Souls at the Resurrection would not resume the gross, material body, but one of fine, incorruptible texture. The best edition of O.'s works is that by Lommatzsch (25 vols. Berl. 1831–48). See Redepenning's *Origenes: Eine Darstellung seines Lebens und seiner Lehre* (Bonn, 1841), Gieseler's *Lehrb. der Kirchengesch.* (Eng. trans. 1855), Davidson's *Sacred Hermeneutics* (Edin. 1843). There is an English translation of O. in the *Ante-Nicene Library* (2 vols. Edin. 1870).

Original Sin is sometimes understood to mean, or it is made to include, all the subjective evil consequences of the Fall (q. v.), namely, 'the guilt of Adam's first sin,' 'the loss of original righteousness,' and 'the corruption of our whole nature.' But properly by O. S. is meant the third of these particulars only, namely, 'the inherent corruption in which all men since the Fall are born,' which is called O. S. by theologians because (1) 'it is truly of the nature of sin,' (2) 'it flows from our first parents as the origin of our race,' (3) 'it is the origin of all other sins,' and (4) 'it is in its nature distinct from actual sins.' The conceptions and definitions of the nature of Sin (q. v.) which prevailed in the primitive Church were very indefinite. According to the dualistic theory of many of the heretical sects, sin was regarded as a necessary consequence of contact with evil matter. Orthodox theologians, on the other hand, regarded it as a voluntary disobedience of God, and in relation to the Fall the sinful acts of every individual appeared to them rather a voluntary repetition of the first sin than a necessary consequence of it. Man stood in the same relation to the tempter that Adam did before the Fall. The first to use the phrase O. S. was Tertullian (q. v.), who taught that 'the soul propagates itself, with all its defects and faults, as matter is propagated.' According to Origen (q. v.) the soul was stained with sin in a former state, and thus enters the world in a sinful condition, while physical generation is in itself a sinful act (an idea which belongs to dualism). It was in the controversy with Pelagius (q. v.), however, in the 5th c., that the doctrine of O. S. was first strictly defined by Augustine (q. v.). According to the former, every human being is a moral agent, complete in himself, and separate from all others, and hence there could be no other connection between the sin of Adam and the sin of his posterity than a voluntary imitation of a bad example. In opposition to this, Augustine laid down the doctrine that 'as all men have sinned in Adam, they are justly exposed to the vengeance of God, because of this hereditary sin and guilt of sin.' In later times, the theologians of the Eastern Church generally, while admitting a deterioration of the moral power of man, retained the earlier notions regarding the freedom of his will. In the Western Church, almost all the Schoolmen (q. v.) followed Augustine, although with various modifications of his doctrine. The Mystics (q. v.) in general spoke of the entire depravity of 'the old man,' and the evangelical theologians regarded all as corrupted by O. S., while making a difference between accountability for it and for actual transgressions. After the Reformation, the doctrine as developed among the Protestants was strictly Augustinian: 'The Fall of man was an act by which his inmost nature was corrupted, his original righteousness changed into absolute depravity, and whose consequences have so affected his descendants as to expose them, in their natural condition, to the Divine wrath, and to unfit them for the free performance of anything that is truly good.' According to the Roman Catholic theology 'the Fall caused only the loss of the Divine gifts, the natural consequence of which is man's imperfection and infirmity.' The doctrine of the Arminians (q. v.) was, (1) That the corruption of nature which all men derive from Adam is not of the nature of sin;' and (2) 'That man by the Fall has not lost his ability for good.' The doctrine of the Socinians (q. v.) was as nearly as possible Semi-Pelagianism (q. v.). See Hodge's *Systematic Theology* (Edinb. 1873), Hagenbach's *Lehrbuch d. Dogmengeschichte* (Eng. trans. 1847).

Orihue'la, a town of Spain, province of Alicante, 16 miles N. of Murcia, on the Segura, which is here crossed by two bridges. The town, which is surrounded by a fine huerta containing palm, orange, citron, almond, pomegranate, and mulberry trees, has a cathedral, four churches, twelve monasteries, three libraries, and a theatre. The people cultivate fruit and silkworms, and also the manufacture of hats, soap, and saltpetre. A great fair is held annually on the 6th of August. O., the Roman *Orcelis*, named by the Goths *Auriola*, came into the hands of the Arabs in 712, from whom it was taken in 1264 by Jago I. of Aragon. Pop. 16,478.

Orino'co, a river of S. America, almost entirely within Venezuela, rises in the Sierra Parime, on the N. frontier of Brazil, in lat. 3° 40′ N. It bifurcates 150 miles from its source, sending the Casiquiare S.S.W. to the Rio Negro, and its main stream in a great curve first N.W., then N., and finally W. to the Atlantic, which it enters at the western extremity of British Guiana, and by one large and many smaller channels, forming a delta 180 miles wide. It is said to receive the waters of nearly 2000 streams; of these, the most important from the W. are the Guaviari, Meta, Apure, &c., from the E. the Caroni and Caura. The total length of the river is 1960 miles, but it is navigable only to the Apure (q. v.), a distance of 777 miles. It drains an area of 650,000 sq. miles. Above this point it is interrupted by cataracts, those of Atures and Maypures being celebrated for their romantic beauty. In its upper course the O. drains on the E. a richly-wooded highland region, and on the W. the wide

expanse of llanos stretching towards the Columbian Andes. At Bolivar, 250 miles from its mouth, the river is 390 feet deep and 4 miles wide.

O'riole (Fr. 'golden yellow'), the name given to very different kinds of *Insessorial* birds. The genus *Oriolus*, to which belong the Golden O. (*O. galbula*), the Mango bird of India (*O. kundoo*) and the black-headed Bengal O. (*O. melano cephalus*), is included in the Dentirostral section of the Insessores. In this genus the nostrils are oval-shaped, and the tail is rounded and of moderate size. The third and fourth quills are the longest. The golden O. inhabits the S. of Europe. It is common in Italy, attains a length of 10 inches, and is of a bright yellow colour (hence its name), with black on the wings. It subsists on insects. Another group of birds so named is included among the *Conirostral* Insessores, and in the family of the *Icterinæ*, or 'Hang-nests.' The orchard O., or 'Bob-o'-Link' (*Xanthornis varius*), occurs in America. It does good service by destroying large quantities of caterpillars in spring. The male is black above, and has brown tints below; the female is of a yellowish-olive above. The average length is 6 inches. The Baltimore O. (*Yphantes Baltimore*) extends throughout N. America, and is also found in Brazil. The nest is pendulous and purse-like. A deep black colour prevails in the upper parts of this bird, while the under parts are a bright orange. The crested O. (*Cacicus cristatus*) of tropical America is a third species, brown in colour, and having a crest on the head.



Orioles' Nests.

Ori'on, a mighty Bœotian hunter, the son of Hyrieus or Poseidon, according to the Greek myth, was so tall that he overtopped the clouds, and could wade through the deepest seas. For violence done to Æro, a Chian maiden, he was blinded by her father Œnopion, but regained his eyesight by journeying eastward, so as to meet the rays of the rising sun. After his death, which was variously ascribed to the sting of a scorpion and the arrows of Artemis, O. was placed among the stars (Hom. *Iliad*, xviii. 486).

Ori'on, one of the most brilliant of constellations. It lies in the southern hemisphere, but is visible in northern latitudes during the winter months as a striking object above the southern horizon. Of its seven principal stars, two (Rigel and Betelgeuse) are of the first magnitude, and three of the others lie in a straight line forming the so-called belt. A little below the belt, forming part of the sword-sheath, is an irresolvable nebula, one of the few visible to the naked eye, and one of the most fantastic in shape. See NEBULA.

Oriss'a, a province of Bengal, British India, running down S. almost from the mouth of the Hooghly river to the Ganjam district of Madras, and lying between the Bay of Bengal and the plateau of Central India. Area (including tributary states) 23,901 sq. miles; pop. (1872) 4,317,999. It consists of a fertile alluvial plain, bordering the sea, which may be regarded as the delta of three rivers, the Mahanuddy, the Brahminy, and the Byturni; and of a hilly tract inland, the home of aboriginal tribes, and still ruled by semi-independent rajahs, of whom those of Morbhunj, Keonjhur, and Dhenkanul are the principal. It is divided into the three districts of Cuttack, containing the capital city of the same name, Puri, with the town and temple of Juggernauth, and Balasore. The staple, and indeed only, crop is rice; the complete failure of which caused the terrible famine of 1865–66, by which one-fourth of the total population is known to have been swept away. Canals both for irrigation and navigation have now been constructed (see ORISSA CANALS), and the ports on the sea-board have also been greatly improved. In 1875–76 the imports amounted to £347,000; the exports, chiefly rice, to £327,000. The harbours are False Point and Chandbally. There is also a brisk trade by land with Madras and Bengal. The manufactures are insignificant, excepting salt. Another valuable product is building-stone. The inhabitants, called Ooriyas, use a peculiar dialect derived from the Sanskrit, which is cognate to Bengali and Hindi. They emigrate to Calcutta as palanquin-bearers, domestic servants, and gardeners. In 1875–76 the total revenue was £319,000, of which one-half came from land and one-third from salt. The land settlement differs from that of Bengal, in being fixed for terms of thirty years instead of permanent; the rights of the cultivators also are better secured.

The province has always enjoyed an isolated history of its own. At the commencement of the Christian era it was a Buddhist kingdom; and the Buddhist caves and sculptures in O. are thought to be the earliest monuments of that religion in India. Then followed two dynasties of Hindus, successively worshippers of Siva and Vishnu, the latter of which founded and endowed the world-renowned temple of Juggernauth (q. v.). In those days the limits of the province were extended N. to the Hooghly, and S. to the Godavery River. In 1559 occurred the Mohammedan conquest; but the descendant of the last Hindu king is still titular Rajah of Koordah, and hereditary sweeper to Vishnu or Juggernauth. The Mahratta marauders obtained possession in 1751, and order was not restored till 1803, when it was conquered by the British in pursuance of the general scheme by which the Mahratta power throughout the peninsula was overthrown by the Marquis of Wellesley. See *Orissa*, by Dr. W. W. Hunter (2 vols. 1872), and Rajendralala Mitra's *Antiquities of O.*, vol. i., published under the order of the Government of India (Calcutta and London, 1875).

Orissa Canals. The husbanding and distribution of the water-supply of Orissa (q. v.) was first commenced in 1862 by the East Indian Irrigation Company. In 1868, after the great famine, the uncompleted works were taken over by Government. The main canals are four in number, and are intended both for navigation and for the irrigation of one and a half million acres. Up to March 1876 a total of £1,657,566 had been expended on capital account. The returns in that year were only £4549, and the aggregate deficit, inclusive of interest, was nearly half a million sterling. The truth is that the cultivators of Orissa are content with the local rainfall in nineteen years out of twenty, and refuse to take and pay for the canal water which they do not want.

Orista'no, a town of Italy, island of Sardinia, in the province of Cagliari, in a fertile plain ('Campidano') on the river Tirso, 3 miles from the Gulf of O., and 61 N.N.W. of Cagliari by rail. It is the seat of an archbishop, and has several churches and monasteries, and a cathedral of the 17th c. with a great belfry. O. carries on maritime trade and tunny fishing, and manufactures earthen vessels for water, wine, and oil, and vases in imitation of the old Etruscan. Pop. (1874) 6996.

Oriza'ba, a town of Mexico, in the state of Vera Cruz, lies in a fertile valley S.E. of the volcano of the same name, 70 miles from the seaport of Vera Cruz by rail. The climate is moist, but not unhealthy. The people are chiefly engaged in cotton and flax spinning, and carry on a considerable trade with Vera Cruz. Round the town are plantations of sugar-cane, tobacco, rice, and coffee. Pop. 37,695.

The *volcano* of O. also called Pic de O., and volcano of San Andres (Mex. Citlaltepetl), is in height and form the grandest mountain in N. America. It reaches (according to Ferrer) an elevation of 17,780 feet above the level of the sea, and was ascended for the first time in 1848 by two American officers, Reynolds and Maynard. The last eruption commenced in 1545, and continued more or less till 1566. The slopes of the mountain are now clothed with forests of fir and oak, and no trace is visible of its former devastations. The snow line is 14,004 feet, the highest pass 14,416 feet, and the limit of tree growth 11,401 feet. The highest inhabited place, Rancho Jacale, is 10,006 feet above the sea.

Ork'ney Islands (Old Norse, *Orkn-eyjar*, 'seal islands'), a group of sixty-seven islands (only twenty-nine of which are inhabited), lying N.N.E. of the county of Caithness, from which it is separated by the Pentland Firth (6 to 12 miles wide), and together with the Shetland Islands (q. v.) forming one county, represented in Parliament by one member. Area, 610 sq. miles; pop. (1871) 31,274. The chief islands, Pomona or Mainland (the largest), Hoy, South Ronaldshay, Rowsay, Shapinshay, Stronsay, Westray, Papa Westray, Eday, Sanday, and North Ronaldshay, are of irregular form and much indented. The surface is generally level and low. Much consists of rock or

waste, especially in the W., where the hills culminate in the Ward of Hoy, 1555 feet high. The formations are Old Red Sandstone, interspersed with basalt, and overlaid in many places with boulder-clay containing striated pebbles. Glacial markings abound. In the sandstone fossil fish, and in the peat-mosses carbonised fossils, have been found in great quantity. The soil is chiefly clay and sand, intermixed with peat and shell-marl. There is little wood, and till recent times agriculture was much neglected. In 1876 there were in O. I. 35,801 acres in oats and barley, 16,301 in green crops, 24,018 in grasses under rotation, 19,146 permanent pasture, and 1014 bare fallow or uncropped arable land. In the same year the horses numbered 5697, cattle 26,156, sheep 30,048, and pigs 4687. In 1877–78 the valued rent was £62,979. The climate, generally moist, is mild for that latitude, but in winter severe storms are frequent. The mean annual temperature is about 46° F., and the rainfall from 28 to 37 inches. Herring, cod, and lobster fishing, rabbiting, fowling, distilling, the manufacture of straw-plait, and the rearing of poultry are the chief occupations of the people. 100,000 lobsters are shipped to London every year, and 20,000 gallons of spirits are annually produced at Kirkwall (q. v.), the county town, at whose port there entered in 1876, 1589 vessels of 114,142 tons, and cleared 1547 of 112,441 tons. Stromness, on the S.W. coast of Mainland, 12 miles from Kirkwall, is a subport to the latter. Between these towns are the prehistoric 'standing stones of Stennis.' Cromlechs, tumuli, and 'Picts' houses' are found in various parts of Orkney. The original inhabitants belonged to the Britanno-Celtic family; but as early as the 8th c. the Northmen (q. v.) began to settle there, and gradually the Celtic population was effaced, and a purely Scandinavian race took its place. Soon after his accession, Harald Haarfager (q. v.) subdued the Vikings who had settled there, and from 875, when Einar, son of Ragnvald, Jarl of Möri, was made Jarl of Orkney, both the Orkney and Shetland Isles owed allegiance to the king of Norway. Christianity was introduced in the 11th c., and soon afterwards, on the conquest of Caithness and Sutherland by the Jarl of Orkney, Malcolm II. of Scotland recognised his authority. In 1355, Orkney passed by the female line to the house of Sinclair, who transferred their allegiance to the king of Scotland, and it was finally handed over to James III. in 1469 as the dowry of his bride, Margrete, daughter of Christiern I. of Norway and Denmark. Ever since Orkney has been subject to the Scottish crown there has been a Lowland-Scotch or Germanic admixture in the population, and the language is now everywhere English, yet in form and features the Orcadians distinctly retain the traces of their Scandinavian origin.

Orle (Fr., from Lat. *orula*, a diminutive of *ora*, 'an edge'), in Heraldry, a subordinary, composed of a double line, at about a fifth part from the edge of the shield. It looks like a narrow border of a small shield charged upon the field of a larger one, and is sometimes called an 'inescutcheon voided.'

Orléans, a town of France, capital of the department of Loiret, lies in a richly cultivated plain on the right bank of the Loire, at the most northerly point of this stream's course, and is connected with the suburb, St. Marceau, which is situated on the other side of the river, by a bridge of 9 arches and 364 yards in length. It is about 75 miles S.W. of Paris by rail. The older part of the town has narrow streets and ancient houses, displaying fine examples in various styles of wooden architecture. The Rue Tabourg in particular preserves all the main features of a street of the 15th or 16th c. In this quarter are the houses of Jeanne Darc and Agnes Sorel; to the first of whom three monuments have been erected in different parts of the town. The upper part of O. is built in modern style. The finest buildings are the Cathedral of Ste. Croix (1601–1790), the churches of St. Aignan and St. Euverte, the Palace of Justice, the Prefecture, and the Hôtel-Dieu. O. has also an archæological museum, rich in Roman antiquities, a library which includes valuable MSS., and a picture gallery containing 500 works. The principal manufactures are woollen and cotton stuffs, vinegar, oils, wax, leather, chemicals, colours, &c. Pop. (1872) 48,976. O., which existed before the Roman invasion under the name of Genabum, became under Roman rule one of the most important cities of Gaul. It owes its name *Aurelianum* (of which O. is the modern form) to the Emperor Aurelian, who greatly embellished the town. Later, O. became the capital of a Merovingian kingdom, and was united with France under Hugo Capet. In 1428 the town was delivered from the siege of the English by Joan of Arc, hence called also the Maid of O. During the late Franco-Prussian War the possession of this place and the bridge over the Loire became of great strategical importance. It was taken by the Germans under General von Tann on the 10th October 1870, reoccupied by the French on the evacuation of the Germans on the 9th November, and again taken by the Germans under the Grandduke of Mecklenburg on the 4th December, when it became the headquarters of the 2d Army Corps.

Orléans, the name borne by several branches of the Houses of Valois (q. v.) and Bourbon (q. v.). The only noteworthy members in earlier times were (1) **Louis Duc d'O.**, born in 1371, brother of Charles VI. His murder by Raoul d'Octonville, a follower of Jean sans Peur, Duke of Burgundy, in the streets of Paris (November 26, 1407), brought on the furious strife between the Armagnacs and the Burgundians, which threw France into the hands of Henry V. of England. A natural son of this Louis was the famous Jean Comte d'O., better known as the 'Bastard of O.,' and founder of the house of Dunois and Longueville.—(2) **Charles Duc d'O.**, lawful son and heir of Louis, born at Paris, 26th May 1391, became the head of the party against Burgundy and England, but was wounded and taken prisoner at the battle of Agincourt (1415), and did not regain his freedom till 1439. On his return to France he withdrew to his castle at Blois, and spent the rest of his life in the cultivation of the muse. He died 4th January 1465. The best edition of his admirable verses is that by Guichard and Champollion (Par. 1842). By his third marriage with Mary of Kleve, he had a son who mounted the throne of France as Louis XII., when the dukedom of O. reverted to the crown.—(3) The next conspicuous man who bore this title was **Gaston Jean Baptiste de France**, younger son of Henri IV., who was born on April 25, 1608, at Fontainebleau. By his marriage with the Duchess de Montpensier (1626) he became possessor of immense wealth and the Duchy of O., but it was not until he had offered the strongest objections to the plan, which was devised by his mother and Cardinal Richelieu. In 1627, his wife being dead, he wished to marry Maria of Gonzagua, and on being hindered, openly declared himself an enemy of the Cardinal. Having fled to Lorraine, he married a sister of Charles IV., declared war against Richelieu, but was driven into exile at Brussels. Thence he issued with a following of 2000 adventurers, who scoured the country as far as Languedoc; but at Castelnaudary, through his own cowardice, he received a final check, and signed a treaty engaging himself 'to respect all the King's Ministers, and particularly the Cardinal.' No sooner had he returned to the French Court than he began to plot against Richelieu's life, his intrigue only being stopped by his exile to Blois (1642). Recalled during the youth of Louis XIV. and the Spanish campaigns of 1644, 1645, and 1646, he did something to re-establish his reputation. During the war of the Fronde he played the pitiable part of a trimmer, and was ultimately sent back to Blois, where he died in confinement on 2d February 1660. See Sismondi's *Histoire des Français*, vols. xxii., xxiii., xxiv., xxv., and Kitchin's *History of France* (vols. i. and ii. 1873–77).

(4) The present house of O. springs from **Philippe I.**, brother of Louis XIV., who was born 21st September 1640, and died 9th June 1702. He was succeeded (5) by his son, **Philippe II., Duc d'O.**, who was born at Saint-Cloud, 2d August 1674, educated under the baneful influence of the Abbé Dubois, took up the profession of arms, and made his first military appearance at Mons. In January 1692 he married Mlle. de Blois, a daughter of Louis XIV. by Mme. de Montespan, and in the same and following years he served at Steinkirk and Neerwinden. By the jealousy of the King he was removed from the army until 1706, when he commanded with distinction in Italy, and in 1707–8 in Spain, to the Crown of which he laid a claim, that was succeeded by some years of exile from the French Court. On the death of Louis XIV., O. became Regent of France, appointing (1715) a Regency-Council, which overthrew the terms of the late King's will. He also elaborated a scheme by which the great feudal houses should again rule the country, and began his regency by extending to religion, literature, and local estates a large measure

of new freedom. But the finances were in hopeless confusion, and O. availed himself of the services of John Law, a Scotch money-changer, who developed a vast system of paper issue, which in 1720 broke down amidst general execration. Foreign affairs were handed over to the guidance of Dubois, and O., though a man of good ability and sound taste, devoted himself to a systematic career of debauchery. Business passed out of his hands, as his indolence and excess grew upon him, and he died at Versailles, 2d December 1723. See Kitchin's *History of France* (vol. iii. 1877).—(6) **Louis-Philippe Duc d'O.**, great-grandson of the preceding, was born at St. Cloud, April 13, 1747, educated by the Comte de Pons-Saint-Maurice, and early developed a taste in the direction of loose pleasures. In 1769 he married a daughter of the Duc de Penthièvre. Two years later he showed to what purpose he had imbibed certain theories of emancipation from America by opposing Maupeou in his arbitrary formation of a Parliament. He got a naval command (July 1778), and by his conduct in action earned the applause of the populace, though it is doubtful whether he did not behave with pusillanimity. At the Assembly of Notables (1787–88) he was chief of the Opposition, and created an O. party, and by lavish expenditure skilfully directed strengthened his hold on the people. In 1789 he was returned for the National Assembly, entered with zest into the Democratic measures adopted against the Court, and in June 1791, after the flight of the king, seemed on the point of obtaining the Crown. He was returned to the Convention (Sept. 1792), and received the name Philippe Égalité from the Commune. Fearful that the Jacobins would avenge an opposite vote, he gave his in favour of the execution of the King. It was received with the execration it deserved, and he was himself brought to the scaffold, 6th Nov. 1793, under the accusation of aspiring to royalty. See Thiers' *Histoire de la Revolution Française*, Lamartine's *Histoire des Girondins*, and Kitchin's *History of France* (vol. iii. 1877). His son Louis-Philippe was called to the throne in 1830. See LOUIS-PHILIPPE.

Orleans Cloth is a plain woven fabric consisting of a cotton warp and worsted woof. It derives its name from having originally been manufactured at Orleans.

Orleans, New. See NEW ORLEANS.

Orloff, a celebrated Russian family, whose founder, condemned to death in 1689 for his share in the insurrection of the Strelitzes, was spared by Peter the Great for his fearless bearing, and appointed an officer in the newly-formed Guard. His son, **Grigorij O.**, governor of Novgorod, had five sons, of whom the second and third, Gregorij and Alexij, played important parts. **Grigorij, Prince O.**, born 1734, came to St. Petersburg during the Seven Years' War, and succeeded Poniatowski in the favour of the Grand-Princess Catharine. O. led the revolution that set Catharine on the throne in 1762, and thereafter, as her declared favourite, received great honours and possessions, being made general of the artillery, raised, with his brothers, Ivan, Alexij, Fedor, and Vladimir, to the dignity of count, and appointed by the Emperor Joseph II. in 1772 Prince of the German Empire. He ruled Russia unrestricted; and would have become the husband of Catharine but for the opposition of the aristocratic party under Count Panin. But at length, estranged by his proud and brutal manners, she forsook O. for Potemkin, and tried in vain to soothe the fallen favourite with the gift of the Marble Palace at St. Petersburg. He married suddenly, sank into insanity, and died in great suffering at Moscow, 24th April 1783. O. was thoughtless, prodigal, and vain, yet clever and courageous. By Catharine he was the founder of the Bobrinskij family.—**Alexij, Count O.-Tchesmenskij**, was an active officer of the Guard in the revolution of 1762, when he was the first to proclaim Catharine Empress of Russia, and is said to have strangled the deposed Peter III. Appointed commander of the Russian fleet in the Archipelago, he gained (1770) the great naval victory of Tchesme over the Turkish fleet, and received the surname 'Tchesmenskij.' When the Emperor Paul ascended the throne, he called O. to St. Petersburg from Moscow, whither he had retired after Catharine's death, but took no further vengeance on him and Baratinski, the only surviving murderers of his father, than to make them bear the pall at the solemn removal of Peter's corpse from the Alexander-Nevsky Monastery, and then to banish them from the court and from Moscow. After the Emperor's death O. returned to Moscow, and died there in his magnificent palace, January 5, 1808. He was a man of gigantic strength, and had great courage and daring, but a harsh and imperious character. —The legitimate descendants of the O. family died out in 1826, but the name was preserved by four illegitimate sons of Fedor, two of whom rose to distinction. **Michael O.**, the elder of the two, born 1785, was aide-de-camp to Alexander I., and concluded in 1814 the agreement for the capitulation of Paris; but, being suspected of a share in the rebellion of 1825, was banished to his estates, where he died in 1842. His brother, **Alexij O.**, born 1787, was a distinguished cavalry officer in the war with France, became thereafter aide-de-camp to the Grand-Prince Constantine, and in 1825 was a colonel at St. Petersburg. For his active measures in crushing the insurrection of that year, he was rewarded with the title of Count. In 1828–29 he led a cavalry division against the Turks, and concluded the Peace of Adrianople. O. was afterwards employed on several important missions, as in 1831 to Poland (where his presence during the death by cholera of General Diebitch and the Grand-Prince Constantine led to the suspicion of foul play), in 1832 to the Hague and London, and in 1833 to Constantinople, where he induced the Sultan to sign a treaty highly favourable to Russia. O. now became a general of cavalry, and after Benkerdorff's death was made Chief of the Police. In 1854 he was sent to Vienna to bring over Austria to the side of Russia. O. was a member of the Congress of Paris in 1856, and in the September of the same year he was appointed President of the Imperial Council. He died **May 2, 1861**. His only son, **Nikolai O.**, distinguished himself in the Crimean War, and lost an arm and eye at Silistria. He has since been employed as a diplomatist, first at Brussels (1860–70), then in London (1870–71), and from January 21, 1872, at Paris.—**Vladimir Davidoff**, son of a daughter of Vladimir O., received permission in 1856 to take the name **O.-Davidoff**. He was the leader of the opposition of the nobility to the abolition of serfdom, and in 1865 was spokesman for the nobles of Moscow who craved a free constitution.

Orlop (Dutch, *overloop*, 'over-running'), the lowest deck of a ship of the line, is situated immediately above the hold, and below the water-line, and contains the storerooms, cockpit, and magazine.

Orme, Robert, the military historian of British India, was born in Travancore, in S. India, 1728. Educated at Harrow, he returned to India as a writer in the East India Company's service in 1744. The first volume of his history was published in 1763, and he was forthwith appointed historiographer to the Company, with a salary of £400 a year. The work was completed in 1778, and covers 'the military transactions of the British nation in Indostan' from 1745 to 1763. O. died at Ealing, Middlesex, 13th January 1801, leaving a valuable collection of MS. and other historical materials to the East India Company, which have never yet been properly catalogued. His literary style was scarcely equal to his industry; but the ornate manner in which he treated an important period of history has stimulated the patriotic spirit of many other readers besides 'Colonel Newcome.' Lord Macaulay, in his well-known essays on Clive and Warren Hastings, has borrowed entire passages from him with but little modification.

Orme's Head, Great (Norse, *ormr*, 'a serpent'), the northernmost point of Cærnarvonshire, in Wales, forms, with the Little Orme's Head, 4 miles to the E.S.E., part of a limestone range which varies in height from 700 to 500 feet. The former of the headlands is surmounted by a lighthouse, and between them lies the watering-place of Llandudno.

Or'min, Orr'min, or Orm, an author whose work, the *Ormulum*, named after himself, is one of the most valuable specimens of 'Transition English.' He was a canon regular of the order of St. Augustine, and wrote for the spiritual edification of his countrymen. His plan was to give a paraphrastic version of the Gospel for every day in the year, adding to each portion an exposition, in which, as a rule, he draws largely on Augustine, Ælfric, and Bede. Of this complete system of homilies we have nothing now beyond the text of the thirty-second. The metre of the *Ormulum* consists of lines of fifteen syllables pointed at the end of the eighth—one of the first English imitations of a Latin rhythm known. The handwriting, ink, and materials of the MS. (a vellum folio now in the Bodleian Library, supposed to be in O.'s own hand), lead to the supposition that it was

composed in the 13th c. The language is East Midland, with certain peculiarities of spelling, such as the doubling of consonants. Mr. Kingston Oliphant says of O. : 'He is the last of our English writers who can be said to have drunk from the undefiled Teutonic well ; no later writers ever use so many prepositional compounds, and on this account we ought perhaps to fix upon an earlier year than 1200 for his date. In the course of his lengthy poem, he uses only four or five French words ; his few Latin words are Church phrases known in our land long before the Norman Conquest. On the other hand, he has scores of Scandinavian words, the result of the Norse settlement in our eastern shires 300 years before his day. His book is the most thoroughly Danish poem ever written in England that has come down to us ; many of the words now in our mouths are found for the first time in his pages.' Dr. White edited the *Ormulum, with Notes and Glossary* (Oxford, 1852). See also Kingston Oliphant's *Sources of Standard English* (Lond. 1873).

Or'molu (lit. 'milled or beaten gold') is a mixture of copper and zinc closely resembling gold in colour. The colour is enhanced by dipping in dilute sulphuric acid and by the use of a 'scratch-brush.' O. is cast into ornaments for the embellishment of furniture and other articles.

Or'mond, James Butler, Duke of, was born in London, 19th October 1610. An ancestry is claimed for him which dates from a Norman family older than the Conquest : what is certain is that in the 13th c. the office of cupbearer to the king was held by the family. When but a boy he lost his father and became Viscount Thurles. His grandfather, the Earl of Ormond, being imprisoned for some years, the youth was placed under the guardianship of Archbishop Abbott. In 1629 he married Lady Elizabeth Preston, and two years later he succeeded to his estates, went across to Ireland, and served with such distinction under Strafford that he received a recommendation as military successor. In 1640 he was nominated lieutenant-general, with a force of about 3000 men. With much talent and patience O. attempted to keep unity among the different sections of the old Irish Catholics, the Catholics of the English Pale, the Episcopalian Royalists, the Presbyterian Royalists of the North, but not always with success. An armistice, which he was compelled to conclude with the insurrectionists in 1643 produced some decline in his popularity, but he continued to maintain the Royal cause with consistency and vigour as Lord Lieutenant of Ireland in the king's service. After Charles had fallen into the hands of the Puritans, however, O. resigned and retired to France (1647) to meditate new schemes in behalf of his sovereign. He returned to Ireland, and by unwearied negotiations among the Papists, was able to bring together a formidable force by the beginning of 1649. On the 2d of August he was defeated near Dublin by an inferior force under Lieutenant-General Michael Jones, and again by Cromwell at Wexford and Ross. In 1650 O. went back to France, and continued to devote himself to the interests of Charles II. He was in England in 1658. 'One of these days,' writes Mr. Carlyle, 'there came a man riding jog-trot through Strafford-at-the-Bow, with "a green glazed cover over his hat," a "night-cap under it," and "his valise behind him ;" a rustic-looking man, recognisable to us amid the vanished populations—who take no notice of him as he jogs along there—for the Duke of O., Charles Stuart's head man ! He is fresh from Flanders and the ex-king ; has arrived here to organise the Spanish Charles Stuart invasion, and see what Royalist insurrection or other domestic mischief there may be hopes of.' At the Restoration he crossed with the king, and was twice nominated Viceroy of Ireland. In 1679 an attempt was made upon his life by Colonel Blood, which led to O.'s son threatening to pistol Buckingham at the throne as the originator of the plot. O. died at Kingston Hall, Dorsetshire, 21st July 1688. His valour, talent, and sincerity won him numerous friends. See Carlyle's *Cromwell*, and Carte's *History of the Life of James Duke of O.* (3 vols. Lond. 1726).

Orms'kirk, a town in Lancashire, England, and a station on the London and North-Western Railway, 42 miles S.S.W. of Lancaster. Hand-loom silk-weaving, rope-making, and the manufacture of cotton and hats are the chief industries, and in the neighbourhood of the town are large collieries. O. possesses a grammar-school, founded in 1614, and a town-hall erected in 1779. Pop. (1871) 6127.

Or'muz, a barren rocky island in the Persian Gulf, 12 miles S.E. of Bandar Abbas. It is 12 miles in circumference, is formed entirely of rock-salt and sulphur, and is inhabited by some 400 persons, who are engaged in salting and fishing. The town, on the N.E. side, is defended by a fort, and was formerly a place of considerable importance. It was held by the Portuguese from 1514 till 1622, when they were driven out by the English and Persians. In recent years it has been farmed to the Imaum of Muscat, who derives a revenue from the export of salt. O. was the temporary refuge of the followers of Zoroaster, when the Mohammedan religion was propagated in Persia, and from hence they fled to Bombay, where they became known as the Parsees (q. v.).

Or'muzd (Zend, *Ahura-mas-das*, 'the spirit of the great god of light') was the principle of light, the good deity in the Zoroastrian system of religion, as Ahriman (q. v.) was the evil deity. Zoroaster (q. v.) taught that all things, good and evil, emanated from one everlasting but unmanifested deity (*Zaruana akarana*, 'the uncreated eternity'). This absolute god created from himself a dualism perpetually exhibiting the antithesis of light and darkness—O. and Ahriman ; the evil principle however coming first. O. came next as a principle of light and order, to regulate the chaotic darkness and anarchy which Ahriman had produced. O. then generated from himself six other spiritual beings, called Amshashpands (Zend, *amescha-çpenta*, 'immortal saint'), between whom and the six Dævas or evil spirits similarly created by Ahriman there is perpetual warfare, not only in the aggregate, but each against his special opponent. It was by the creative word, Honover, that Zaruana created O., and by the same the latter now created the world and all material things, completing the work in a series of six periods. See ZOROASTER, ZEND AVESTA.

Orne, a department in the N.W. of France, embracing that part of Normandy formerly known as the duchy of Alençon, together with a large part of the district of Perche, which was included in the old province of Maine, is separated on the N. and E. from the English Channel by the departments of Calvados and Manche. Area, 2350 sq. miles. Pop. (1876) 392,526. The country is generally hilly, and contains large tracts of uncultivated moorland ; but the river valleys are fertile, and produce good crops of oats, potatoes, hemp, flax, beetroot, and various kinds of fruit. The department takes its name from the river O., which rises here, becomes navigable at Caen, and flows into the Channel ; the principal other streams being the Rille, which flows into the estuary of the Seine, the Huisne and Sarthe, affluents of the Loire. Large quantities of iron, granite, quartz, and porcelain clay are obtained, and seventeen large mineral springs exist, the most frequented of which is that of Bagnolos. Besides cattle, the chief articles of commerce produced in O. are ironwares, sugar, linen, lace, leather, and cider. Alençon is the chief town.

Ornithodel'phia ('bird-wombed'), the term given to the lowest division of the Mammalia (q. v.), represented by the two genera *Ornithorhynchus* (q. v.) and *Echidna* (q. v.). In these animals there exists a striking resemblance in the disposition of the female generative organs to that which obtains in birds. Thus the two *Fallopian tubes* or *oviducts*, instead of uniting, as in higher mammalia, to form a *uterus* or *womb*, remain separate and distinct throughout. These oviducts, moreover, open separately into a *cloaca* or common cavity, which receives the *rectum* or lower extremity of the intestine, and the *ureters*. A like disposition of parts exists in birds. Other characters of the O. are found in the fact that *marsupial bones* exist, as in *Marsupialia* (q. v.). The bones of the shoulder also evince birdlike characters. The *coracoid bones* (which are mere processes of the shoulder-blade in other mammals) extend to the breast-bone, whilst a T-shaped bone (the *interclavicle*) supports the united collar-bones. The *cerebellum* or lesser brain is uncovered by the cerebrum. No teats exist on the mammary glands, which are situated posteriorly. The angle of the mandible lower jaw is not inflected, and there is no outer ear. The males have a kind of spur on the hinder feet, the use of this organ—which is perforated and connected with a gland—being unknown. The brain-hemispheres are smooth in *Ornithorhynchus* (q. v.). The O. are confined in their distribution to Australia and Tasmania. The higher divisions of the mammalia are the *Didelphia* (q. v.) and *Monodelphia* (q. v.).

Ornithol'ogy, a special branch of zoology which was formerly devoted to the investigation of the structure, classification, and habits of birds. With the rapid growth, within recent years, of zoology, and with the extension of research into all departments of natural history, 'special' departments have well-nigh disappeared. Birds are now studied as a great class of natural history objects, falling within the ordinary range of observation of the zoologist. The most famous ornithologists of past times were Belon, Willoughby, Ray, Latham, Temminck, Illiger, Swanson, Nitsch, Wilson, and Audubon. These men described chiefly the habits of birds, and noted their external appearances. Their systems of classification were almost entirely *artificial*—that is, were drawn from external resemblances alone. It cannot be denied that even the modern classification of birds is thoroughly artificial. The striking general likeness of the various members of the group to each other, and the difficulty of determining characters which will serve for their absolute distinction, are obstacles that hinder the construction of a true or natural system of management. See BIRDS.

Ornithorhyn'cus, or **Plat'ypus**, in Natural History, a curious mammal found in Australia and Tasmania, and belonging to the family *Ornithorhynchidæ*, of the order *Monotremata*. Only one species (*O. paradoxus*) is known. It measures from 18 to 20 inches in length, including the tail, and has a depressed body clothed with coarse hair, at the roots of which there is a soft, thick fur. The hair is dark-brown on the back, but ferruginous on the throat, breast, and belly. The head is small and round, with small bright eyes and internal ears, and terminates in two mandibles nearly 3 inches long, resembling the bill of a duck, and at the end of which are the nostrils. The bill is covered by a leathery membrane, and changes in form and colour after death. The mouth contains eight horny toothlike processes, and the tongue is of very peculiar shape, being furnished at the root with a kind of bulb, preventing the involuntary swallowing of food, which is directed into cheek-pouches. The legs are short, and the feet have each five toes armed with strong claws, and connected by a membrane which in the fore-feet projects beyond the claws, but is drawn back when the animal burrows. On the hind-legs of the male there is a spur whose use is unknown, as it is not employed in defence. The tail is flat, broad, and in the adult O. clothed with hair on the upper surface only. The O. also possesses anatomical peculiarities approximating it to both birds and saurians. It is ovoviviparous, and usually produces at a birth two young ones, which are then very imperfectly developed. The food of the O. consists of aquatic insects and river shell-fish, which it procures both by diving and by dabbling in muddy places with its bill like a duck. When alarmed it growls like a puppy, and when asleep coils itself into a ball. The O. makes its abode in a bank near water, burrowing in a serpentine manner as much as 50 feet, and then forming a nest, which it lines with grass and dry weeds. It is crepuscular in its habits, swims rapidly, and on land runs and climbs with considerable agility. In captivity it is gentle, but delicate to rear. It has a fishy smell, probably from an oily secretion, as it takes great pride in keeping its fur clean. The flesh is eaten by the blacks, and the skin is manufactured into leather in Sydney to a small extent.

Ornithoscel'ida, a division of extinct *Reptilia*, proposed by Huxley to include the existing division of the *Deinosauria*, along with the curious little reptile *Compsognathus*. The latter appears to have been intermediate between birds and reptiles. It had toothed jaws, a slender neck, short fore-limbs, long and birdlike hind-limbs, and a short femur or thigh. Its remains occur in the lithographic slates of Solenhofen in Bavaria, a formation belonging to the Upper Oolitic series of rocks.

Orobancha'ceæ, or **Oroban'cheæ**, is a natural order of Dicotyledons—all leafless brownish root-parasites—consisting of about 130 species, which are distributed through temperate and tropical countries, but are most abundant in S. Europe and E. Asia. Their properties are astringent and bitter. They ordinarily consist of a simple leafless fleshy stem, furnished with bract-like scales, and terminating in labiate flowers generally arranged in a dense spike. The seeds are very numerous and very minute. The root-stock is thick and tuberous. Each species appears to have its own special set of plants on which it feeds. Thus in the genus *Orobanche*, or broom-rapes, of those occurring in Britain, *O. major* is found on furze and broom, *O. minor* is injurious to clover crops, *O. hederæ* grows on ivy, *O. rubra* on thyme (or trap-rocks). The *Lathræa squamaria*, or toothwort, so called from the toothlike scales of the root-stock, found parasitic upon the roots of trees in shady places, is also a British species. See CANCER-ROOT.

Or'obus can only be considered a sub-genus of *Lathyrus* (q. v.), the characters by which it differs not being of sufficient importance to constitute generic distinction. There are a considerable number of species, chiefly found in mountainous and woody districts, and dispersed over Europe and parts of Asia. The tuberous O. (*L. macrorrhizus*), is a common plant in Britain, in woods and shady hilly ground, ascending to 2100 feet in Scotland. Its creeping root-stock forms tubers, which are (or perhaps were) sometimes eaten by the Highlanders under the name of Cormeille, and are said to repel hunger. The plant has dark-green leaves, and flowers of lurid crimson, fading to green and blue; it forms acceptable pasturage on the hill-sides. Another species, *L. niger*, found in two Scotch localities, is now nearly extinct.

Oron'tes (Arab. *Nahr-el-Asi*, 'rebel stream'), the principal river of Northern Syria, rises from the watershed of the Cœle-Syrian valley, about three miles N.N.E. of Baalbek, and flows in a general northerly direction through the Bahr-el-Kades—a lake 6 miles long by 2 wide—past Hems and Hamah, as far as Jisr Hadid ('the iron gates'). Here it enters the valley of Antioch, and doubling back upon itself flows S.W. towards the sea, this part of its course being compared by Stanley to the Wye. Its entire length is upwards of 200 miles. The O. was famed in antiquity, Juvenal using its name as equivalent to Syria (*Sat.* iii. 62).

Oro'sius, a historian whose fame is greater than his merit, was a presbyter of Tarragona, in Spain, in the 5th c. In 413 he went to Africa to visit Augustine, who instigated him to write his history of the world, with the object of showing that as great calamities had happened to the Roman Empire under Paganism as under Christianity. After visiting Jerome in Palestine (415), where he joined in opposing the errors of Pelagius (q. v.), he returned through Africa to his native country. The date of his death is unknown. His principal works were *Historiarum adversus Paganos Libri VII.*, and *Liber Apologeticus contra Pelagianos*, &c. The former of these, better known as the *Historia Mundi*, was a favourite historical compend of the earlier part of the middle ages, when men who desired knowledge were glad of anything that threw a light upon the darkness of the past. King Ælfred turned it into English, enriched it with additions of his own, and omitted a good deal of controversial stuff. See Mörner's *De Orosii Vita*, &c. (Berl. 1844).

Orosz'haza, a town of Hungary, county of Békés, and 31 miles N.E. of Szegedin by rail. It produces excellent wine, and has a large trade in cattle. Pop. (1869) 14,554.

Orota'va, a town of the Canary Islands, near the N. coast of Teneriffe, in a beautiful valley, 1027 feet above the sea. Next to Santa Cruz it is the principal town in the island, and has a pop of 8628. Its port (pop. 3800), which is fortified, is two miles distant, and carries on some trade with Europe and America, chiefly in wine.

Or'pheus, in Greek mythology, was the son of the muse Calliope by Apollo or the Thracian river-god Œagrus. The music of his song and lyre, Apollo's gift, had power to tame wild beasts and move the very rocks and stones, and with it he aided the Argonauts (q. v.) in their famous expedition. Reft of his loved Eurydice by a serpent's bite, O. sought her in Hades, and there by his melody prevailed on stern Pluto and Proserpine to release their captive, but only on the condition that O. should not look back on her as she followed him to the upper world. He broke his pledge, and saw her, to lose her again for ever. For his opposition to the orgies of Dionysus, O. was torn to pieces by the Mænads; his head was cast into the Hebrus, and his lyre floated across the sea to Lesbos, whence Zeus caught it up and set it among the stars. Comparative mythologists connect O. with Arbhu (a Vedic epithet of Indra, 'the sun'), and Eurydice (Gr. 'far-seeing') with the dawn, which, strangled by the serpents of the night, is recovered by the sun, only to be once more slain

by the full brightness of his glory. The works attributed to O. may be divided into (1) the Orphic Theogony, a body of mystic literature preserved to us only in fragments, which belonged partly to the 6th and 5th centuries before, and partly to the first three centuries after the Christian era; and (2) certain poems, formerly believed to have been pre-Homeric, but now determined to have been composed in the last days of paganism by writers of the Alexandrian school. The latter, which include the *Argonautica*, *Hymni*, *Lithica*, &c., have been edited by Hermann (Leips. 1803). To O. was also ascribed the institution of the Orphic Mysteries, which, centring round the worship of Dionysus Zagreus, inculcated on the initiated a life of ascetic purity, and seem to have borne reference to a life after death. See Lobeck, *Aglaophamus* (2 vols. Königsb. 1829); E. Gerhard, *Ueber O. und die Orphiker* (1831); Max Müller, *Comparative Mythology* in *Oxford Essays* (1856); and vol. i. ch. i. of Grote's *History of Greece* (Lond. 1846).

Orp'iment, a term corrupted from *auripigmentum*, or golden paint, is a native sulphide of arsenic of a brilliant lemon-yellow colour, the finest qualities of which come from Persia, although it is of not unfrequent occurrence in other localities. Artificial O. or king's yellow is a pigment prepared by subliming arsenious acid with sulphur. It is used medicinally in China, and has been employed in western countries as a depilatory.

Orr'ery, a mechanical arrangement for exhibiting the motions of the solar system, of the planets round the sun, and the satellites round their planets. At best, it is only a philosophical toy.

Orr'is Root is obtained from *Iris Florentina*, which for commercial purposes is extensively farmed about Pontassieve in Tuscany. In appearance the plant somewhat resembles the blue flag of English gardens. The roots are dug in spring, are spread to dry, then trimmed, and sorted for market. For scent purposes, the O. R. is used as a powder, and as a spirituous tincture. For the first, it is crushed between millstones, and ground in a drug-mill. The powder, mixed with six parts of dry wheat starch, forms the 'Violet Powder' of the shops. The tincture or essence is obtained by keeping for about a month the proportion of eight lbs. of the broken root in one gallon of rectified alcohol. It enters largely into the composition of all the celebrated 'bouquets.' Beads are turned from the root in Italy, and a hank of them is the possession of even the peasant girls there.

Orsi'ni, an ancient princely family, which, as head of the Guelphic faction, played a part second only to that of the rival house of Colonna (q. v.) in the medieval history of Rome. Its members rose to be Princes of Tarento and Salerno, Dukes of Venosa, Bracciano, and Gravina, Counts of Alba, Tagliacozzo, Nola, &c., and it gave four popes to the world—Celestine III. (1191–98), Nicholas III. (1277–80), Benedict XIII. (1724–30), and Clement XII. (1758–69). The sole surviving direct branch, the O.-Gravina, is at present represented by Prince Filippo O., who, born December 10, 1842, succeeded his father, April 18, 1874. To a collateral line belonged **Felice O.**, born at Meldola, in the province of Forli, in 1819. While yet a student at Bologna he joined a secret revolutionary society, and in 1844 was condemned to the galleys for life, but released by the amnesty of Pius IX. (1846). On the downfall of the Roman Republic O. fled to England (1853), but returning in the following year as Mazzini's agent, was arrested and imprisoned at Mantua, whence he again escaped to London. Here he devised a plot for the assassination of the Emperor Napoleon, by throwing three 'O. bombs' beneath his carriage. This he put into practice in the Rue Lepelletier at Paris, on January 14, 1858, the result being that eight persons were killed and 156 wounded. Seized and put on his trial, O. was guillotined, March 13, 1858.

Or'sova, the name of two fortresses at the 'iron gates' of the Danube. (1) Old O., or Rushava, lies in an island of the river, 92 miles S.E. of Temesvar, is a chief station in the steam navigation of the Danube, and a centre of trade between Hungary and Rumania. It belongs to Austria. Pop. 1000. (2) New O. in Servia faces it, and is also built in part on an island, and repeatedly changed hands in the Austro-Turkish wars of last century.

Orthez, a town of France, department of Pyrénées-Basses, on the Gave-de-Pau, 25 miles N.W. of Pau by rail, contains a fine Ogival church and the ruined Tour de Moncade (once the residence of Gaston Phœbus de Foix), and has tanneries, sawmills, bituminous springs, and a trade in salt and hams. Pop. (1872) 1737. Near O. Wellington defeated Soult, February 7, 1814.

Or'this (from Gr. *orthos*, 'straight'), a genus of extinct *Brachiopodous* Mollusca, the valves of whose shell are articulated by teeth and sockets, the hinge line being straight, and notched for the passage of a *peduncle* or fleshy stalk, by means of which the shell was attached to fixed objects. The shell is usually marked by striæ or stripes on the exterior. Species of O. are common in Silurian, Devonian, and Carboniferous strata. *O. elegantula* is a familiar Silurian genus.

Ortho'ceras (Gr. 'straight horn'), a well-known extinct genus of *Cephalopoda* (q. v.) or Cuttlefishes, belonging to the *Tetrabranchiate* or four-gilled order of that class. Their shells occur as fossils from the Silurian to the Triassic rocks inclusive. The genus forms the type of a family—*Orthoceratidæ*—in which the shells are straight, curved, or discoid in shape; the last or body-chamber of the shell being small. Specimens of O. have been obtained measuring 6 feet in length and over 1 foot in diameter. Upwards of 500 species are found in the Silurian deposits of Bohemia alone.

Or'thodoxy (Gr. *orthos*, 'right,' and *doxa*, 'opinion') is the name given by theologians to soundness of doctrine, the standard being the doctrine acknowledged and received by the Church Catholic. Heterodoxy (Gr. *heteros*, 'another,' and *doxa*), meaning any departure from that doctrine as expressed in the creeds and confessions of the churches, is thus synonymous with Heresy (q. v.), but it is generally used in a milder sense.

Or'thoepy (Gr. *orthos*, 'right,' and *epos*, 'a word'), the art of correct pronunciation, deals with the articulate sounds of a language, and teaches us to avoid such errors of articulation as *sow* for *sow*, of accent as *cónfer* for *confér*, of quantity as *orātor*, &c.

Orthog'raphy (Gr. *orthos*, 'right,' and *graphō*, 'I write'), the art of correct spelling, in a wider sense includes punctuation, the right dividing of words, a proper use of capitals, &c. The spelling of a language when it is first reduced to writing is always, however rudely, phonetic, and only becomes traditional under the influences of time and dialectic growth. Where books are few, it can easily keep pace with changes in pronunciation, as may be seen by comparing the O. of Cicero with that of early Roman inscriptions. But, on the invention of printing and consequent multiplication of books, spelling became stereotyped, not at once, for we find Tyndale spelling the word *it* in eight different ways, but by a gradual consensus of printers, and in England by the appearance of Johnson's *Dictionary*. For a perfect O. an alphabet is requisite that is neither defective nor redundant—where one letter shall not represent two sounds (as *gun*, *gin*), or one sound have two letters to represent it (as *cow*, *kine*). The Continental languages, especially Italian, were more fortunate in these respects than English, which applied a Latin alphabet of unsettled pronunciation to a Teutonic speech. The very discrepancies, however, of English, preserve, we are told, its historic continuity and etymological character more fully than in any other modern language. To a certain extent this is true. To the philologist such words as *cough*, *enough*, tell a clearer tale than the Italian *filosofo*. But how about such words as *squirrel* (Gr. *skiouros*), *quinsy* (Gr. *kynanchē*), or *nostril* (Old Eng. *nosu-thyrel*)? We are not consistent in our discrepancies between etymology and pronunciation, because our spelling at starting was partly phonetic, partly etymological. We have *fancy* and *phantom*, *error* and *labour*, *sword*, *know* and *knight*, but not *swebstor*, *hlāf*, or *kring*. Again, how many of the so-called etymological spellings are simply later restorations, entitled to no higher respect than the pseudo-archaisms of romance writers. *Debt*, *fruit*, and *doubt*, three centuries ago were spelt *dett*, *frute*, and *dout*. How many of these are wholly misleading, as *whole* and *wholesome* (Old Eng. *hal* and *halsum*), based on the analogy of *who*, as *could* on that of *should*, or *shamefaced* (Old Eng. *sceamfæst*), *lanthorn* (Fr. *lanterne*), *delight* (Old Fr. *delaiter*, Tyndale's *delite*), *neighbour* (Old Eng. *neah-búr*; Spenser's *neibor*), *feign* (Old Fr. *faindre*, Old Eng. *feyner*), *island* (Old Eng. *edland*), *foreign* (Low Lat. *foraneus*), *sovereign* (Low Lat. *superanus*), *righteous* (Old Eng. *riht-wis*), &c., examples that might be multiplied almost inde-

finitely. The conflict between the phonetic and historical systems is shown in the retention of *geese*, but substitution of *mice* and *lice* for *mys* and *lys*. Such are some of the features of that O. to which have been ascribed English orthodoxy and English respect for authority, and which Max Müller has denounced as a 'growing national misfortune,' Lord Lytton as 'a lying, round-about, puzzle-headed delusion,' and the late Bishop Thirlwall as 'a mass of anomalies, the growth of ignorance and chance, equally repugnant to good taste and to common sense.' Besides their æsthetic objections, opponents of proposed reforms, headed by Archbishop Trench, maintain that such reforms would involve (1) the sacrifice of all our earlier literature, (2) would confound such homonyms as *write, rite, right*, and *wright*, and (3) rest on the assumption of a chimerical uniformity of pronunciation. To the first two of these objections it may be briefly answered that no proposed system differs more from our present O. than that from Chaucer's, or Chaucer's from Cædmon's, yet that those writers are still read with delight; and, secondly, that if in speaking confusion rarely arises from the identity of sound in *wright* and *rite*, still less is this likely to be the case in reading, and that, to be consistent, these same upholders of our present O. should devise differentiated forms for the various meanings of *box* or *sole*. The third objection will be best considered under PHONETIC WRITING. See Trench, *English Past and Present* (Lond. 1855); and Max Müller, *On Spelling*, in the *Fortnightly Review* (April 1876; reprinted 1878).

Orthop'tera ('straight-winged'), an order of insects, represented by locusts, grasshoppers, earwigs, crickets, &c. This group is distinguished by the fact that the front pair of wings is rendered of leathery consistence to protect the membranous hinder wings, which fold up like a fan, and which have straight *nervures* or ribs—hence the name O. The metamorphosis is incomplete, the larvæ and pupæ resembling the imago or perfect insect to a greater or less extent. The mouth-parts are free, and form powerful organs of mastication; the ravages of the locusts, &c., bearing testimony to the destructive capabilities of the masticatory apparatus. The head is large, and the ocelli are two or three in number. The compound eyes are small and widely separated. The antennæ are filiform organs, and may be very long. The two chief divisions of this order are the *Saltatorial* or *Leaping O.*, and the *Cursorial* or *Running O.*, each with legs adapted to their special modes of progression. In some O., *e.g.*, the walking-stick insects (*Phasmidæ*), the wings are absent; but these are of a degraded type. Organs of hearing occur in some O. (*e.g.*, grasshoppers and locusts). Over 5000 species of these insects are known.

Or'tolan, or **Garden Bunting** (*Emberiza hortulana*), a species of *Insessorial* birds belonging to the family *Fringillidæ*. The bill is small, and the nostrils are partly hidden by plumes. The second and third quills are the longest. The tail is divided, and the hinder claw is long. The O. has long been celebrated among epicures for the delicacy of its fat. It is common on the Continent, but rare in England. Large numbers are annually captured, and fed on corn and millet in the dark, until they become plump and fat. The average length is 6 inches. The O. is of a grey colour on the head, and brown on the back, the wings being black, and the chin and throat greenish-yellow. The belly is a warm brown. The nest is built on the ground, and is frequently found in corn-fields. The eggs number five or six, and are of a pale bluish-white hue, spotted with black. The O. appears to migrate northwards in summer.

Orto'na (the ancient *Orton*, capital of the Frentani), a town of Italy, in the province of Chieti, on the Adriatic Sea, is built on a lofty promontory, with a small quay on the shore below. O. gives title to a bishop, and has a cathedral and several churches. It exports the excellent wine grown in the neighbourhood. Pop. (1871) 7126.

Or'tyx. See VIRGINIAN QUAIL.

Oru'ro (in full, San Felipe de Asturia de O.), capital of the province of Oruro, in the republic of Bolivia, S. America, on a plateau 12,442 feet above the level of the sea, and 207 miles N. by W. of Chuquisaca. It has lately become the seat of the government of Bolivia. Founded in 1590, it rose rapidly, its gold and silver mines being second only to those of Potosi, and about the end of the 17th c. it had 70,000 inhabitants, but it sank as rapidly as it had risen, when the mines had become worked out or less profitable, and now has a pop. of 7980.—The *province* of O. is about 21,600 sq. miles in extent, and has a pop. of 111,000. A considerable part of the surface is occupied with swamps and lakes, the largest of which is that of Aullagas (1075 sq. miles), which receives the river Desaguadero. Though the soil is fertile, agriculture is still in a very backward state.

Orvie'to, a town of Italy, province of Perugia, on the summit of an isolated tufa hill, 735 feet above the level of the plain, near the confluence of the Paglia with the Chiana, 7½ miles N.E. of Lake Bolsena (q. v.), and 65 miles N.N.W. of Rome by rail. The seat of a bishop since 590 A.D., it contains, besides its famous cathedral, several ancient palaces, affording fine examples of medieval art, and has around it remains of the fortifications which formerly made it a place of great strength. The cathedral of O., a magnificent structure in the Italian Gothic style, was commenced in 1290 and was finished in the end of the 16th c. It is built in alternate courses of white and black marble, and is 294 feet in length by 109 in breadth. The façade, which is 160 feet high, is especially rich in bas-reliefs and mosaics, and is said to be the largest and most gorgeous 'polychromic' structure in existence. The people are chiefly engaged in the production of wine, the wine of O. being well known and highly esteemed in Rome. Pop. (1874) 14,455. The town, which stands on the site of the ancient Etruscan city Volsinii, received in the middle ages the name Urbs Vetus (old city), of which the present O. is a corruption.

Orycteropus, a genus of *Edentate* quadrupeds, represented by the *O. Capensis*, ground hog, or 'aard vark' of S. Africa. This animal somewhat resembles a clumsy pig in form. It has long ears; its body is covered with coarse hair, and it attains a length of 5 feet, inclusive of its tail. The toes are provided with very strong claws, by means of which the O. burrows in the earth. The O. is active at night. It subsists, like its neighbour the S. American Ant-eater (q. v.), on ants and other insects, which it captures by means of its long tongue and glutinous saliva. It has no incisor or canine teeth; the premolars number 14 above and 12 below, and there are 10 molars in each jaw.

Or'yx (*Oryx Leucoryx*), a species of Antelope (q. v.), allied to the Gems-Bok (*O. Gazella*), and found in N. Africa in large herds. The horns are about 3 feet long, and are bent backwards in a curve of considerable extent. The colour is a light grey, marked with brown and black. The average height is 3½ feet. The O. is represented on ancient Egyptian monuments.

Osage Indians, a branch of the once great family of the Sioux, are now settled in the Indian Territory and in Nebraska, S. of the river Plate, and N. of the Cherokees. See INDIANS, AMERICAN.

Osage Orange is *Maclura aurantiaca*, a deciduous-leaved tree belonging to *Moraceæ*, and a native of the southern United States. It is furnished with strong thorns, and as it can be kept dwarf is trained for hedgerows, but with full liberty, in a favourable situation, it attains a height of 60 feet. The timber is elastic, and is suitable for carriage-poles, &c.; indeed, the Indians formerly used to make their bows from it, and the name of 'bow-wood' is still retained. The tree resists severe frosts, and has been introduced into Britain. Its fruit is of a golden colour, about the size of an orange, consequently is tempting to the eye, but scarcely edible. A yellow dye is obtained from the root.

Osa'ka, a city of Japan, on a deep inlet in the S.E. of Nipon, and at the mouth of a river which, by several branches, drains the great lake Biwako, 250 miles in a direct line S.W. of Yedo, and 30 miles S. by W. of Kiyôto, to which a railway is (1876) being constructed to form part of a projected trunk line from that city to Yedo. The city is intersected by many streams, spanned by bridges, and has a mint and college, and many palaces of the old Daimios. On the W. side of the bay is the port of Hiogo, to which most of the foreign trade of O. has passed, and which is connected with O. by railway. O. is, however, the seat of considerable manufactures, on a European method, of paper, sugar, glass, slight woollen goods, and hats and caps. In 1875 there were here twenty-four British residents, and a mission supported by the Church of England Missionary Society. Though the foreign trade has declined, Japanese steamers enter O. almost daily from the inland sea with native produce, and from Yokohama, with foreign goods purchased by

Japanese merchants there. In 1875 the imports in foreign vessels alone amounted to £118,579, the exports to £44,066. Hiogo, opened to foreign commerce in 1863, had a British community of 163 adults in 1875. Its exports are chiefly tea (in 1875, 7,649,020 lbs.), rice (value $793,390), copper, bronze ornaments, tobacco, camphor, porcelain, lacquered ware, fans, isinglass, seaweed, and vegetable wax. As many as three million fans, valued at $90,000, were exported from O. and Hiogo in 1875, chiefly to the United States. In 1875 the exports of Hiogo amounted to $3,092,405, and the imports to $5,726,797. The pop. of O. is 80,000, of Hiogo 6000.

Os'born, Admiral Sherard, born April 25, 1822, entered the navy in 1837, and was present at the capture of Canton (1841), and of the Woodang Forts (1842). As commander of the *Pioneer* in the Franklin Discovery Expedition of 1849, he made a memorable sledge journey to the extreme western point of Prince of Wales' Land (1851); and as post-captain of the *Vewvius* he led the advanced squadron in the Sea of Azof (1855), at the close of the Crimean War being made a C.B. and an officer of the Turkish Medjidie and French Legion of Honour. He served through the second Chinese war (1857), ascended the Yangtse as far as Hankow, 600 miles from its mouth (1858), and in 1862 accepted from the Chinese government the command of a squadron for the suppression of piracy. O. returned home (1864) to test the newly-turreted *Royal Sovereign*, was for some years managing agent of the Great Indian Peninsula Railway at Bombay, and at the time of his death (May 6, 1875) was serving on a committee for the Arctic Expedition of 1875. O. was author of *Stray Leaves from an Arctic Journal* (1852), *Quedah, or my Journal in Malayan Waters* (1857), *Japanese Fragments*, (1860), &c.

Os'borne Se'ries is the lowest member of the middle Eocene (q. v.) formations. It is divided into two groups—the lower, the Nettlestone Grits, consisting of shelly sandstone and yellow limestone, and the upper, the St. Helen's Sands, composed of light-coloured sands, clays, and marls. They occur in the Isle of Wight, are of fresh and brackish water origin, and have fossil species of plant and animal of the usual tropical characters.

Os'cans (Lat. *Oxci* or *Opsci*, Gr. *Opikoi*, connected by Mommsen with Lat. *opus*, 'work'), an ancient Italian race, occupying Campania, and closely connected if not identical with the Ausonians. Invaded from the N. by the Samnites in the 5th c. B.C., they became amalgamated with their conquerors, who borrowed at once the Oscan name and language. The latter, which stood in the same relation to Latin as French to Italian, continued a spoken dialect till the 1st c. A.D. Specimens of it, now rendered intelligible by the labours of Mommsen, are preserved to us in the *Graffiti* (q. v.) of Pompeii, in the legends of coins struck by the Confederates in the Social War, and in various inscriptions. The most famous Oscan inscriptions are the Bantine Tables, of thirty-eight lines, discovered at Oppido in 1793; the Cippus Abellanus, which till 1745 was employed as a doorstep at Avella; the Bronze Tablet of Agnone, discovered in 1848. The *Atellanæ* (q. v.) were of Oscan origin, and Ennius, Pacuvius, and Lucilius, as natives of Calabria and Campania, may be deemed the representatives of Oscan literary genius. 'Oscan,' however, was used by later Roman writers as synonymous with 'barbarous' (*cf.* Plin. xxix. 1, and Juv. *Sat.* iii. 207). See Mommsen, *Oskische Studien* (Berl. 1845), and *Die Unteritalischen Dialekte* (Leips. 1850); Friedländer, *Die Oskischen Münzen* (Leips. 1850); Huschke, *Die Oskischen und Sabellischen Sprächdenkmäler* (Elberf. 1856); and Rabasté, *De la Langue Osque d'après les Inscriptions et de ses Rapports avec le Latin* (Par. 1867).

Os'car I., Josef Frans, King of Sweden and Norway 1844–59, only son of General Bernadotte and Desirée Clary, was born in Paris, 4th July 1799. When his father was chosen Crown-Prince of Sweden, O., then only eleven years old, was made Duke of Södermanland. His education was conducted with the greatest care. In 1814 he accompanied his father in the war with Norway, his first and last campaign, and on the 19th June 1833 he married Josephine Maximiliane Eugenie of Leuchtenberg (born 14th March 1807). While Crown-Prince, O. was familiarised with civil as well as military power, being chancellor of the three universities, high-admiral, and chief general of artillery, and being at different times provisionally entrusted with the chief power, as vice-king of Norway in 1824 and 1833, and, during his father's sickness, of both Norway and Sweden. He also gave much attention to art and science, was a successful composer of music, and wrote a valuable treatise, *Om Straff och Straffanstalter* (1840). On his father's death, 8th March 1844, O. ascended the throne. His earliest efforts were devoted to the acknowledgment of absolute equality, and the fostering of friendly relations between his kingdoms. His reign was a period of unexampled prosperity for both kingdoms, and he was completely successful in preserving their neutrality during the disturbance of European politics in its latter years. He had scarcely recovered from a severe attack of a sickness that had affected him for many years, when the zeal with which he entered into the complications resulting from the Crimean War broke his strength, and forced him to resign the government to the Crown-Prince, 11th September 1857. After a daily decline of two years, he died 8th July 1859. His children were Karl Ludvig Eugen (Karl XV.); Fredrik Gustaf O. (1827–52); O. Fredrik (O. II.); Charlotte Eugenie (born 1830); and Nikolas August (1831–73).—**Oscar II., Fredrik,** third son of the preceding, King of Sweden and Norway from 1872, was born 21st January 1829. He received the title of Duke of Södermanland, and entered the navy at an early age, and in 1845 he became after examination a sub-lieutenant in the fleet, from which he advanced by degrees to vice-admiral. Meanwhile he had made great progress in many studies, had learned much of the institutions of foreign lands, and had appeared as a writer on naval affairs and Swedish military history, and also as a poet. His collection of poems, *Ur Svenska flottans minnen*, received (1857) the prize of the Swedish Academy. After having several times, as first prince of the blood, held the government during the travels and sickness of Karl XV., he received the crown on the death of the latter, 18th September 1872. Crowned at Stockholm, 12th May 1873, he undertook a journey through the most northerly provinces of his dominions, and was again crowned at Throndhjem on the 18th July of the same year. On the 6th June 1857 O. married, at Biberich, Sophie (born 9th July 1836), daughter of Duke Wilhelm of Nassau, by whom he had four sons, O. Gustaf Adolf, Duke of Vermland (born 1858), O. Karl August (born 1859), O. Karl Wilhelm (born 1861), and Eugen Napoleon Nikolas (born 1865).

Os'cott, a village in the parish of Handsworth, Staffordshire, 4 miles N. of Birmingham, is the seat of St. Mary's College, one of the largest Roman Catholic schools in England. It was founded in 1794, and rebuilt by Pugin in 1840, at a cost of £60,000. A fine church is attached to the buildings, which are cruciform in shape.

Oscula'tion. Two curves are said to be in O. when they are in the closest possible contact with each other. The degree of contact (see CONTACT) is determined by the number of constants which enter into the equation of the curve of lower degree. A straight line involves two constants, and has contact of the first order with the curve under consideration. When it thus osculates it is called the tangent line. A circle involves three constants. Its closest contact is of the second degree, and when it so osculates it is called the osculating circle. The plane in which it lies is obviously the plane containing three contiguous points on the curve, and is known as the osculating plane. A plane curve, therefore, lies in the plane of its osculating circle. The osculating plane of a tortuous curve is constantly rotating as we pass along the curve, and its rate of rotation per unit of length of the curve is the *tortuosity* of the curve, exactly as the rate of change of direction of the tangent per unit of length is the measure of the absolute curvature. The radius of the osculating circle is the radius of absolute curvature of the curve, plane or tortuous.

Oshkosh, a city of Wisconsin, U.S., on the W. shore of Lake Winnebago, and at the mouth of the Fox River, 15 miles N. of Fond du Lac, and 80 N.N.W. of Milwaukee by rail. It is the second most important commercial city in the State, and has 40 shingle and saw-mills, 12 sash, door, and blind factories, and large work for the making of farm implements, the State normal school, 4 newspapers, &c. Pop. (1870) 12,663.

Osian'der (prop. *Hosemann*), **Andreas,** a once famous divine of the Reformation period, was born at Gunzenhausen, near Nürnberg, Franconia, in 1498, studied at Ingoldstadt and

Wittenberg, became first a pastor in Nürnberg (1522) and then a professor of theology in the University of Königsberg (1548), where he died suddenly in 1562. O. supported Luther in his controversy with Zuinglius regarding the eucharist, but came into collision with the Lutherans on the subject of justification. In two disputations (1549, 1550), and in his principal work, *De Unico Mediatore J. C.*, &c., he maintained that what Protestants called justification is properly redemption, since the Greek *dikaioun* means to make just, and can only by metonymy mean to declare just in the forensic sense; and thus justification is properly what is called sanctification. In connection with this he held that Christ did redeem men by the satisfaction he rendered to divine justice, but that the righteousness of Christ by which the believer is justified is entirely the divine nature of Christ, 'the essential righteousness of God,' 'the divine essence,' 'God himself.' His followers, called Osiandrists, continued the controversy after their leader's death, till in 1567 by the *Corpus Doctrinæ Prutenicum* they were finally banished from Prussia. See Wilken, *Andreas O.'s Leben, Lehre und Schriften* (Stralsund 1844). His son, Lukas O. the Elder (*b.* 1534, *d.* 1604), and his grandson, Lukas O. the Younger (*b.* 1587, *d.* 1638), were, like their father, inveterate controversialists.

O'sier is the name given to those species of *Salix* used for basketmaking and other wicker-work. It is said that in the trade about 300 different varieties are recognised. This subdivision of course is purely technical, as botanically, with few exceptions, the whole series range under *S. viminalis*, *S. triandra*, and *S. purpurea*. The first bears the name of the common O., and is the best for hoops or work requiring rods of two years' growth. It will throw up a shoot of 12 feet, and is the representative of the soft-wooded group. From the others it may readily be known by its long narrow leaves, with a silvery silky covering on the under side. The second is the prominent representative of the hard-wooded kinds adapted for white basket-work, and comprises some of the most pliant and durable varieties in the use of the manufacturer. It is often called the French willow. The third, called the purple O., yields rods qualified for the finest work. A hybrid between it and the first, called *S. rubra*, when cut down, will make shoots of 8 feet in a season, and they are the best adapted of any for purposes where unpeeled rods are required. For the production of the O. what are called O.-plantations, holts, beds, or grounds are formed, where such kinds are grown which best meet the wants of the market to be supplied—this varying according to local circumstances. The soil most suited for an O. plantation is a strong loam, and the most favourable position is where it can be flooded at will and yet the land be well drained. The O. will not grow in water-logged land, nor in peat bog, nor in sandy soil; it will, however, grow on land occasionally overflowed by salt water, if it is suitable in other respects. To form the plantation, cuttings must be used, not rooted plants, and they are best taken from branches one or two years old. They should be pushed into the soil fully 9 inches or their whole length, and placed at a distance of 18 inches apart, which gives about 20,000 to the acre. If this plan is adopted straight shoots will be secured, and when gathered they must be cut to the ground. What are known as pollard trees soon decay, and only serve to harbour destructive insects. A well devised O. plantation will last fifteen to thirty years. Notwithstanding that about 7000 acres are devoted in Britain to O. growth, the consumption is much in excess of the home supply, upwards of 5000 tons, of the value of £40,000, being annually imported from neighbouring European countries. It seems probable that Australia will soon enter into the trade. If O. are planted on the banks of rivers they are of great value in preserving the soil from being washed away, by reason of the grasp and tenacity of their long fibrous roots. The word O. is French, and comes from a Celtic word meaning water or *ooze* (as in the rivers Oise, Ouse, Ose). Withy is a synonym of O. See WILLOW.

Osi'ris, the son or husband of Isis, and the many-eyed God of the Lower World (also said to be born from the egg of the cackler or goose, an emblem of Seb), was with his son Horus, the last of the gods who ruled over Egypt. He was put to death by the wicked Typhon, and raised again to be the Judge of the Dead. He appears in a mantle coloured like fire, bearing a crook and a whip, two feathers, and on his head a Nilometer. He is also called Revealer of Good and Lord of the Tombs. The myth appears in all sepulchral formulæ and rites, especially in Lower Egypt. A Louvre hieroglyph identifies him with the sun. Many cities, such as Sais and Busiris, claim the honour of being his burial-place. Tradition asigns his birth to Mount Sinai. At Memphis he became united to Pthah, and also to the bull Apis, and he was a member of the Trinity—Isis, Os, and Nepththys. Xenophanes ridiculed the idea of a mortal and a divine nature in one person, which he saw involved in the annual lament of the Egyptians for the death of O. O., at a later time, appears as Serapis, so much worshipped at Rome; and he also answers in some respects to the bearded Bacchus, although the Greeks called him the Sinopite Jupiter. The Egyptian kings all traced their descent from O., and in order that the Ptolemies might do this, Macedon, a new son of O., was invented.



Presentation to Osiris.

Os'man or **Oth'man I.**, the founder of the Turkish dynasty, was born at Sukut in Bithynia in 1259, and was the son of Orthogrul, an Oguzian chieftain, who became the soldier and subject of Aladdin, the ninth Seljuk Sultan of Iconium, and established a camp of 400 tents on the banks of the Sangar. O. succeeded his father in the headship of the tribe in 1280. He was a bold warrior, ready and able to seize the opportunity offered by the extinction of the Seljuk line (1299), and the remoteness and decline of the Mongul khans. Crossing the unguarded passes of Olympus, he entered the territory of Nicomedeia (July 27, 1299), and invested Nicæa, which surrendered after a five years' siege. Throughout his reign O. made a series of the same successful inroads, increasing his forces by the accession of captives and volunteers, and fortifying the towns and strongholds he had won. He held his court at Kara-Hissar, and founded a mint, though he never assumed the title of Sultan. The conquest of Prusa by his son Orchan, the true era of the Ottoman Empire, immediately preceded O.'s death (1326). From him are derived the names Osmanli and Ottomans applied to the Turks. See Gibbon, *Decline and Fall* (ch. lxiv.).

Os'man Bazar', a town of Bulgaria, in a valley on the N. side of the Binar Dagh, an off-set of the Balkans, 40 miles W.S.W. of Shumla, and on the route from Rustchuk to the Slivno Pass. Its name repeatedly occurred in the Russo-Turkish War of 1877–78, but it was not the scene of any important incident.

Os'man Pasha, Ghazi, a distinguished Turkish general, is said to have been born at Tokat about 1832, and to have been educated at a school conducted by his brother, from which he was transferred to the military academy at Constantinople. He obtained a lieutenant's commission in 1853, and on the outbreak of the Crimean War was attached to the general staff at Shumla. After serving with distinction as major in the Cretan campaign in 1867, he obtained rapid promotion to a colonelcy, and subsequently a generalship. He was commandant at Widdin during the Turco-Servian war in 1876, and for brilliant conduct at the battle of Saitschar was created a mushir or field-marshal. The declaration of war by Russia in April 1877 found him still at Widdin, whence he marched to Plevna immediately on the passage of the Danube, entering that town on 14th July. The enemy's vigorous attempts to oust him on the 24th and 31st of July were repulsed with terrible slaughter. From an open town he transformed Plevna into an entrenched camp, which for five months engaged a Russo-Rumanian army of more than 100,000 men, checked the general progress of the invaders, and cost them the lives or services of 50,000 gallant soldiers. In the desperate and unsuccessful assaults in the second week of September alone, their loss was estimated at 25,000 men. The Sultan conferred on O. in October 1877 the well-won title of

Ghazi (Victorious). On General Todleben assuming the direction of the besieging forces he initiated an investment, and his cautious strategy succeeded where the brilliant onslaughts of Skobeloff had failed. Every hope of relief vanished, his stores exhausted, and his troops decimated by disease, O. made a grand but futile effort on the 11th of December to break through the circle of steel which encompassed him. He was himself wounded, and obliged to surrender with 40,000 troops. The Czar returned his sword to the heroic soldier, who has been treated as a prisoner with the greatest courtesy by his conquerors.

Os'mium (symbol Os, atomic weight 199), one of the noble metals occurring associated with platinum, alloyed with iridium, ruthenium, and rodium. It is infusible under the oxy-hydrogen flame. Heated in a current of dry air, O. forms osmic acid (OsO_4), the vapour of which has a very irritating odour. It forms; colourless prismatic crystals, which fuse and volatilise below the boiling point of water. The action of sulphuretted hydrogen upon its solution results in the formation of a black precipitate, the tetrasulphide (OsS_4). A protoxide and binoxide of O. also exist. Further it appears to form four chlorides—$OsCl_2$, $OsCl_3$, $OsCl_4$, and $OsCl_6$. Of these the bichloride and tetrachloride are formed by direct combination of chlorine with the metal.

Os'mose, the name given by Graham to liquid diffusion through a membrane. See DIFFUSION.

Osmun'da is the principal genus of the tribe or division of *Filices* called *Osmundeæ*, distinguished by their vertically two-valved spore cases, which have an incomplete ring represented by a few parallel striæ near the apex. There are six species. The fructification is paniculate, and in the type species—the flowering or royal fern (*O. regalis*)—the upper pinnæ of the fronds are the spore-bearing portion. This is the largest fern found in Britain, attaining a height up to 10 feet, and is not uncommon in boggy, peaty ground, though it has been much destroyed in many places by drainage and the fern mania. It is widely distributed—occurring in the four continents. The term 'flowering' is given in consequence of its handsome fructification, and that of 'royal' has descended from the old herbalists, who supposed it to possess great virtues. The name O. is of doubtful derivation.



Osmunda regalis.

Os'nabrück ('the bridge over the Hase,' of which 'Osna' is a corruption), the chief town of a circle of the same name, province of Hannover, Prussia, on the Hase, 80 miles W.S.W. of Hannover by rail. It has a Byzantine cathedral of the 12th c., the church of St. Mary, a noble Gothic structure of the 14th c., with a beautifully-carved wooden altar-piece, a Rathhaus containing portraits of princes, ambassadors, &c., and celebrated as the place where the negotiations for the Peace of Westphalia were conducted in 1643–48, and a statue of Justus Möser, the 'Franklin of Westphalia,' designed by Drake, and raised 1836. There are large ironworks and sugar-refineries, and manufactures of leather, linen, tobacco, &c. Pop. (1875) 29,850, of whom a third are Roman Catholics. The *bishopric* of O., founded by Karl the Great in 783, was secularised in 1803. The town has again become the seat of a bishop since 1858. See Friderici and Stüve, *Geschichte der Stadt O.* (Osnab. 3 vols. 1816–26).

Os'prey (*Pandion haliaëtus*), otherwise named the 'Fishing Hawk,' is a species of *Raptorial* birds belonging to the sub-family of the *Aquilinæ*, or true eagles. The bill is short and curved, and the wings reach to the extremity of the tail. The second and third quills are the longest. The tail is of moderate length, the tarsi are strong, and the claws are powerfully made. The O. is now rare in Britain. It inhabits the sea-coast, and is an expert fisher. Its colour is a dark-brown above, and white below, a band of brown colour passing across the chest. The legs and toes are bluish, and the beak and claws black. The average length is about 20 inches, or a little more. The nest is built of sticks, and is placed either on some ruined building or on the top of a tree. The eggs number two or three, and are of a dirty white colour, splashed with brown. The O. is monogamous, and male and female usually pair for life, the one exhibiting signs of distress on the death of the other. The flight is graceful and hovering, and the descent of the bird on the water very rapid.



Osprey.

Oss'a (mod. *Kissavos*), a mountain of Thessaly, 6194 feet high, is separated to the N. from Olympus by the Vale of Tempe, and on the S. is connected by a low range of hills (Mavrovuni, 'black mountains') with Pelion, on whose summit O. was fabled to have been piled by the Titans in their fruitless endeavour to scale heaven.

Oss'ein, the name given to the substance obtained by steeping a bone in dilute hydrochloric acid, when the earthy matter is dissolved out, and the animal matters left. The O. may be said to represent the gelatin and other matters which form the organic basis of the bone. O. is largely resolved into *gluten* by the action of boiling water, gluten being an albuminous substance closely allied to gelatin itself. O. is insoluble in water.

Oss'ian (the word is of uncertain derivation) is the name of the Gaelic Homer, who is claimed alike by Scotland and Ireland, and is said to have lived in the 3d or 4th c. of the Christian era. He was the son of Fingal, 'king of the great mountains,' and was renowned for heroic valour and unequalled poetic gifts. Many poems attributed to Ossian have been published at different periods; but the most important by far are those issued by James MacPherson (q. v.) in 1762–63, and to these we shall direct our chief attention.

In the year 1759, MacPherson, then twenty-one years of age, was induced by John Home, author of the well-known tragedy of *Douglas*, Rev. Dr. Blair, Edinburgh, and others, to publish a small volume bearing the title *Fragments of Ancient Poetry, collected in the Highlands of Scotland*, and professing to be translated by him from Gaelic into English. These were so favourably received that his literary patrons sent him on a tour through the Highlands and Islands in 1760, in order to recover any other remains of Gaelic poetry which might have been preserved in those remote regions. It should be observed that this undertaking was not of his devising, and was not carried out in secrecy. He was publicly employed by men of the highest character. He corresponded with Dr. Blair, telling him of the progress he made, and was accompanied by friends and acquaintances, who certify that they saw various old Gaelic MSS. handed to him from time to time, and also helped him frequently in taking down Ossianic poetry from oral recitation. He passed more than a twelvemonth between his native district Badenoch and Edinburgh, in both places employing friends who were Gaelic scholars in helping him to translate from his written stores. In 1762 he published, in London, *Fingal* and fifteen minor poems; in 1763 *Temora* and five minor poems, all bearing to have been translated by him from Gaelic.

The poems profess to be sung by Ossian, old, blind, and the last of his race, to Malvina, the widow of his only son Oscar, who was cut off in the beginning of a most heroic career; and this situation is in entire keeping with the tone of chivalrous refinement and deep sadness which pervades them all. There is unsurpassed pathos in the last of them, *Berrathon*, where he alludes to her death as already past—avoiding all description of it—and calmly forecasts his own as at hand. Their contents, relating chiefly to war, present a considerable variety both as to locality and incident. *Fingal* refers to an invasion of Ireland by Swaran, King

of Lochlin, or Scandinavia, who defeats the Irish forces under their leader Cuchullin. The king of the Caledonians, Fionn, or Fingal, comes to the rescue, defeats Swaran, but generously dismisses him to his native land without ransom or forfeit. *Temora* also represents him as warring in Ireland. Cairbar had killed Cormac, the king of Ireland, and usurped his throne. Fingal goes to restore the rightful dynasty. The usurper, pretending friendship towards him, invites Oscar his grandson to a feast, and treacherously slays him, but is himself slain by the expiring hero. Cathmor, brother to Cairbar—a noble character—takes up his cause; but after various turns of fortune, is at length killed by Fingal, who places the lawful heir on the throne, and feeling the weight of years now pressing upon him, formally delivers the spear of his father Treunmor—the symbol of sovereignty—to his only surviving son Ossian, and withdraws to his favourite Selma. *Ca Lodin* relates an expedition of Fingal's to Lochlin, where he is attacked by Starno, who is quite the picture of a savage, piratical viking; but as usual the 'great king' with his irresistible sword, 'the son of Luno, or of brightness,' proves victorious. *Carric-Thura* represents him in Orkney aiding his friend Cathulla against the king of Sora, who had invaded his dominions. But while there is a thread of continuous narrative pervading these longer poems, they are very much made up of episodes relating to adventures in love and war, and especially 'tales of the time of old,' recited by the bards during every pause in the warfare. The smaller poems generally record single expeditions by the king or some one of his heroes, all undertaken for the rescue of innocence and weakness from oppression. But a few, like *Darthula*, *The Songs of Selma*, &c., show instances, as in real life, of sorrow unrelieved, and of evils unredressed. The Ossianic poetry throughout is distinguished alike for sublimity and pathos. It is also remarkable as embodying in *Fingal* a character of excellence and attractiveness surpassing that of any hero of romance—remarkable too for the purity and even delicacy of tone which pervades it throughout. Further it is entirely original in bringing before us a strange spirit-border-land, where the ghosts of the departed descend from their clouds, and give warnings and counsels to their friends on earth, without exciting fear or alarm; and also as dealing with nature in a truly primitive and natural manner. Descriptions, whether of scenery or of actions, often very vivid and pictorial, are undimmed by any tinge of that subjectivity or self-consciousness which casts its shadow on all descriptions by minds of modern culture. The mind of Ossian appears passive in receiving images, and reflects them as from the surface of a bright mirror.

These poems, entirely opposed to the tame, conventional style of the 18th c. literature, were received with wonder and acclamation throughout Europe. Within a year they were translated into the languages of France, Germany, Italy, Denmark, and Poland, while edition after edition was called for at home. But amid the general admiration a storm of adverse criticism burst on the head of MacPherson which has not quite died away yet. Dr. Johnson in England, Messrs. Pinkerton and Laing in Scotland, denied alike the genuineness and the merit of the poems, said they were mere forgeries by the pretended translator, and that they were worthless under any view. A strong array of able men, Dr. Blair, Lord Kaimes, Sir John Sinclair, John Home, &c., mustered in defence of their genuineness; and a controversy was carried on for many years with a degree of bitterness seldom equalled in literary warfare. The first demand made upon MacPherson was to exhibit his original MSS., and to this challenge he answered at once by placing his MSS. in the hands of his London publishers, advertising that they were there, and offering to publish them if a sufficient number of subscribers came forward. The publishers, Beckett & De Hondt, certify that these MSS. remained in their hands for twelve months; yet, incredible as it may now sound, no one followed the common-sense plan of comparing them with the English translation. His opponents, knowing nothing of Gaelic, could not make the requisite comparison, and his supporters, very stupidly, took the genuineness for granted. At the end of the twelve months he removed the MSS., and, so far as is known, they were never again seen by friend or foe. He left £1000 for publishing the Gaelic Ossian, and 10,000 lines were in consequence published in 1807, several years after his death; but all the Gaelic thus found was either in his own handwriting, or in that of his friends; nor was there found among his papers a scrap of information as to the fate of the old MSS. which were unquestionably collected by him, whatever their contents may have been.

Various objections have been brought against the genuineness of these poems, *e.g.*, that the Highlanders were too barbarous to produce poetry of such a high order; also that MacPherson's work was compiled from those of other authors, ancient and modern; but these have been abandoned long ago. The same may be said of the objections based on the difficulty of preserving such a mass of poetry without committing it to writing; and on the comparatively modern style of the language, a necessary result of oral transmission through centuries. But the difficulty arising from the non-appearance of the original MSS., instead of having been removed, has been recently urged in stronger terms than ever by J. F. Campbell, Esq., the accomplished editor of the well-known *West Highland Tales*, and the author of various antiquarian and scientific works. He has ransacked every corner of the Highlands and Islands, and has collected an immense quantity of old legend, both in poetry and prose, including many Ossianic ballads, but he has never found one stanza of MacPherson's Ossian anywhere amid all his researches, and he concludes from this that the current Ossianic ballads were the sole foundation of MacPherson's work—that he never found any MS. but such as contained these, consequently that his Ossian is his own manufacture.

Mr. Campbell's opinion is entitled to great weight, and he has some followers. But his opponents say:—1. If the MSS. which MacPherson advertised for examination were forgeries, his conduct implies recklessness amounting to insanity. The presumption then undeniably is that these MSS. were what they professed to be. 2. It is very possible that these MSS. formed the only record of the poems which they contained. The history of literature affords instances exactly in point. 'Eighty years ago England possessed only one tattered copy of Childe Waters and Sir Cauline, and Spain only one tattered copy of the Cid' (Lord Macaulay's preface to *Lays of Ancient Rome*). Of the fine old poem of *Beowulf* only one MS. exists. Had any of these perished immediately after being printed, the publisher would have been defenceless if charged with forgery; and so it may be in MacPherson's case. 3. When Mr. Campbell says that he did not find a stanza of MacPherson's *Ossian* anywhere, it is answered, that many poems which were remembered a hundred years ago are now forgotten. Further, facts are submitted which prove that at the least some pieces in MacPherson's book are genuine and ancient. In the appendix to the *Report of the Highland Society* on the Ossianic question (1806) testimony is given by several gentlemen of competent scholarship and unimpeachable character that long before MacPherson's Gaelic appeared they took his English translation, compared with it various short pieces recited by old people around them, and found them quite to correspond. Hundreds of lines have been thus verified, and among these may be specially mentioned 'Malvina's Dream' and two Sun Hymns, which, from other sources as well as the *Report*, are proved to be independent of MacPherson, and are among the very gems of his poetry. It is also deserving of mention that Mr. Skene (and no higher authority can be quoted), in his introduction to the Dean's Book (p. 48), expresses the opinion that the sixteen 'Fragments' originally published were genuine—the circumstances in which they were published rendering imposture altogether improbable.

It is proper to notice briefly various other collections of Gaelic poetry which help to throw light on the question before us, and which ought to be studied by all who take a part in it. In 1784 the Rev. Dr. Smith published a small vol. of 348 pages, with the title of *Sean Dàna, or Ancient Lays*, ascribed to Ossian, Orran, Ullin, &c. They are truly beautiful, and far more polished in language than MacPherson's poems. They treat of Ossianic subjects, but not of those mentioned by him. Dr. Smith gives the names of those from whom he obtained his *Lays*, but no one appears to have questioned these witnesses on the matter. In 1786 there was a miscellaneous collection of Gaelic poetry published by Gillies in Perth, among which are 'Malvina's Dream,' and one or two more of MacPherson's episodes. In 1804 there was a similar miscellany published by the Brothers Stewart, men who were well qualified as editors; and in their book we have the two Sun Hymns formerly mentioned and the poem of 'Conloch and Cuhona' (185 lines) found subsequently in MacPherson's Gaelic. Still unpublished there is the collection of Jerome

Stone, 1750–56, containing eleven Ossianic ballads, but nothing of what is in MacPherson. A collection, by the Rev. D. M'Nicoll, minister of Lismore, made about the same period, contains 'Malvina's Dream.' The Kennedy collection (Adv. Lib., Edinb.), made between 1774–83, is very voluminous, and contains many Ossianic pieces, some of which are similar to those published by Dr. Smith. The Irvine MS.—1796–1802—(likewise in Adv. Lib.), while very miscellaneous in its contents, gives the poem of 'Conloch and Cuhona,' also the two Sun Hymns, accompanied with a note in the Rev. Dr. Irvine's hand saying that he got these two from the Rev. Mr. M'Diarmid of Weem, who says that 'he got them upwards of forty years ago from Duncan Robertson, Glenlyon.' This testimony, which has never been overthrown, places these two very beautiful poems entirely beyond MacPherson. In 1862 was published, under the editorship of the Rev. Dr. M'Lauchlan, Edinburgh, by far the most interesting of all our Gaelic MSS. This is known as the *Book of the Dean of Lismore*, and was written 1512–26. It contains many heroic ballads, nine of which are attributed to Ossian. Space forbids any minute account of this collection, but it proves clearly that upwards of 300 years ago Ossian was held to be the prince of poets, as Fingal was the king of heroes. We mention, in the last place, *Leabhar na Féinne, or the Book of the Fingalians*, published in 1872 by Mr. Campbell, already referred to. This is a collection of all the Ossianic ballads preserved, whether in print, in MS., or in the memories of men still living. The various versions from 1520 to the present day are carefully placed side by side, and very elaborate notes are added. We have already mentioned the conclusion which he draws from these—that they comprise all the Ossianic poetry which existed in the days of MacPherson, and that it was entirely on them he founded his work.

It is needless to discuss the claims which Ireland puts forward to MacPherson's Ossian. Whether Fingal be a myth or a historical character, whether he ruled in Ireland or in Scotland, whether the Irish poetry be superior or inferior to MacPherson's, it is certain that MacPherson never was in Ireland, nor got a line from an Irish source. His poems, such as they are, are unquestionably Scottish, not Irish. Mr. Campbell and a few others maintain that he composed his work in English, and subsequently translated the chief portions of it into Gaelic; but the majority of Gaelic scholars are opposed to this view, and among these is Mr. Skene, who, while maintaining that he interpolated largely, holds the English theory altogether unreasonable. MacPherson's Gaelic was published in 1807 with a Latin translation, copious dissertations, and notes. An edition containing the mere text was published in 1818, another in 1859, and in 1870 appeared a very elaborate work by Dr. Clerk, minister of Kilmallie, containing Gaelic text, with a literal English translation, side by side with MacPherson's, and numerous notes, in which two prevailing errors regarding the Gaelic Ossian are removed—(1) that it contains scarcely any allusion to religion, and (2) makes no mention of clans or tribes. It is shown that there is frequent reference to religious worship, and that *clans* are mentioned over and over again.

We have thus stated everything which we know to be capable of throwing light on the vexed question of the genuineness of MacPherson's Ossian. We think there are very few among those competent to judge who will maintain with Mr. Campbell that these poems are an absolute forgery, entirely the work of MacPherson. His inference, resting only on proof of a negative kind, which can never be carried out exhaustively, is at the best only a presumption. The testimony of Rev. Mr. MacDiarmid regarding the Sun Hymns, and of several other persons to other short pieces, as having been known long before MacPherson's* Gaelic appeared, and by people wholly unacquainted with him, has not hitherto been discredited. The irresistible conclusion in these circumstances, then, seems to be that MacPherson's book contains, at least, several short poems, and these of great beauty, which tradition had long preserved as the P. of O.; so that here we have truly the 'Fragments' of ancient Gaelic heroic poetry. That he has joined these detached ballads together, in order to carry out his favourite idea of an 'epic poem,' seems also an irresistible inference. The extent of his supplementing it is very difficult now to ascertain; but we may fitly close our remarks in the words of Matthew Arnold (*Lectures on Celtic Literature*, pp. 152, 153), who, after making due deduction for what is 'forged, and modern, and tawdry,' and for what may be of Irish origin, adds . . . 'there is still left in the book a residue with the very soul of Celtic genius in it, and which has the proud distinction of having brought this soul of the Celtic genius into contact with the genius of modern Europe, and enriched all our poetry by it. Woody Morven, and echoing Sora, and Selma with its silent halls! We all owe them a debt of gratitude, and when we are unjust enough to forget it may the Muse forget us!'

* For these and all the principal statements regarding the question, we refer to the Highland Society's Report, with its valuable Appendix, which must be carefully examined by any one who wishes to know the *facts* of this interesting subject.

Ossifica'tion, the process of bone-formation. Bone is formed from *cartilage* or *gristle*, or from *fibrous* tissue. Hence the process of O. is described as being either *inter-cartilaginous* or *inter-membranous*. Some physiologists recognise a third process, to which they give the name of *sub-periosteal* O.; but this is simply a modification of the second process. The long bones of the body are formed from cartilage; the flat bones (such as those of the side of the skull, &c.) from fibrous tissue. When cartilage exhibits the process of O., its cells appear to undergo a marked increase in numbers. The cells arrange themselves in rows, their long axes lying transversely to that of the future bone. A section through cartilage, at the point where O. is commencing, shows that nearest the *centre* or active point of O., there are large cells or *osteoplasts*. These are arranged in parallel rows, and contain granular matter. Below the osteoplasts the cartilaginous substance is being encroached upon by the calcareous or limy material which is to form the typical and characteristic bone-substance. This is deposited around spaces in the form of rings, and is furnished by the minute bloodvessels which extend into the cartilage from the periosteum, and finally come to occupy the Haversian canals in the fully formed bone. Thus the process of O. is essentially one of lime deposition within a cartilaginous matrix or basis. The *shaft* of a long bone is at first solid. It becomes hollow by the absorption of the central material, and the medullary canal containing the marrow is thus formed. The *periosteum* or membrane which closely invests the surface of bones, and which supports the bloodvessels of the bone, appears to contribute largely to the work of O., by increasing the thickness of the bony tissue. The importance of the *periosteum* in the growth and repair of bone was fully demonstrated by Professor Syme of Edinburgh in certain experiments conducted on the limbs of dogs, by way of proving the reparative powers of this membrane. In his *Principles of Surgery*, Mr. Syme states that he removed an inch and a quarter of the radius of a dog, taking away the periosteum, and that he repeated the experiment on the radius of the other leg, leaving the periosteum as far as possible uninjured. Six weeks afterwards the dog was killed, when the bone from which the periosteum had been removed was found to present a great deficiency of bony matter; while in the bone which had had the periosteum left intact, there was already formed a compact mass of new bone.

In the formation of bone from fibrous tissue, a deposit of limy spicules is at first observed to take place. Then certain clear fibres (*osteogenic fibres*) are developed, and when these become calcified, they are seen to enclose in their interior large *osteoplasts* or bone-cells. These ultimately rest in spaces or areolæ formed for them amongst the fibres, and become the *lacunæ* of the future bone. The bones do not ossify at the same time, but exhibit great variations in the period of attaining full growth. O. begins in the second month of intra-uterine life, and first appears in the clavicle or collar-bone, and then in the lower jaw (fifth to seventh week). The vertebræ, thigh, humerus, and ribs are the next bones to exhibit this process. At the beginning of the third month, the shoulder-blade, frontal bone, the bones of forearm and leg, and upper jaw become developed, and in the course of the third month the other bones of the head, and the palm, instep, and digits are ossified. In the fourth month the iliac bones and small bones of the ear are developed; and in the fourth and fifth months the pubis, ischium, breast-bone, and ethmoid exhibit the progress of O. The calceneum and astragalus of the ankle ossify in the sixth and seventh months, and the hyoid or tongue-bone in the eighth month. Thus at birth many portions of the body are still unossified (*e.g.*, the ends of all the long bones, all the wrist bones, the coccyx,

&c.). The term *epiphysis* is applied to the centre of O. at the end of a long bone, the *diaphysis* being the centre of O. for the shaft. The shaft is first ossified. Other centres of O. named *apophyses* are found (as in vertebræ) in the development of projecting parts or processes.

Osta'de, Adrian Van, a famous artist, was born at Lubeck, Germany, in 1610, formed his style in Holland under Frank Hals and Rembrandt, and closely followed Teniers in many of his mannerisms. He was fond of painting drinking scenes, lively farmyards, cottage interiors, and in particular winter scenes, his management of snow being unrivalled. O. died at Haarlem in 1685. The warmth and depth of colouring which distinguished his pictures also marked those of his brother **Isaac,** who was born in 1617, and died in 1654. The best English collection of the elder brother's pictures is that of the Dulwich Gallery. Sir Robert Peel's specimens of Isaac's style are very fine. See Gädertz's work on O. (1869).

Ostashkov', a town in the government of Tver, Russia, on Lake Seliger, at the point of departure of the Seliger Ovka, a small affluent of the Volga, and 250 miles N.W. of Moscow. It is famed throughout Europe for its manufacture of leather, and produces yearly some 200,000 pairs of white boots called 'Ostashi.' Other industrial products are axes, scythes, cotton goods, and sugar. Pop. (1870) 10,806.

Ostende' ('the east end,' *i.e.*, of the canal), next to Antwerp the second port of Belgium, province of W. Flanders, on the coast, 20 miles from the French frontier, and 14 W. of Bruges, with which it is connected by canal and railway. It has passenger and mail communication daily with Dover (seven hours), and in summer attracts some 20,000 visitors (mostly Germans and English) exclusive of the immense number of travellers who arrive and depart on the same day. Its sea-bathing is particularly delightful. An excellent promenade is the Digue or breakwater (3280 feet long), built of great stone blocks, and extending nearly parallel to the seaward rampart. O. has two spacious floating basins and handsome quays for the Dover packets, finished in 1874, while the fortifications have been in great part demolished (1876) to make room for several fine new streets, an hospital, and other buildings. There are breweries, distilleries, sugar and salt refineries, oil-mills, and brick kilns (producing yearly 80 million bricks), but the great industry is fishing. So-called 'O. oysters' are nearly all English 'natives' brought from Whitstable and Barnham, and fattened in the numerous 'parcs' here, before being exported in barrels to all parts of the Continent. In 1872 150 fishing smacks belonged to O., and of these 139 were engaged in the cod fishing on the Dogger Bank. In 1873 the exports amounted to £597,870 (£596,850 to England), and the imports to £1,779,580 (in transit direct £1,163,873, total from England £1,132,732). Of the former, the chief articles are butter, meat, wool, hops, and eggs (3,640,336); of the latter, salt, guano, timber, coal (1873, 113,802,000 kilogrammes), chemicals, woollen fabrics, and indigo. In 1873 there entered and cleared the port 1363 vessels of 310,293 tons, and in addition there entered 724 mail steamers of 259,304 tons. In 1873 the number of passengers who embarked and disembarked to and from England was 45,228. Pop. (1874) 16,533. Old O. was destroyed by the sea in 1334. The present town, fortified by the Prince of Orange in 1583, after a memorable siege of three years surrendered to the Spanish under Spinola in September 1604.

Osteocoll'a (Gr. *osteon,* 'bone,' *kolla,* 'glue') is another name for bone-glue. It is prepared by digesting in superheated water the gelatine that remains after bones have been treated with muriatic acid to remove the earthy phosphates.

Osteolep'is (Gr. *osteon,* 'bone,' and *lepis,* 'a scale'), a well-known extinct genus of Ganoid (q. v.) fishes, the remains of which occur only in the Devonian rocks. O. belongs to the section *Crossopterygidæ* ('fringe-finned'); the paired fins consisting of a central lobe, to the sides of which the fin-rays are attached. In O. there were two dorsal fins. The scales were rhomboidal and smooth. The tail-fin was markedly *heterocercal,* or unequally lobed. The first dorsal fin was near the middle of the back, and the mouth was well provided with teeth.

Osteol'ogy, the department of anatomy which treats of the structure, form, disposition, and development of the skeleton of animals. See BONE, OSSIFICATION, SKELETON, &c.

Ostero'de, a town of Prussia, circle of Hildesheim, at the W. base of the Harz Mountains, and on the Söse, 20 miles N.E. of Göttingen. It has many picturesque old houses, an ancient castle, a hydropathic establishment, large grain stores for the supply of the neighbouring mines, important manufactures of cottons, woollens, and wooden wares, and Scherenberg's extensive white-lead and small-shot factory. Pop. (1875) 5658.—Another town of the same name, in the circle of Königsberg, has a timber trade and a pop. (1875) of 5735.

Os'tia (Lat. 'mouths'), a city of Latium, at the mouth of the Tiber, 14 miles W.S.W. of Rome, was founded, according to tradition, by Ancus Martius, and in the Second Punic War had risen to be an important naval and mercantile station. In Sulla's time it had a pop. of 80,000 inhabitants, and was famed for its saltworks and grain trade with Sicily and Sardinia. But the Tiber constantly receding from O. in consequence of alluvial deposits, Claudius constructed a new basin 2 miles to the N., which, enlarged by Trajan, was called Portus Augusti et Trajani, and about which a new town sprang up, Portus Ostiensis. O. nevertheless remained a flourishing and populous place under the earlier emperors, and was adorned by Hadrian, Septimius Severus, and Tacitus. It declined on the fall of the Western Empire, and in 827 was in ruins. Its remains, now 3 miles from the S. bank of the Tiber, include a temple of Jupiter, a theatre, baths (excavated in 1867), and a shrine of the Magna Mater (1869). The modern village of O., half a mile from the old town, founded by Gregory IV. in 830, lost the importance which it had enjoyed during the Middle Ages, on the reopening of the right arm of the Tiber (1612), and has now only 50 inhabitants.

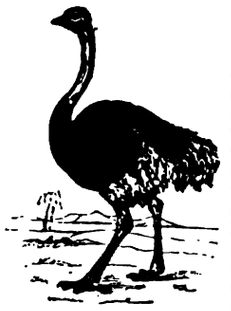
Ostra'cion, a genus of Teleostean fishes, belonging to the suborder *Plectognathi* (q. v.). It includes the 'trunk fishes.' The *O. cornutus,* or horned trunk-fish, is a good example. In the O. the body is encased in a stiff inflexible armour of scales, the fins protruding through apertures in the armour. The name 'Coffer fishes' is frequently applied to the species, all of which are natives of tropical seas.

Os'tracism, in the words of Aristotle (*Pol.* iii. 8), was a means whereby 'democratical states used to remove from the city for a definite period those who seemed to be pre-eminent above their fellow-citizens by reason of their wealth, the number of their friends, or any other means of influence.' The senate and ecclesia having decided on the necessity of such a step, each of the citizens received a tile (*ostrakon*) on which he might inscribe the name of the person to be ostracised, who, if there were 6000 votes against him, had to quit the city within ten days for a period of ten (or later of five) years. As O. was simply a precautionary measure, it involved no confiscation of property, was followed by a restoration of all civic privileges, and could at any time be revoked by popular vote. The system was instituted at Athens by Cleisthenes in the 6th, and abolished by Alcibiades in the 5th c. B.C. It also prevailed at Argos, Megara, Syracuse, and Miletus, a leaf, however, taking the place of the tile in Sicily, where it was accordingly known as *petalism.* See Grote's *History of Greece* (part ii. ch. xi.).

Ostracoda, an order of the class *Crustacea* (q. v.), represented by several genera of small organisms collectively named 'water-fleas.' To this group belongs the genus *Cypris,* found in fresh water; *Caudona,* in brackish streams; and the marine genera *Cythere* and *Cypridina.* The body is enclosed within a shell or *carapace,* which consists of two valves, united along the back by a flexible membrane. The valves are closed by the action of a special (*adductor*) muscle. The gills or branchiæ are attached to the hinder jaws. The O. are represented as fossils in rocks beginning with the Lower Silurian strata. They are known as fossils through the preservation of the valves of the shell.

Os'trich (*Struthio*), a genus of *Cursorial* or *Ratitate* birds distinguished by its size, and by having only two toes on each foot. The O. (*Struthio camelus*) is the type of the family *Struthionidæ.* The nostrils are in a broad groove about the middle of the bill. The plumes of the wings are especially long, and, as in other Cursores, have the barbs of the feathers disconnected

and united to form a web—a conformation giving to the feathers their well-known graceful appearance. The tail is also formed of plumes which are long and drooping. The O. inhabits Africa, and affects sandy deserts, over which it travels with wonderful ease and rapidity. In length the adult male may measure from 6 to 8 feet; its plumage is blacker than that of the female. The food of the O. consists of vegetable matters, especially, it is said, of the large wild melons which grow plentifully in its native regions. In habits the O. is gregarious. It is also polygamous, one male mating with several females. From two to seven females are found in the *suite* of each male. The female lays a number of eggs, which are set upright in the sand and watched with great care, although they are hatched chiefly by the heat of the sun. Each egg weighs about 3 lbs., and equals in capacity about twenty-four hens' eggs. The shells are employed by the natives of Africa for a variety of purposes, but chiefly as water-vessels. The flesh is said to be palatable but somewhat tough. The mode of hunting the O. varies. When it can be approached near enough, the rifle is used, but the great speed of the bird enables it to distance the fleetest horse, although its habit of running in circles gives the hunter the means of intercepting it. When brought to bay, the O. defends itself valiantly by kicking; the leg being kicked out in front, an action rendered the more formidable by the strong claws with which the toes are provided. The voice of the O. is a deep hollow sound. The average duration of the existence of this bird is stated to be fifteen or twenty years. The wings, as in all cursorial birds, are rudimentary, and are used after the fashion of aerial paddles. The leg bones are specially strong, and many of the bones are *pneumatic* or filled with air. The breast-bone is flat and raft-like, and wants the *keel* for the attachment of muscles, so well seen in birds of flight.



Ostrich.

The voracity of the O. is well known. In a tame state it has been known to swallow nails, pieces of glass, large stones, and a variety of other substances. The probable cause of this voracity is the natural tendency exhibited by all grain-eating birds to swallow hard substances, which aid the gizzard in its work of triturating the food. The O. survives confinement for long periods, although its plumage becomes sadly defaced and subject to the attack of parasites. The feathers taken from the recently killed or from the living O. are more valuable than the dropped ones. The back feathers, those above the wings, are most valued, those of the wings and tail ranking next in worth. O. feathers have been prized in all ages for purposes of personal adornment. They surmounted the heads of the Pharaohs of Egypt; and to-day, in England, the head-dresses of ladies presented at court are imperfect without them. O. feathers enter largely into commerce; in 1876 the estimated value of the imports into the United Kingdom amounted to nearly £700,000. Dyed black, they are largely used as undertakers' plumes, a full set being valued at from £200 to £300. Aleppo, in Syria, is the chief place of export for the finest O. feathers. Algiers, Cairo, Senegal, Madagascar, and S. Africa, also export large quantities. The Argentine Republic sends considerable quantities of Rhea feathers, which are commercially classed as O. F. Each healthy full-grown bird reared on the O. farms of Cape Colony produces feathers which fetch on an average £15 a year. See Mosenthal and Harding's *Ostriches and O. Farming* (Lond. 1876).

Ostrich Feathers, a favourite heraldic badge of the princes of the Middle Ages, which by the close of the Plantagenet period had become the peculiar ensign of the Princes of Wales. The Black Prince directed that certain of the shields placed about his monument should be charged with three O. F. ('plumes d'ostruce') upon a sable field.

Ostrog', a town of Western Russia, government of Volhynia, was formerly the seat of the ancient and powerful house of O., but sunk into insignificance on the death of the last prince of that line in 1673. Here under the rule of Constantine Duke of O., a zealous adherent of the Greek Church and opponent of the Jesuits, a college and printing-press were established, from which issued in 1581 the first Slavonic translation of the Bible. Pop. 8937.

Os'trogoths. See GOTHS.

Ostu'ni (*Ostunium*), a town of S. Italy, province of Lecce, 22 miles W.N.W. of Brindisi by rail. It lies in a district rich in grain, vines, olives, and almonds, and has numerous churches and convents. Pop. (1874) 14,422.

Osu'na, a town of Spain, province of Seville, in a fertile plain, 48 miles E.S.E. of Seville. It has a castle perched on a hill, a Gothic collegiate church of 1534, four hospitals, large barracks, and several fine promenades. The university of O. was abolished in 1824. Soult abstracted from the collegiate church some five cwt. of old plate. There are slight linen, iron, and earthenware industries, and a trade in barley, olives, almonds, capers, esparto grass, and wine. Pop. 15,500.

Os'wald, King of Northumbria, began to reign in 634 A.D., and restored to his subjects the Christian religion, which had been deserted for paganism by his predecessors Œric of Deira and Eanfrid of Bernicia. Cædwalla, the Welsh Prince, was slain by this king at Denisesburn (Dilston) after a long and bloody battle. Oswald was one of the mildest yet most capable kings of the Heptarchy, and along with Aidan (q.v.), whom he made Bishop of Lindisfarne, sought so earnestly to cultivate the spiritual welfare of his people, that the ecclesiastical chroniclers never tire of detailing his acts of charity and his miracles. He died in battle against Penda, king of Mercia, in the thirty-eighth year of his age, 643 A.D. See Bede's *Hist. Eccl. Gent. Angl., Lib. III.*; Freeman's *History of the Norman Conquest*; and Green's *History of the English People* (new ed. 1877).

Oswe'go, a city in New York, U.S., near the E. end of Lake Ontario, at the mouth of the O. River, and at the end of the O. Canal, which links the lakes Ontario and Erie with the Hudson, and 328 miles N.E. of New York city, with which it is connected by rail. It is a great railway terminus, and has a large trade, mainly in importing Canadian grain and lumber. The Kingsford starch works here are probably the largest of the kind in the world, producing thirty-five tons of starch daily, and consuming a million bushels of corn annually. O. has also fifteen flour-mills, capable of producing 6080 barrels of flour daily; ten grain-elevators, with a storing capacity of 2,000,000 bushels; extensive iron and railway works; large malt-houses, barrel-factories, &c. The streets are 100 feet wide, and cross at right angles, and among the public buildings are a city-hall, a U.S. court-house, fifteen churches, a free library with 20,000 volumes, and an opera-house. There are two beautiful parks. Fort Ontario, a casemated structure overlooking the lake and harbour, is garrisoned by a company of the U.S. army. The harbour, at the mouth of the O. River, is protected from the action of the lake by extensive piers; the U.S. government is now (1877) constructing a new harbour outside the old one, which when completed will have a depth of 20 feet, and be one of the best on the chain of great lakes. Pop. (1870) 20,190.

Oswe'go Tea is a name that was given by the colonists of last century to *Monarda didyma*, a common N. American plant belonging to *Labiatæ*. They used an infusion of its leaves as a domestic medicine, probably much in the same way and for the same purpose that allied aromatic herbs were in the past used in England. Several other species of the genus have a very strong scent, as *M. punctata*, which is called 'horse mint'—another reminiscence of the 'old country.'

Os'westry, a market-town of England, in Shropshire, 18 miles N.W. of Shrewsbury by rail, has a town-hall, corn-market, assembly-rooms, grammar-school, the ruins of a castle, three banks, and one newspaper. The Cambrian Railway Works, for the manufacture of rolling-stock, were erected in 1865, and extensive sewerage and water systems completed in 1866. Malting and brickmaking are the chief industries. Pop. of municipal borough (1871) 7306, an increase of over 30 per cent. since 1861, due mainly to the development of collieries and quarries in the surrounding district.

Osyman'dyas, an Egyptian king mentioned by Strabo and Diodorus Siculus, but not yet identified by Egyptologists with

any historic personage. He is said to have been twenty-seventh in succession from Sesostris, to have invaded Asia at the head of 400,000 men, and to have built the remarkable temple at Thebes, called by Diodorus the tomb of O., by Strabo the Memnoneium, and now generally known, on the authority of the hieroglyphics, as the Rameseion.

Ota'go, a district, and formerly a province, of New Zealand, occupying the southern portion of the Middle Island, together with Stewart's Island. Its total area is about 16,000,000 acres, of which 3,000,000 acres are agricultural, 7,000,000 pastoral, and 2,000,000 forest land, the remaining 4,000,000 acres being made up of lakes and mountains. The W. portion is little known, and almost uninhabited, consisting as it does of a congeries of lofty mountains, many of which rise above the snow-line. Several other ranges of considerable altitude also traverse O., and the principal tracts of level land are found in the S. and N.E. The drainage of the mountains forms several large lakes (see NEW ZEALAND), and is carried off by a number of rivers, of which the chief, from N. to S., are the Waitaki, Taieri, Clutha (q. v.), Mataura, and Waiau. These streams are so rapid as to be almost useless for navigation. There are several good harbours both in O. proper and Stewart's Island, but the magnificent sounds of the W. coast (see NEW ZEALAND) are deprived of commercial value by the inaccessibility of the region into which they penetrate. The mineral wealth of O. is very great, including gold, brown coal, iron, antimony, and copper. Gold was first discovered in Gabriel's Gully, near Lawrence, in 1861, and from that date to the end of 1876 the quantity exported from O. amounted to 3,584,179 oz., valued at £14,077,688. Building stone of the finest quality is abundant near Oamaru and Kakanui in the N.E. Fine timber is obtained on the W. and S. coasts and in Stewart's Island, but the interior is almost treeless. The climate of O. is healthy and invigorating, and free from extremes. Snow rarely falls at the coast, and frost is only severe in elevated situations. All the crops and fruits grown in Britain flourish in O. The total area under crop (including land in sown grasses) in Feb. 1877 was 536,753 acres, oats and wheat being the two principal crops. The trade of O. is much greater than that of any other district of New Zealand. The chief exports are wool, gold, oats, wheat, skins, and preserved meats; and the leading industries are manufactures of iron, woollens, pottery, and soap, besides brewing, shipbuilding, and an extensive timber trade. The construction of railways is being vigorously proceeded with, and about 200 miles are now (1878) open for traffic. Much attention is paid to education, and in March 1877 there were in operation a university, two high schools, five grammar schools, and 160 elementary schools, all deriving more or less support from Government.

The first regular settlement of O. was commenced on 23d March 1848 by an association connected with the Free Church of Scotland, but its original class character was effaced by the great influx of miscellaneous immigrants caused by the discovery of gold. From 1861 to 1870 a portion of O. constituted a separate province under the name of Southland. On the abolition of the provinces in 1876, O. was subdivided into 13 counties. The pop. of O. at the census of 1874 was 85,082, but at the end of 1877 was probably about 105,000. The principal towns are Dunedin (q. v.), Invercargill (q. v.), Port Chalmers, Oamaru, Milton, and Lawrence.

Otahe'ite. See TAHITI.

Otal'gia (Gr., lit. 'earache') is a painful affection of the ear of a neuralgic nature, occurring in fits of excruciating pain shooting over the head and face. It is frequently caused by decayed teeth, the removal of which is necessary for a cure; but, in other cases, the treatment is that of neuralgia generally.

O'tary, or **Ota'ria** (from Gr. *ōtis, ōtos*, 'an ear'), a genus of carnivorous quadrupeds included among the *Pinnipedia* or seals, and representing the family of the *Otaridæ* or 'eared' seals, which are distinguished from the common seals by having a small external ear. They are also known as 'sea lions' and 'sea bears.' They differ markedly from seals in several important points of structure. Their limbs are much freer from the body, and the O. can thus raise themselves, and waddle over the land more easily than seals. Their neck is very flexible, while that of the seals is short. Then the seals have no under fur, while the O. is well provided with a fur below the outer covering of coarse hairs; this under fur, in certain species of *Otaridæ* affording the rich *sealskin* of commerce. Several species have hair on the head and neck, forming a kind of 'mane,' whence the name 'sea lions.' In general conformation of body and activity of habits, the O. presents a striking contrast to the seals. The teeth number thirty-six; twenty in the upper and sixteen in the lower jaw. There are six upper incisors, two canines in each jaw, and six molars above and five below on each side. The canines are very large. The food consists of crabs, molluscs, and fishes, the O. being skilful fishers. When a fish is too large to be swallowed at one gulp, the O. bites it in halves, swallows the first half, and then instantly dives to secure the remainder. The stomach always contains a large quantity of pebbles. The O. have a very peculiar distribution. None inhabit the Atlantic Ocean, save in the very southernmost portions. They are first met with on S. American coasts at the mouth of the river Plate; and thence southward they are found all round the coast, and in distant islands, such as Juan Fernandez, Chonos Islands, and the Galapagos. They are numerous on the Californian coast, and extend as far N. as the Aleutian Isles to the coast of Japan. The Prybilov Isles form their most northern limit of distribution. They occur on the New Zealand coasts, and on the S. and E. coasts of Australia. The males grow until they attain the age of six, and the females until they reach four years, when the former weigh each from 500 to 700 lbs., and the latter from 80 to 150 lbs. or more. They return to their island haunts in May, the males arriving first, the females some weeks later. About nine well-defined species are known. These are the *O. Ursina*, *O. Gilliespii*, and *O. stelleri* of the N. Pacific; the *O. jubata* and *O. Falklandica* of the S. Pacific and S. Atlantic; the *O. Antarctica* or *O. pusilla* of the Cape of Good Hope; and the *O. Hookeri*, *O. lobata*, and *O. gazella* of Kerguelen's Land. Immense numbers of these animals are annually slaughtered. A pair of sea lions (*O. stelleri*) are at present (1878) alive in the Brighton Aquarium, where the female gave birth to a young O. in May 1877.

Otchakov', a fortified port of Russia, government of Kherson, on the Dnieper-Linan, 40 miles N.E. of Odessa. A town of great antiquity, it was invested with a transient importance during the wars between Turkey and Russia in the 18th c. Pop. (1870) 5227.

Oth'man Ibn Affan, the third Arabian calif, was born about 574. He was early converted to Islam by his kinsman Mohammed, two of whose daughters he married, and whose secretary he became. In 644, three days after the death of Omar (q. v.), he was raised to the califate, on condition that he would govern according to the Koran. The first successes of his reign in Persia, Armenia, Asia Minor, and Northern Africa were soon followed by a series of disasters, due to O.'s folly in entrusting all commands, not to the bravest warriors, but to his own kinsmen and favourites. A growing discontent, fostered by the adherents of Ali (q. v.), and by the priests, who hated O. for his departure from time-honoured customs, ended in a general rising, and in the assassination of O. by Mohammed, a son of the Calif Abu-Bekr, June 18, 656. The first revision of the Koran was made by O.'s orders. See Ockley's *History of the Saracens*, and Gibbon's *Decline and Fall of the Roman Empire*.

Oth'man, the founder of the Ottoman Empire. See OSMAN.

O'tho, the seventh of the Roman emperors, was born of an ancient Etruscan family in 32 A.D. Profligate and luxurious, the Rochester of Nero's court, he yet governed the province of Lusitania with considerable credit from 59 till Galba's revolt in 68. O. participated in that revolt, hoping to secure the succession to himself, a hope that was baffled by Galba's adoption of Lucius Piso, 10th January 69. Five days later O., greeted as emperor by three and twenty common soldiers, murdered both Galba and Piso, and within twenty hours of his usurpation began to foretell his own downfall. Already a third competitor had arisen in the person of Vitellius (q. v.), whose revolt at Cologne was followed by the advance of the German legions on Italy. After fruitless negotiations O. marched to meet the enemy. In the battle near Bedriacum, between Verona and Cremona, the Vitellians were victorious; and the news being brought to O., who had stayed behind at Brixellum, he stabbed himself, 15th April 69. His Life was written by Plutarch and Suetonius, but the standard authority is the *Historia* of Tacitus (lib. i. and ii.).

Oti'tis, or Inflamma'tion of the Tym'panum, is a painful catarrhal affection, the pain often extending over the whole of the head and down the neck, aggravated by swallowing, and often complicated with fever and delirium. The throat is also usually inflamed, and there may be total deafness. The *treatment* should be of a soothing nature—leeches, hot fomentations, and sedative poultices, with purgatives and opiates. O. may terminate in complete resolution, or matter may discharge itself down the Eustachian tube, or the *membrana tympani* may give way. O. may occur during the course of certain febrile affections, especially scarlatina, and occasionally after measles and hooping-cough. In such cases the mucous membrane of the tympanum becomes red and swollen, the cavity is filled with pus, the ossicles are destroyed, and the walls of the cavity are diseased, causing permanent *Otorhœa* (q. v.), and incurable deafness.

Ot'ley, a market-town of England, in the W. Riding of Yorkshire, on the Wharfe, 8½ miles N.E. of Bradford by rail, has a cruciform parish church (restored 1869), numerous dissenting chapels, a mechanics' institute, and two newspapers. There are extensive woollen factories, printing-machine works, corn and paper mills, tanneries, breweries, &c. Pop. (1871) 5855.

Otorhœ'a is a purulent or muco-purulent discharge from the external ear, caused by chronic inflammation of the meatus or diseased conditions of the *membrana tympani*. O. may be catarrhal, or it may depend upon some constitutional cachexia, of which struma and gout are the most frequent. In the acute stage, the ear should be syringed with warm water, and warm fomentations should be applied to the inflamed membrane. In the chronic stage, mild mercurial ointments, or a solution of nitrate of silver, five or ten grains to the ounce, should be applied on a camel's-hair brush. When abscess occurs in the meatus, a free incision should be made. Should the discharge be very fœtid, a weak solution of Condy's fluid, chloride of lime, or carbolic acid may be used for injection.

O'toscope, an instrument used by aural surgeons for examining the *membrana tympani*. In a very good light the membrane can be seen without a speculum; but a silver tube is usually necessary, the light of a lamp, with a reflector behind it, being thrown into the tube. In operative procedure a small mirror is placed on the forehead, in order to leave both hands free. An instrument sometimes called the O., consisting of an indiarubber tube about 18 inches long, is used by the surgeon to hear the air passing into the tympanum by the Eustachian tube, the one end of the indiarubber tube being placed in the ear of the patient and the other in the ear of the observer.

Otran'to, a decayed fishing town of Southern Italy, in the province of Lecce, 53½ miles S.E. of Brindisi by rail, is the seat of an archbishop, and has a cathedral and a castle erected by Alfonso of Aragon. It carries on a considerable trade in oil with the Levant. Pop. (1874) 1155. The *Hydrus* of its Greek colonists, and the *Hydruntum* of the Romans, O. was long one of the principal harbours of the Adriatic. On July 28, 1480, it was stormed by the Turks, who slew 12,000 of the inhabitants, and carried off the remainder into slavery.—The *Terra d'O.*, or *province* of Lecce, comprising the heel of the Italian peninsula, has an area of 3293 sq. miles, and a pop. (1874) of 493,263.

Ott'awa, an important river in the Dominion of Canada, rises on the watershed between the basin of the St. Lawrence and Hudson's Bay, and flows first in a westerly direction, receiving from the N. the Abittibi, Blanche, and Ketacumnaw, then S., expanding into lakes Mijizowaja and Temiscamang, and finally E., being joined from the N. by the rivers Du Moines, Black, Coulonge, Gatineau, Du Lièvre, and Rouge, and from the S. by the Mattawa, Pelewahweh, Bonnechere, Madawaska, and Rideau, and entering the St. Lawrence by three mouths, which encircle Montreal Island and the Isle Jésus. It has an extreme length of over 600 miles, and a drainage area of some 80,000 sq. miles. Its basin is richly wooded, and includes much fertile land, now rapidly filling with settlers. Though impeded by many rapids, it is rendered navigable by an extensive system of dams and canals for river boats and steamers, and forms a channel for a lumber trade that is perhaps the largest in the world. The O. is connected by the Rideau Canal with Lake Ontario, and navigation is possible from it by the Mattawa, Lake Nipissing, and French River, to Georgian Bay in Lake Huron. There is some prospect of this latter passage, which would shorten the waterway from Montreal to the great lake-ports W. of Huron by nearly two-thirds, being rendered more practicable.

Ottawa, the capital of the Dominion of Canada, beautifully situated on the S. bank of the O. River, 87 miles above its confluence with the St. Lawrence, and at the point where the Rideau Canal joins the river, 125 miles W. by S. of Montreal, and 240 N.E. of Toronto. It is reached by a loop line of the Grand Trunk Railway, and is on the highway of the Canadian Pacific Railway, at present (1878) under construction; in summer lines of steamers run hence to Montreal and the Upper O. The business part of the city is on the W. side of the Rideau Canal, and here are the city-hall, the principal churches, schools, hotels, and other public buildings. Further W. is the suburb of Rochesterville, and the great lumbering depôt of the Chaudière, opposite the recently incorporated city of Hull (pop. 9000), in Quebec province. On the E. side of the canal are the Lower Town and Sandy Hill, composed mainly of dwelling-houses, the Major's Hill, laid out as a public park, and the village of New Edinburgh, containing Rideau Hall, the governor-general's residence. The Falls of the Chaudière, 130 feet in descent, are singularly romantic, and are the chief attraction in the beautiful scenery of the vicinity. O. is the seat of the Anglican bishop of Ontario, and of a Roman Catholic bishop, who takes his title from the city. It has many excellent educational institutions, including the Roman Catholic O. College, with a university charter, a normal school for Central Canada (opened 1876), a Protestant Ladies' College, and two large convents. On Barrack Hill stands its chief architectural ornament, the Parliament Buildings, the grandest pile in America, after the marble capitol at Washington. The city is the central mart of the great Canadian lumber trade, and some 5000 people are engaged here alone in sawing and shipping. American enterprise has developed here an important import trade in provisions and general merchandise. The government employés of all grades in the city number 1300. Three newspapers are published daily. The assessed value of city property in 1869 was $5,081,679, and in 1875 $11,254,635. Pop. in 1851, 10,000; in 1861, 15,000; in 1871, 21,000; in 1875, 24,262. More than half of the inhabitants are French Canadians, professing the Roman Catholic faith. O. was founded in 1827 by Colonel By, who constructed the Rideau Canal as an interior line of defence. Bytown, so called after its founder, was incorporated as a city under the name O. in 1854. It became the capital of Canada in 1856, and the government was installed in its new buildings in 1866.

Ottawa, a town of Illinois, U.S., on the Illinois River, 80 miles W.S.W. of Chicago by rail, has large starch and glass industries, several fine hotels, stores, &c., and four newspapers, and is connected by canal with Plaines River and Lake Michigan. In a handsome park on the S. side of Illinois are great mineral springs. Pop. (1870) 7736.

Ott'er (*Lutra*) a genus of *Carnivorous* quadrupeds belonging to the family *Mustelidæ*, or that of the weasels. The feet are short and the toe webbed, in adaptation to an aquatic life. The ears are small but prominent, and the tail is rounded and of moderate length. The teeth number thirty-six, and consist of six incisors and two canines in each jaw; the upper jaw having eight premolars and two molars, and the lower jaw six premolars and four molars.



Otter.

The average length of the O. is about 3½ feet. Specimens have been captured which weighed 40 lbs. The colour is a very rich brown, intermingled with tints of grey; and the outer fur is coarser than the inner coating. The O. is well known from its habit of destroying large quantities of salmon and other food fishes. Its destructive propensities are, however, not limited to

killing and devouring fishes; it rejects large numbers of those it kills, and mangles the remainder by selecting the most juicy portions for food. The O. burrows in the banks of the river it infests. The young vary in number from three to five, and are born in March or April. O.-hunting is a sport which is highly exciting and often difficult. A special breed of dogs, well known under the name of 'otter-hounds,' is employed. These dogs are wiry and powerful, swim well, and possess great endurance and strength of limb and jaw—qualities which an O. brought to bay is likely to put to a severe test. Frequently an enraged O. will bite and maim several of his canine pursuers, and contrive to escape through the perfect command he retains of his faculties and powers of swimming and diving in the most expert manner. The otter-hound is also known by the name of 'Welsh harrier.' The Chinese O. (*L. Chinensis*) otherwise named the Indian O., occurs in Asia, and is hunted like its European representative. The fur is of lighter hue than in the latter. This and the Indian O. have been tamed and trained to capture fishes. The Canadian O. (*L. Canadensis*), closely resembles the common O., but may attain a larger size. The sea O. or Kalan (*Enhydra Lutris*) occurs in the N. Pacific Ocean. It is a scarce animal, and possesses a fur of the highest possible value, and may weigh from 70 to 80 lbs. The fur has a black velvety gloss, and is of a rich blackish or brown colour on the upper parts of the body.

Ott'erburn, Battle of. See CHEVY CHASE.

Ott'o I., son of the Emperor Heinrich I., born in 912, was early married to Edith, grand-daughter of King Ælfred, and was crowned at Aachen in 936. In 937 the Duke of Bavaria revolted against his authority, but was promptly defeated; in the following year O.'s half-brother led the Dukes of Franconia and Lotharingia into a similar rebellion, which was also put down. The consequence was that O. obtained either for himself or his kinsmen all the great duchies, which he swayed with a firm hand. Other wars were carried on by him against the Danes, whose king, Harald, he compelled to do homage and accept Christianity, and against the Poles, whom he added as feudatories of the crown. The Slavs of the Baltic, the Middle Elbe, and the Oder were brought under his authority by two of his markgrafs. In 951 he made a romantic expedition into Italy to espouse the cause of Adelheid, the widow of Lothar, who was then in her nineteenth year, and whom Berengar had seized. Entering Lombardy by the Adige valley, O. forced Berengar to a condition of vassalage and married Adelheid, assuming to himself the title of King of the Lombards. A rebellion was conducted against him in 953 by his son Ludolf, Duke of Swabia, and in 955 the Hungarians made an irruption into Bavaria. The rebellion was suppressed, and O. in person routed the Hungarians at a battle fought near Augsburg. In 961 O. visited Italy for the second time, was crowned King of Lombardy and (February 2, 962) Roman Emperor by Pope John XII., whom he shortly after deposed. 'This restored empire,' writes Mr. Bryce, 'which professed itself a continuation of the Carolingian, was in many respects different. It was less wide, including, if we reckon strictly, only Germany proper and two-thirds of Italy; or, counting in subject but separate kingdoms, Burgundy, Bohemia, Moravia, Poland, Denmark, and perhaps Hungary.' Its character was 'less ecclesiastical.' 'Under him,' says the same writer, 'the Germans became not only a united nation, but were at once raised on a pinnacle among European peoples as the imperial race, the possessors of Rome and Rome's authority.' O. died at Minsleben, in Thuringia, 7th May 973, having previously obtained for his son, through war, the daughter of the Eastern Emperor Nicephorus. See Vehse's *Leben Kaiser O.'s des Grossen* (Dresd. 1827; 3d ed. 1867), and Bryce's *Holy Roman Empire* (Oxf. 1864).—**Otto II.**, son of the preceding, was born in 955, crowned King of the Romans in 961, and reigned along with his father, married the Greek princess Theophanô in 972, and became emperor in the following year. He soon came to warlike issues with the great fiefs, his first contest being with Heinrich the Wrangler of Bavaria, who struck up a rebellious alliance with Harald of Denmark and the Dukes of Bohemia and Poland. They were each in turn defeated by O., and Heinrich was deprived of his duchy. O. was next engaged with Lothar, who seized Aachen and asserted his right to Lotharingia, but having marched as far as Paris O. made him abandon the claim. Revolts at Milan and Rome next drew the emperor across the Alps, and in the S. of Italy he fought with distinction in Apulia and Calabria. In 982 the Saracens defeated him, and he barely escaped with his life, after which he returned to Rome, where he died 7th Dec. 983. See Giesebricht, *Jahrbücher des Deutschen Reichs unter der Herrschaft Kaiser O.'s II.* (Berl. 1840).—**Otto III.**, son of the preceding, was born in 980, and crowned at Aachen when only three years old. During his childhood Theophanô undertook the imperial regency. O. was seized by Heinrich of Bavaria, who resented the establishment of female authority and aimed at supreme power, but in 984 he was given up again. The famous Gerbert acted as his preceptor and reared his pupil 'in the dream of a renovated Rome, with her memories turned to realities.' During the years of tuition O. came to be known as 'the Wonder of the World.' In 996 he led an army to Rome and engaged the troops of Crescentius, the consul, whom he defeated. On that occasion he was crowned emperor. In 999 he lifted Gerbert to the pontificate, and thus began 'that Teutonic reform of the Papacy which raised it from the abyss of the 10th c. to the point where Hildebrand found it.' In the year 1000 O., who had returned from a pilgrimage to the Holy Land, presented himself at the tomb of Karl the Great in Aachen and took from his upright figure a consecrated cross, after which he returned to Rome. He died at Paterno, near Viterbo, 21st January 1002, poisoned it was said by Stephania, widow of Crescentius, who had first of all ensnared him by her beauty. His body was carried to Aachen and buried beside Karl the Great. 'Short as was his life,' says Mr. J. Bryce, 'and few his acts, O. III. is in one respect more remarkable than any who went before or came after him. None save he desired to make the seven-hilled city again the seat of dominion, reducing Germany, Lombardy, and Greece to their rightful place of subject provinces.' See Wilman's *Jahrbücher des Deutschen Reichs unter Kaiser O. III.* (Berl. 1840), and Bryce's *Holy Roman Empire* (Oxf. 1864).

Otto I., King of Greece from 1833–62, was the second son of King Ludwig of Bavaria, and was born at Salzburg, June 1, 1815. On the 13th February 1832 he was chosen by the Great Powers King of Greece. Being accepted by the Greeks, he arrived at Nauplia, then the capital, on the 30th January 1833, and on the 6th February made a solemn entrance into the town. Till the 1st July 1835 Greece was governed by a regency (under Armansperg, Maurer, and others), but even after O. himself took the government, German officials held the chief influence. In 1836 he married the Princess Amalie of Oldenburg, whose interference in the politics of the Greeks was disastrous. She was understood to be the instigator of that reactionary and autocratic policy that lasted till the revolution of September 1843 forced O. to grant a free constitution. Yet he would not fairly yield to constitutional government, but sought to secure an artificial majority in the Chamber by intrigues and bribery. His pro-Russian feeling during the Crimean War gained him some popular favour, which he soon lost, and at the beginning of 1862 O. appealed to Kanaris to form a ministry. But the attempt failed, as he would not accept Kanaris' terms, and in October of the same year an insurrection broke out at several places. On the 22d October O.'s deposition was proclaimed at Athens. He forthwith lodged his protest and left for Bavaria. He died at Bamberg, 26th July 1867.

Otto, or Attar of Roses, is obtained by distilling the flowers of the Provençe or cabbage rose (*R. centifolia*), and probably also those of the damask rose (*R. damascina*). The principal farms for the production of the rose, and where the attar is manufactured, are situated in the valley of Kézanlik, in Rumelia, at the foot of the Balkans. The third year after planting a crop is secured, and the bush will yield well for fifteen years. The harvest generally begins in the middle of May, and each morning before sunrise the flowers are gathered, and are distilled by noon on the same day. Into the stills (which hold about 2½ cwts.) the roses are placed with water, and during the process of boiling the attar is carried forward with the steam into the refrigerator. It is collected as it there floats on the condensed water. On an average 3000 lbs. of blossom are required to produce 1 lb. of the attar. The yearly production varies considerably from various causes, but the average of the last ten has been ascertained to be about 55,500 oz., and the price, when pure, may be fairly estimated at 25s. to 30s. per oz. The whole district was devastated during the Russo-Turkish War of 1877–78.

Ott'okar II., Przemysl, King of Bohemia 1253–78, son of King Wenceslaus III., was early chosen Duke of Austria, when the old ducal line had died out with Friedrich the Quarrelsome. At twenty-three he married Margaretha (then forty-six years old), sister of the latter and widow of Heinrich, son of the Emperor Friedrich II., but she was afterwards divorced by him. O. also gained possession of Steiermark, for which he had to fight with the Hungarians, whom he defeated at Marchfeld in 1260, and also of Carinthia and Carniola. Soon after his accession he undertook in 1254, in union with the Teutonic Knights, a crusade against the heathen Prussians, whom he subdued, and founded at Pregel a town which, in honour of the king, he named Königsberg. The imperial crown was offered to O., who refused it, but yet would not recognise the election of Rudolf, in consequence of which he had to yield Austria, Styria, Carinthia, and Carniola to Rudolf, and take Bohemia and Moravia as fiefs of him in 1276. When O. shortly after renewed the war, he fell, after a brave resistance, in a battle on the same plain where eighteen years before he had won a glorious victory, in the neighbourhood of Vienna, August 26, 1278. See Lorenz, *Geschichte König O.'s II.* (Vien. 1866).

Ott'oman Em'pire. See TURKEY.

Otto von Frei'singen, a German chronicler, was the son of Leopold IV., Markgraf of Austria, and of Agnes, daughter of the Emperor Heinrich IV. His father dedicated him to the service of the Church. He studied at Paris, and while still a youth was made Provost of the Monastery of Neuburg. O.'s talents, learning, and high birth seemed to point him out for ecclesiastical distinction, but he was destitute of worldly ambition. His stepbrother, the Emperor Konrad III., compelled him to become Bishop of Freisingen, where he died, 22d September 1158. O. has won an honourable place among the chroniclers of the Middle Ages by his *Universal History*, which comes down to 1153, and was continued by Otto of St. Blasius to 1209, and by his *De Gestis Frederici I., Cæsaris Augusti*, continued by Radewic. His family connections gave him a knowledge of imperial policy possessed by few, and an access to important documents of which he has liberally availed himself. The best edition of his *Universal History* is in Urstitius' *Germaniæ Historici Illustres* (vol. ii.); of his *Friedrich*, in Muratori's *Scriptores* (vol. vi.). See Wiedemann's *O. von Freising, sein Leben und Wirken* (Passau, 1849).

Ot'way, Cape, a bold headland, forming the S.W. extremity of the colony of Victoria, and the first land usually made by vessels bound from the United Kingdom to Port Phillip. It is situated in 38° 52′ S. lat., 143° 33′ E. long., and is crowned by a lighthouse.

Otway, Thomas, an English dramatist, was the son of a clergyman, and was born at Trotton, Sussex, March 3, 1651. From Winchester School he passed to Christ College, Oxford, which he left for London without a degree. Hunger naturally turned him into playwright and actor—actor only once, however; for at Sir William Davenant's theatre in Dorset Garden, where he acted 'King' in Mrs. Behn's *Forced Marriage*, 'the full house put him to such a sweat and tremendous agony, he being dash't, spoilt him for an actor.' In 1675 appeared his *Alcibiades*, and in 1676 *Don Carlos*, a great success, played for thirty consecutive nights. In 1677 O. published the tragedy of *Titus and Berenice* from Racine's *Berenice*, and a version of Molière's *Cheats of Scapin*. After the production of *Friendship in Fashion* (1678), a 'very diverting,' very indecent comedy, he was shipped off to Flanders as cornet of horse; but he was soon back poorer than ever, and wrote two more tragedies—*Caius Marius*, a mere hash of Shakespeare's *Romeo and Juliet*, and *The Orphans*. In the same year (1680) he scribbled a political piece entitled *The Poet's Complaint to his Muse*. His comedy of *The Soldier's Fortune* (1681) was supplemented by a second part, *The Atheist*, in 1684,—both are poor. *Venice Preserved*, his last, and by far his greatest play, appeared in 1682. Its wretched author died in London, April 14, 1685. Some say that he died of fever incurred by his irregular habits; others, that he choked with a piece of bread given him in charity. O. excelled in domestic tragedy; in delineating passion, the miseries and the ecstasies of love, the dark depths of hate and the steadfastness of virtue, he has left us scenes unsurpassed, perhaps unrivalled, in our literature. *The Orphans*, banished from the stage because of its somewhat impure plot, continues to be read with tears for its pathetic incidents; while *Venice Preserved*, with scarcely a virtuous character but the heroine, is justly deemed one of the most melting and thrilling plays since Shakespeare's time. No finer love scenes were ever penned than those between Jaffier and Belvidera. The last edition of O. is that of Thornton, with notes and life (3 vols. 1813). See *Cornhill* for December 1877.

Oude, or **Oudh**, pronounced 'Owd' (*Avadh* or *Ayodhya*, 'the invincible'), a province of British India, bounded N. by the independent state of Nepal, and encircled on all its other sides by the N.W. Provinces, with which it has been amalgamated since 1877; on the S.W. it is bordered for a long distance by the Ganges. Area, 23,930 sq. miles; pop. (1869) 11,220,232. O. is the most densely populated province in all India, the average number of inhabitants being 469 to the square mile, which exceeds that of England and Wales, or even Belgium. Besides Lucknow (q. v.), the capital, there are no large towns above 40,000, and consequently almost the whole population is agricultural. The Mohammedans number 10 per cent., including many of the higher classes; and the Hindus 89 per cent. The Brahmins, with 1,400,000, are by far the most numerous caste; the Rajputs are 662,000 in number. It was from these two high castes of O. that the Bengal sepoys were largely recruited before the Mutiny. O. forms one vast alluvial plain, with no mountains or minerals; the jungly hills to the N. were ceded to Nepal after the Mutiny. Besides the Ganges, the chief navigable streams are the Gumti, the Gogra, and the Rapti, which all flow S.E. towards the great river. According to a law of silt-laden rivers flowing through plains, they run on natural embankments 30 feet above the level of the country, which is thus divided into cup-like basins, forming marshes or *jheels*. Their inundations and the marshes supply irrigation; there are as yet no canals. The most formidable wild animal is the wolf; tigers only wander in from the Nepal terai. *Nilgai* ('blue cows') abound, and no Hindu will kill them. Of the total area, about 8,500,000 acres, or 56 per cent., are under plough cultivation. The crops are wheat, rice, and inferior food grains; sugar, oilseeds, tobacco, opium, and cotton. Most of these are largely exported by river and rail, to pay for the piece-goods, salt, and all sorts of manufactured articles which require to be imported. The large imports of Indian wheat into the United Kingdom, reaching 3,000,000 cwts. in 1876, chiefly come from this tract. The poor mainly subsist upon a mess of barley and pulse, and the rate of wages for unskilled labour is less than 3d. a day. Beyond a thriving weaving colony at Tanda, who import raw cotton largely, and manufactures of luxury at Lucknow, there are no manufactures throughout the provinces. The total imports are estimated at £1,650,000, the exports at £1,420,000. The administration was (prior to 1877) conducted by a chief commissioner resident at Lucknow, according to what is called the non-regulation system, under which the district officers, known as deputy-commissioners and not collectors, are not limited to members of the Covenanted Civil Service. The province is divided into 4 divisions, 12 districts, and 43 subdivisions. In 1875–76 the total imperial revenue was £1,668,000, of which £1,407,000 was derived from the land; in addition, the provincial and local revenue amounted to £452,000. In the expenditure an important item is £160,000, paid to various persons, on account of political pensions, not including £120,000 a year allowed to the ex-king of O. at Calcutta. The total military force is about 8000 men of all ranks and arms of the service, of whom more than half are Europeans, maintained at a total cost of £250,000. The regular and municipal police number 7700 officers and men, costing £107,000, apart from the *chowkeydars* or indigenous village watchmen. There were in 1875 altogether 1371 educational establishments, attended by 59,391 pupils; the total cost was £523,000. The chief of these is the Canning College, which has Oriental and law departments. Among charitable institutions are the King's Hospital, endowed by a former king of O. with £1454 a year; and the Bulrampur Hospital, built in 1871 by a wealthy *talukdar* at the cost of £10,000, and endowed with as much more. These are both at Lucknow. There are 1347 miles of water communication, 4225 miles of road, and at the end of 1876, 542 miles of the O. and Rohilcund Railway were open, mostly within the province, on which a capital of more than 5 millions had been expended; the net earnings were £122,581.

O. forms part of the great plain of Hindustan, and many of the earliest legends of the Hindus centre in this region. It was the birthplace of Sakhya Muni, the founder of Buddhism. But the separate history of the province only dates from 1756, when Shujah-ud-Dowlah, the vizier of the Mogul emperor, established his independence of Delhi, under the title of Nawaub Vizier. In 1819 his descendant, Ghazi-ud-Din Hyder, was acknowledged by the British as king. The dealings of the British in Bengal with the dynasty were very intimate, chiefly taking the form of continual loans and cessions of territory. But the subsidiary force of the British was used to enforce daily the grossest acts of misgovernment, and in 1856 the last king, Wajid Ali Shah, who refused to sign a treaty parting with his sovereignty, was forcibly dethroned. Garden Reach, near Calcutta, was assigned to him as a residence, where he still lives, surrounded by a numerous circle of courtiers, on a pension of a *lac* of rupees a month (£120,000 a year). In the following year the Mutiny broke out, and both the *talukdars* or large landholders, who had been dispossessed, and the general population joined the mutinous sepoys. The British under Sir H. Lawrence (q. v.), and afterwards under Sir J. Outram (q. v.), were shut up in the Residency and the Alum Bagh of Lucknow for many months, and were only relieved at last by Sir Colin Campbell (Lord Clyde) in March 1857. The rebel leaders were the Moulvi of Fyzabad and the Begum or Queen of O., who finally escaped safely into Nepal. Lord Canning, the Governor-General, now passed his celebrated confiscation order, by which the proprietary right in the whole soil was resumed, to be afterwards granted away again on most favourable terms to the *talukdars*. Since January 17, 1877, O. has been amalgamated with the N.W. Provinces. See *Annual Blue-Books on the Moral and Material Progress of India* (Lond.), *Annual Administration Reports of the O. Government* (Lucknow), Sleeman's *Journey through the Kingdom of O.* (Lond. 1858).

Oude, the former capital both of the Hindu and Mohammedan kingdoms of the same name, now a ruined city in the British district of Fyzabad, on the right bank of the Gogra river, 75 miles E. of Lucknow; pop. (1869) 9949. It is considered by the best authorities to be the most ancient city in Hindustan, having been founded by Menu 2000 years B.C. O. was the birthplace and capital of Rama, the mythical hero of the *Ramayana*, from whom all the Rajput princes claim to have sprung. Nothing is now left but large mounds of earth and brick, with which various legends are associated. The Hindu temples that exist are all modern, the ancient buildings having been destroyed by the Mohammedans, who removed the seat of government to the adjoining city of Fyzabad (q. v.) in 1730. See General Cunningham's *Ancient Geography of India* (Lond. 1874); and Goldstucker's *Sanskrit Dictionary*, art. Ayodhya.

Oude'narde, or **Audenarde** (Dut. 'old earth' or 'land'), a town of Belgium, province of E. Flanders, on the Scheldt, 16 miles S. of Ghent by rail. It has a fine Gothic town hall, and linen and cotton mills, chemical works and tanneries. Pop. (1873) 4835. Marlborough and Prince Eugene here gained a brilliant and decisive victory over the French, under the Duke of Burgundy and Marshal Villars, 11th July 1708.

Ou'dinot, Charles Nicolas, Duc de Reggio, was born at Bar-le-Duc, 25th April 1767, joined the army in his seventeenth year, distinguished himself in suppressing a local riot (1790), and two years later was appointed lieutenant-colonel of the third battalion of the Meuse Volunteers. He executed a brilliant movement (May 1794) as chief of brigade at Kayserslautern, and was promoted general; on the 6th of August he manœuvred himself into Trier, where he got his leg broken. On the 18th October 1795 he was wounded in five places before Mannheim, and fell into the hands of the Austrians. He made the Swabian and Bavarian campaigns, and was wounded at Neuburg (September 1796); in 1799 he became general of division, and was wounded both at Wurmlos and Schwitz; in the same year he performed a dashing feat at the passage of the Mincio, by which he captured a battery. In 1801 he received a sabre of honour, and in 1805 the grand cross of the Legion of Honour, with the command, at Arras, of ten battalions of reserve. With these he earned fresh renown at Vienna, Hollabrunn (where he was again wounded), Austerlitz, Jena, and Ostrolenka. He commanded the advance guard on the march to Friedland, and in 1808 was nominated governor of Erfurt. In the Austrian campaign of 1809 he received a gun-shot wound at Lobau, and after the battle of Wagram, in which he successfully engaged, he was created Marshal of France and Duc de Reggio. O. occupied the Hague in 1810, and administered the country; in 1812–14 he operated against the Russians and Austrians, and on Napoleon retiring to Elba attached himself to Louis XVIII., whom he never afterwards forsook. Honours were heaped upon him, and at his death in Paris, 13th September 1847, he was a peer of France, Grand Chancellor of the Legion of Honour, and governor of the Invalides.—**Charles Nicolas O., Duc de Reggio**, eldest son of the preceding, was born at Bar-le-Duc, 3d November 1791, entered the army, and became a lieutenant of hussars in 1809, took part in Masséna's campaigns in Portugal and Spain, and in the Russian campaign of 1812. He was wounded at Leipsic and Craonne, but his valour won him a colonelcy (April 1814). Like his father, he remained faithful to the Bourbons. O. was made *maréchal de camp* (1822), was charged with the reorganisation of the French cavalry (1824), served in Algeria (1835), entered on a political career in 1842, and in 1849 commanded the troops that the French Republic despatched to Italy to sustain the authority of the Pope against the Mazzinists and Garibaldians. His success was decisive. He pronounced against the *coup d'état* of the 2d of December, was seized and imprisoned for some days, and on his release withdrew into private life. O. died 7th July 1863. See De Persiis, *Vie de Général O., Duc de Reggio* (Par. 1866).

Ougrée, a town of Belgium, on the Maas, 3 miles S.S.W. of Liege, has extensive engineering works, a cannon foundry, flour and oil mills, &c. Pop. (1873) 5759.

Ounce (Lat. *uncia*), in troy weight is the twelfth part of a pound, and is equivalent to 480 grains; in avoirdupois weight it is the sixteenth part of a pound, and is equal to 437½ grains troy.

Ounce (*Leopardus uncia*), a species of *Feline* Carnivora, allied to the Leopard (q. v.) and found in Asia. Some zoologists regard it as the young form of the leopard or panther, but there appear to be good grounds for believing the animal to represent a well-marked variety if not a distinct species of *Felidæ*. The fur of the O. is coarser than that of the leopard, and the spots which diversify it are not nearly so well-defined as those of the latter animal. Its tail is also clumsier.



Ounce.

Ourari. See CURARINE.

Ou'ro Pre'to, capital of the province of **Minas Geraes**, Brazil, in a bleak mountain region 4000 feet above the sea, and 200 miles, or fifteen days' journey by mules N.N.W. of Rio Janeiro. Originally a mining settlement, it rapidly attained a high degree of prosperity, but of late years it has greatly declined in consequence of the almost complete exhaustion of its gold mines. Pop. 8500.

Ouse (like Axe, Exe, and Usk, a derivative of the Cymr. *wysg*, 'water'), the name of several English rivers, of which the following are the most important—(1) The Great O., rising in Brackley, Northamptonshire, 10 miles W. of Buckingham, and after a N.W. course through the counties of Buckingham, Bedford, Huntingdon, Cambridge, and Norfolk, falling into the Wash, near Lynn. It receives the Ouzel, Cam (q. v.), Larke, Little O., and Nar, and has a length of 140 miles, of which 25 are navigable for barges. (2) The Yorkshire O., formed by the confluence of the Ure and Swale at Aldborough, 15 miles N.W. of York, and flowing in a S.E. direction till it joins the Trent, the two streams forming the estuary of the Humber (q. v.). It receives the Wharfe, Aire, Don, and Derwent, and has a length of 60 miles from Boroughbridge, or 135 miles from the source

of the Ure, being navigable as high as York (45 miles) for vessels of 150 tons. (3) The Sussex O., rising at Slaugham, and, after a S. course of 28 miles, falling into the English Channel at Newhaven.

Ou'sel, a name given to various Insessorial birds, such as the ring O. (*Turdus torquatus*), which arrives in Britain in April, and is known by the collar of white encircling its neck. The water O. or dipper (*Cinclus aquaticus*) is allied to the ant thrushes, and is notable for its activity in swimming, and more so for its diving habits, which are practised by the young dipper immediately on leaving the egg. The water O. is of a brown colour above; the throat and chest are white, and the abdomen a rusty red. The average length is 7 inches.

Ouseley, The Rev. Sir Frederick Arthur Gore, Bart., an English musician, was born in London, August 12, 1825, and educated at Christ Church, Oxford, after which he entered holy orders. He succeeded his father, the late Right Hon. Sir Gore Ouseley, as second baronet in 1844. In 1855 he was elected Professor of Music in the University of Oxford, and received the Precentorship of Hertford. He is incumbent of St. Michael's, Tenbury, and founder of a college in that parish for the instruction of boys in classics and choral singing. The following standard musical treatises are from his pen:—*On Harmony* (1869); *On Counterpoint and Fugue* (1869); *On Musical Form and General Composition* (1875). He has also edited several collections of church music, and has composed a number of excellent anthems and sacred pieces. His oratorio of *Hagar* was first performed at the Hereford Festival in 1873.

Oustiti. See MARMOSET.

Out'crop, in Geology, is the line along which an inclined stratum appears at the surface. The strike is the direction of this line, and is coincident with it when the surface is plane. The dip is at right angles to the strike. See DIP AND STRIKE.

Outer House. See COURT OF SESSION.

Out'fit Allow'ances in the British Army are granted to non-commissioned officers on obtaining regular commissions, to the extent of £100 in infantry, and £150 in cavalry regiments.

Out'lawry, in English law, means the exclusion of one from the protection of the law. The penalty is incurred by the wilful avoidance of legal process. In England, in cases of treason and felony, the law interprets the party's absence as proof of his guilt. In civil cases, O. renders a man incapable of suing for redress of injury.

Out'posts, the soldiers charged with the defence of the advanced positions of an army. See Colonel J. Jebb's *Practical Treatise on Strengthening and Defending O., &c.* (Lond. 1848).

Ou'tram, Sir James, G.C.B., G.C.S.I., a hero of the Indian Mutiny, and one of the most honoured characters in the army of the East India Company, was born at Butterley Hall in Derbyshire, January 29, 1803. His mother was of a Scotch family, and he was brought up in Scotland, studied at Marischal College, Aberdeen, and went out to Bombay as an infantry cadet in 1819. His chief services were in the political department, half diplomatic half administrative. He was first employed in introducing order among the wild hill tribes of the Bombay Presidency, then as *aide-de-camp* in the disastrous Afghan expedition of 1839, and afterwards as Resident at the Courts of Hydrabad, Sattara, and Baroda. It was while O. was at Hydrabad that the annexation of Scinde was effected, greatly against his advice, and he was besieged in the Residency. In 1856 he was selected by Lord Dalhousie to announce to the King of Oude his deposition, and to be the first Commissioner of that province. He conducted successfully the short Persian War of 1856–57, and reached Calcutta in time to help in suppressing the Mutiny. Though the superior commanding officer, he chivalrously consented to serve under Havelock as a volunteer in the force that relieved Lucknow; and after the final succour brought by Lord Clyde, resumed his duties as Civil Commissioner of Oude. O. received the thanks of Parliament, and was made a member of the Supreme Council of India, but retired in broken health in 1861. He died at Paris, 11th March 1863, was buried in Westminster Abbey; and has left a name as 'the Bayard of India,' and the friend of the people and native chiefs. Statues have been erected to his honour on the Thames Embankment, London, and at Calcutta.

Out'rigger is a name given to a long racing-boat having fixed to the wale and projecting outside of it an iron framework to support the rowlocks. This contrivance enables the boat to be made very narrow and light, while it gives increased leverage in manipulating the sculls. The framework itself is also called an O., and when applied to gigs they are termed *outrigged gigs*. On shipboard, O. is a general name for a spar or boom rigged out for various purposes, as from a ship's side to suspend boats, or from the crosstrees or top to extend the top-gallant breast backstays.

Out'works, the defences constructed beyond the *enceinte* of a fortress, such as ravelins, lunettes, counterguards, tenailles, &c. See FORTIFICATION.

Ou'zel. See OUSEL.

O'val (from Lat. *ovum*, 'an egg'), a general name given to any plane curve which resembles the longitudinal section of an egg. The ellipse is the simplest and most familiar example. The Cartesian and Cassinian ovals, so called from having been first investigated by Descartes and Cassini respectively, are curves of the fourth order. The former are physically interesting as being the plane sections of the equipotential surfaces due to two oppositely electrified or magnetised points. For a particular case, that of zero potential, the ovals which are at first in pairs reduce to circles. For a particular value of the potential, the ovals join to form one curve enclosing the two points, which approaches more and more nearly a circle as we recede from the electrified centres.

Ovam'pos, a race inhabiting S.W. Africa between the Cuanene river and the parallel of 21° S. lat. They are tall, muscular, and very dark, and seem to form a connecting link between the Kaffir and Negro races. Their language is without clicks, and they are more civilised than the tribes intervening between them and Cape Colony, having a king, inhabiting villages, and practising agriculture and various industrial arts. Cattle, ivory, ostrich feathers, and slaves are the chief articles of trade. On the S. border of their territory and partly mixed up with them are the Damaras, a Kaffir people whose language is intelligible to the O., and the Hill Damaras, a Negro race speaking the Namaqua language. Ovampoland consists of a tableland 6000 feet above the sea level, broken up to the S. by rugged peaks and barren hills, but declining to the N. into fertile plains, on which are grown large crops of maize and Kaffir corn. To the E. and S.E. it merges into the flat region near Lake Ngami and the Kalahari Desert. On the W. the plateau is divided from the sea by a sandy region from 50 to 100 miles wide, barren, rainless, and fever-stricken. The streams of Ovampoland are few and periodical, being absorbed in the sand in the dry season. The interior plains abound in lions, elephants, rhinoceroses, giraffes, antelopes, &c., which have retired northwards before the advance of civilised man.

O'var, a town of Portugal, province of Beira, at the mouth of a river of the same name, and on the lagoon of Ria d'Aveiro. It has a good trade and valuable fisheries. Pop. 10,374.

O'varies, the essential organs of the female generative system in animals, in which the *ova* or eggs are formed and matured. The ovary of the female corresponds to the *testis* in the male. The essential act of sexual reproduction consists in the contact of the fluid of the male (*seminal fluid*) with its contained spermatozoöids with the ovum of the female. The act of contact constitutes fertilisation, and the result of this process is the initiation of those changes mentioned in the article DEVELOPMENT, and which culminate in the production of a new being. In the human female, the *ovaries* are two oval bodies which lie one on each side of the *uterus* or womb. The ovary of each side is contained within the *broad ligament* of the uterus, and lies behind and below the *Fallopian tube* or *oviduct* of its side. By its front margin the ovary is connected with the broad ligament, while by its inner margin it is attached to the uterus by its own or *ovarian ligament*. It is also attached to the fimbriated mouth of the Fallopian tube by a ligament of small size. The O. are of whitish colour, and may be either smooth or rough on their outer surface. In length they measure 1½ inches in the adult subject, about ¾ of an inch in width, and about ½ of an inch in thickness. They each weigh from 1 to 2 drachms. The O. are covered by the *Peritoneum* (q. v.). Each ovary has its

substance composed of fibrous tissue or *stroma*, the tough outer layer being named the *tunica albuginea*. Within the meshes of the fibrous network or *stroma* small vesicles are to be discerned. These are the *ovisacs* or *Graäfian vesicles*, and contain the ova. In subjects who have not borne children, the ovisacs vary in number from fifteen to twenty, their size averaging that of a pin's head, but occasionally attaining to that of a pea. In their early development the Graäfian vesicles are small, but when they ripen they approach the surface of the ovary, and form projections on its surface beneath the peritoneal covering of the organ. The Graäfian vesicles continue to be formed from infancy to the end of the child-bearing period. Before puberty they are small and insignificant, and never attain any great degree of development. But after puberty, when *menstruation* occurs, the vesicles become matured and discharge their ova at the menstrual periods. Hence menstruation is the sign of the deeper work of *ovulation* or the production and maturation of ova. When the Graäfian vesicle bursts, the ovum is liberated on the surface of the ovary, and is grasped by the fimbriated mouth of the Fallopian tube, through which the ovum is conveyed to the uterus or womb, where meeting with the seminal fluid of the male it becomes fertilised. Fertilisation may, however, take place in the Fallopian tube itself.

When an ovum is discharged from its *Graäfian follicle*, there is left a small cavity which becomes filled with blood, and the margin of the vesicle becomes lined with a yellow substance, consisting probably of blood which has undergone chemical alteration and change. This appearance is known as the *corpus luteum*. It exists after the discharge of an ovum, but the *corpus luteum* which forms in the ovary after impregnation of an ovum, and that which results from the discharge of an ovum which has not been fertilised, are widely different in nature. The latter is smaller than the *corpus luteum* of pregnancy, and at the end of six months has disappeared, whilst the *corpus luteum* of pregnancy is as large as before. The *ligaments* of the ovary are the *ovarian ligament*, already mentioned, and the *round ligaments*. The arteries of the O. are derived from the aorta, and nerves originate from the *spermatic plexus*.

Diseases of the O.—The ovaries are liable to become the seat of tumours of all kinds, and those which are solid may be fibroid or malignant. *Fibroid* tumours of the ovaries are difficult to distinguish, during life, from fibroid tumours of the uterus, which are sometimes pedunculated and attain a very large size. They are distinguished from *malignant* tumours by the absence of the cancerous cachexia, and by their being of slower growth. Surgical interference, in the case of solid tumours, is inadvisable. The class of tumours with which surgeons are more immediately concerned are the cystic, which may be serous, colloid, or dermal. *Serous cysts* may be unilocular or multilocular, and the former are occasionally situated not in the ovary itself but in the broad ligament, and originate in degeneration of the Wolffian body or of the duct of Müller. *Cystic tumours* of the O. may be simple, single cysts, or proliferous; and the latter may be merely multilocular cysts or with a solid intracystic growth of a sarcomatous nature. Other compound cysts contain *colloid* matter; and *dermoid* cysts, which are congenital, contain masses of hair, portions of skin, and sometimes irregular pieces of bone, mixed often with a large quantity of fat. The fluid contained in cysts of the broad ligament is watery, like that of hydrocele; but true cysts of the O. contain a fluid rich in albumen, a good deal of cholesterine, and is generally like thick gum. Sometimes the contents are seropurulent or pure pus.

The gradual growth of an ovarian cyst produces the disease called *ovarian dropsy*, which may prove fatal from wasting, in consequence of the loss of albuminous matter in the cyst, from the effects of its size and pressure, or from its bursting into the peritoneal cavity. In some cases the secretion of fluid may cease and reabsorption may take place; or it may be reabsorbed from the peritoneum after it has burst into the peritoneal cavity. Suppuration will almost inevitably lead to ulceration and death.

Dropsy of the ovaries may be mistaken for peritoneal dropsy, for a softened fibroid tumour of the uterus, for large cysts in the kidney, for pregnancy, for tumours of the omentum, and even for phantom tumours. Diagnosis may be established by the history of the case, the constitutional symptoms, the physical examination of the abdomen, by exploration from the vagina or from the rectum, and in cases of doubt by tapping the tumour.

There are only two methods of treating dropsy of the ovaries, viz., tapping and excision or ovariotomy. Many surgeons recommend that ovariotomy should not be performed except after a preliminary and experimental tapping; but repeated tapping is by no means devoid of danger, and in the case of young healthy women the operation of excision is preferable. The success of this formidable operation of late years has been very encouraging, the ratio of mortality not exceeding a quarter, and even this ratio may be diminished by antiseptic appliances. In this operation the minutest precautions must be taken that every instrument, sponge, or other thing that touches the patient, and also the hands of the surgeon and his assistants should have been steeped in solution of carbolic acid. The operation should be performed under the carbolic acid spray. See Paper by Mr. Spencer Wells in *Med. Chir. Trans.*, vol. lvi. p. 120.

Ovariot'omy. See *Ovaries, Diseases of.*

O'vary, in Botany, is the part of the Pistil (q. v.) that contains the Overtes (q. v.).

Ova'tion. See TRIUMPH.

Ov'en (Old Eng. and Ger. *ofen*), an arched brick chamber capable of being raised to a high temperature for the baking of bread, also used in the arts of metallurgy, in glass-making, and the manufacture of pottery. The name is also applied to many kinds of apparatus placed on or near a fire for general purposes of cooking. Domestic ovens are of three kinds—the ordinary range or stove O., the Dutch O., and the out-O. The Dutch O. is simply a closed metal vessel or pot placed on the hearth and surrounded by burning faggots. Many ingenious and successful modifications of it have been devised, suitable, on account of portability, alike for the army and navy, new settlers, or kitchen use. Hebert's domestic O., patented 1836, is extremely useful for baking or roasting on a small scale. The patented cooking apparatus of Captain Warren is now held in great esteem for barracks, shipboard, workhouses, &c., and it, together with Perkins' military portable steam-O., provides the British soldier with better cooked food than can be obtained in any Continental army. The out-O., now old-fashioned, is an arched brick cell, closed by an iron door, constructed *outside* a dwelling. The chamber is heated by burning faggots on the tiled floor, and after sweeping out the ashes, the bread or other food is introduced and baked or cooked by radiation of heat from the bricks. *Bakers' ovens* were for a long time constructed and heated on the same principle, which is obviously wasteful of fuel, but within the present generation immense improvements have been introduced, by which economy of fuel, cleanliness, and uniform distribution of heat are secured. There is now a great diversity in the shape and materials of construction, and modes of heating bakers' ovens. Some are circular or annular, others tubular, iron in some instances has superseded bricks, and hot water, gas, steam, and hot air are also in favour for heating. Charging and discharging the ovens are also effected mechanically, and in 'travelling ovens' the goods are placed on travelling platforms or shelves, and are baked in one passage through or round the cell.

O'ven Bird (*Furnarius fuliginosus*), a species of Insessorial birds, so named from the peculiar shape of their nests, which are constructed in the form of a dome, the walls being fully an inch in thickness. The nest is formed of clay, grass, and vegetable fibres, packed so as to form a thick dense structure, which is usually placed in some exposed situation. These birds lay four eggs, and both sexes appear to assist in the formation of the nest. The plumage of these birds is of sombre colour. They inhabit S. America.

Ov'ens, an important gold-mining and agricultural district in the N.E. of Victoria, the principal towns in it being Beechworth (q. v.) and Wangaratta. It is drained by the O. river, a tributary of the Murray, and traversed by the railway from Melbourne to Albury, intended ultimately to connect the former place with Sydney.

O'verbeck, Friedrich, a German historical painter, born 3d July 1789 at Lübeck, studied in Vienna under Füger, and removed in 1810 to Rome, where he remained till his death, 12th November 1869. The influence of his early training under the Romantic School in Germany led O. to devote himself at Rome chiefly to the study of the pre-Raphaelite masters, in

whom he found the expression of piety and love that best harmonised with his own nature. He and his friends strove by imitation to catch the spirit of the old art, but often failed through a certain stiffness of drawing and poorness of colour. His becoming a Catholic was consistent with his artistic mode of thought. 'Christ's entry into Jerusalem' in the Marienkirche at Lübeck, the frescoes in the Villa Massimi at Rome (scenes from *Orlando Furioso*), 'St. Francis at Assisi,' also al fresco; 'The Influence of Religion upon Art,' an oil painting at Frankfurt, and the 'Ascension of the Madonna,' in the Cathedral of Köln, are O.'s best known works. One of his latest paintings, 'The Seven Sacraments,' distinguished by a wonderful fineness and purity of form, is scarcely reconcilable with his mystic symbolism.—**Johann Adolf O.**, nephew of the preceding, was born at Antwerp in 1826, and since 1858 has been Professor of Archæology at Leipsic. He is a valued art historian and critic. Among his writings are *Die Antiken Schriftquellen zur Geschichte der bildenden Künste bei den Griechen* (1868), and *Griechische Kunstmythologie* (1871).

O'verbury, Sir Thomas, an English author and courtier, son of Nicholas O., a Gloucestershire gentleman, was born at Compton Scorfen, Warwickshire, in 1581, studied at Queen's College, Oxford, and shortly afterwards proceeded to the Continent, whence he returned with the reputation of an accomplished gentleman. In 1601 he paid a visit to Scotland, and while there formed an intimacy with Robert Carr, afterwards Viscount Rochester and Earl of Somerset, who was then page to the Earl of Dunbar, and who accompanied O. on his return to London. Carr, handsome, ambitious, and unscrupulous, soon became a favourite with King James, was created viscount, and obtained in 1608 a knighthood for his friend. Events soon occurred, however, which broke up the intimacy between O. and his patron, and brought about that tragedy which has given such a strange interest to the former. O. had been induced to aid Rochester in his guilty intrigues with Frances Howard, the beautiful though dissolute Countess of Essex; but on learning from the Viscount that it was his intention to get her divorced and then to marry her, he endeavoured to dissuade him from the design of forming a regular alliance with a woman of such notorious character. Rochester, ill-pleased at such counsel, mischievously imparted it to Lady Essex, who was much incensed, and immediately set about planning the ruin of her paramour's adviser. In this she was assisted by Rochester himself and the Earl of Northumberland, who was privy to their intrigue. It was determined to get rid of O. by poison, but as this was difficult so long as he was at liberty, Rochester laid a scheme to irritate the king against him. An ambassador to the French Court being required about this time, he advised the appointment of O. to this post, at the same time privately advising the latter not to accept it. O. having accordingly sent in his refusal, was by the king's orders thrown into the Tower, 21st April 1613. Here he was kept in close confinement. On the 15th of September he died of poison administered to him by Rochester's commands. Twelve years afterwards the whole plot was discovered, and several persons convicted of having taken part in the murder were executed. Rochester, now become the Earl of Somerset, and his guilty wife were condemned to death in 1616; but the king, by the exercise of a criminal clemency, changed their sentence into one of banishment from the Court. The only one of O.'s works which appeared during his lifetime was *A Wife now a Widowe* (2d ed. Lond. 1614, printed along with his *Characters*). The felicity of the sketches in these *Characters, or Witty Descriptions of the Properties of Sundry Persons*, is at times not to be surpassed. Their quaint conceits, sweet fancies, epigrammatic daintiness, and rich flavour of poetic feeling, give them an enduring charm. 'The fair and happy milkmaid' is an idyll in prose that has no rival in English verse. Among O.'s other productions are *The First and Second Part of the Remedy of Love* (*ibid.*, 1620); *Observations on the Seventeen Provinces* (*ibid.*, 1626–51); *Crumms Fallen from King James' Table or Table Talk* (*ibid.*, 1715). The latest edition of O.'s complete works was issued in 1856.

O'ver Dar'wen, a manufacturing town of England, in Lancashire, 3½ miles S. of Blackburn by rail, has four churches and numerous schools and dissenting chapels, a theatre opened in 1877, club-rooms, a market-house, free library, temperance hall, public baths, washhouses, &c. There are bleaching and print works, very extensive cotton and paper mills, and paper-staining establishments, and in the township are collieries and stone-quarries. O. D. was governed by a Local Board of Health till 1878, when it received a charter of incorporation as a borough. Pop. (1871) 21,278; estimated (1878) at 30,000.

O'verland Route is the name given to the most direct route from England to India, namely, that by rail *vid* Calais, Paris, Lyons, Mont Cenis, Turin, Bologna, and Ancona or Brindisi, thence by steamer to Alexandria, by rail to Suez, and again by steamer through the Red Sea and Indian Ocean to Bombay. The passage may be made by the Peninsular and Oriental Steam Company's line in twenty-one days (contract time); sometimes in nineteen days; and the through fare is £170 second class, and £300 first class. The French Messageries steamers sail from Marseille direct *vid* Port Said, Suez, and Aden to Bombay. The sea route by the Cape of Good Hope, though considerably cheaper, is not accomplished in less than 94 days by steamers, while sailing vessels take four months. The name was first used by those enterprising travellers who really travelled overland through Turkey and Persia, in the line of the Indo-European Telegraph and the proposed railway, but it has now become rather a misnomer.

O'verseers are officers annually appointed to determine the poor-rate in parishes of England and Wales, and to collect and apply it in giving relief to the poor. O. are chosen by two or more justices from among the resident householders paying the poor assessment. They must be substantial householders; which fact must be stated in appointing them. Doubts having arisen as to the coequal jurisdiction of city and burgh justices and county justices under 43 Eliz. c. 2, in certain matters relating to the poor, they are removed by 12 and 13 Vict. c. 64, enacting that all power which may be exercised out of general or quarter sessions by two or more county justices, may be exercised by two or more city or burgh justices, within their jurisdiction. 12 and 13 Vict. c. 103, enacts that no one is to be appointed an overseer who is directly or indirectly concerned in any contract for the supply of goods or provisions for the workhouse, or for the relief of the poor of the parish, or of the union which comprises it. The duties of O. are to raise, by rate on the inhabitants, the funds necessary to relieve the poor and to provide material for giving them work; to apprentice poor children, and to set to work all persons, married or unmarried, who have no means of maintaining themselves. O., in granting relief to the poor, are entirely under the direction of the guardians, vestry, or other governing authority. They have no discretionary power in granting relief, except in an emergency, and in no case are they entitled to grant money. Persons threatening to run away, and leave their families chargeable on the rates, or refusing to work and maintain them, being able to do so, may be committed to the house of correction. When a family is left chargeable, the O. may seize, by order of the justices, so much of the means of the father as will maintain them. The husband is liable for all relief given to his wife, or to his children under sixteen; and such relief may be considered *a loan*, for which the wages of the party may be attached in the hands of his employer. Books must be kept open for the inspection of the parishioners, in which shall be registered the names of persons receiving relief, the time when they were first admitted, and the cause of their requiring relief. Under 6 Vict. c. 18, the O. having received printed forms on or before the 10th of June from the clerks of the peace, must give notice on or before the 20th June, requiring all persons entitled to vote for a county member, and who are not already on the register, or who have changed their qualification or residence, to send their names in a prescribed form, with a claim to be placed on the register, to the overseer, on or before the following 20th July. Lists of claimants are to be delivered to the clerk of the peace before the 29th of August, with the comments of the overseer, when required. An overseer wilfully contravening any provision of the Reform Act is liable to a penalty of £500. In Scotland, inspectors of the poor are appointed under the Poor Law Amendment Act. See POOR LAWS.

O'verstone, Samuel Jones Loyd, Baron, born September 25, 1796, passed from Eton to Trinity College, Cambridge, and succeeded his father Lewis Loyd as head of the London banking-house of Jones, Loyd & Co., originated in

Manchester. He sat as Liberal member for Hythe (1819–26), was defeated for Manchester (1832), served as High Sheriff of Warwickshire (1838), and was raised to the peerage (1850). A munificent art-patron, he is best known as an authority on the decimal coinage and other financial questions, on which he has published various important treatises. He warmly advocated the Bank Charter Act (1844), in a series of letters to the *Times* signed 'Mercator,' and as warmly opposed the Limited Liability Act (1856). See Grindon's *Manchester Banks and Bankers: Historical, Biographical, and Anecdotal* (Manch. 1877).

O'verture (Ital. *overtura;* Fr. *ouverture*, lit. 'an opening') an introductory orchestral movement prefixed to an opera or oratorio. Most old overtures were founded on two models, that of Lully (French) and Scarlatti (Italian). The first (adopted by Handel among other composers) usually opened with a slow movement, followed by free imitation, reverted to a 'grave,' and concluded with a spirited passage. The second had three movements, the first and third being vigorous and lively, the middle slow. The modern overture, taking its leading themes from the work which follows, foreshadows its dramatic incidents. Fine examples of this style are the overtures to *Fidelio* (Beethoven), *Der Freischütz* (Weber), *William Tell* (Rossini), *Fra Diavolo* (Auber), *Zampa* (Herold), and *Tännhäuser* (Wagner). The concert overture is a complete work in itself, and is akin to the first movement of a symphony. Mendelssohn's *Isles of Fingal* and Sterndale-Bennett's *Naiades* belong to this class.

Overture, a Scotch ecclesiastical term, means a proposal brought forward by a member of a church court, to be, if approved in that court, submitted to the supreme court, with the view of amending, defining, enforcing, or repealing any existing law, or enacting a new law, on matters which are within the legislative or executive functions of the Church. In terms of the Barrier Act (1697), no new law can be enacted by the General Assembly of the Church of Scotland, nor can an existing one be rescinded, without the consent of a majority of the Presbyteries. Hence an O. may also be transmitted by the Supreme Court to the Presbyteries in order to elicit their opinions on the matter in question. See Cook's *Styles*, &c. (Edin. 4th ed. 1870).

Overyss'el ('over,' or 'beyond the Yssel'), a province of Holland, lying between the Zuider Zee on the W. and Hannover and Westphalia, and bounded S. by Gelderland, and N. by Friesland and Drenthe. Area, 283 sq. miles; pop. (1876) 265,144. The Yssel, the northern branch of the Rhine, mainly forms the western boundary, and the rest of the province is watered by the Vecht, Regge, and Havelter Aa, which, after joining the Zwarte Water, enters the Zuider Zee by the Zwolsche Diep. Along the Yssel are produced good crops of rye, barley, oats, hemp, buckwheat, and potatoes. Throughout the rest of O. the soil is for the most part sandy and unproductive. There are considerable stretches of heath, and from N. to S. the province is traversed by a broken chain of low sandhills. The chief occupations are cattle-rearing, peat-digging, and the manufacturing of cottons and linens. The capital is Zwolle.

Ovid'ius Na'so, Pub'lius, one of the greatest and most charming of the Latin poets, was born at Sulmo in the country of the Peligni, 20th March 43 B.C. He was descended from an old equestrian family of moderate means, and he, along with his brother Lucius, his senior by exactly a year,—'a double birthday offering kept the day,'—was destined for the bar, and under Arellius Fuscus and Porcius Latro received a careful training with a view to entering on professional life. Though enjoying a high reputation as a declaimer, the practical bent of O was irrepressible, and instead of studying jurisprudence or frequenting the noisy forum, like Pope, 'he lisped in numbers for the numbers came.' His brother Lucius died immediately after completing his 20th year, and the family property, which no longer required to be divided, enabled him to repair to Athens for the completion of his education. There he acquired a perfect mastery of the Greek language. His sojourn at Athens was interrupted or followed by a tour made in company with the poet Macer. This tour included the famous cities of Western Asia Minor and Sicily. On his return to Rome O. did not give up the prospect of a public career. He was made one of the *Triumviri Capitales*, a singularly incongruous post for a poet to fill, since the duties corresponded pretty nearly with those of our police magistrates and undersheriffs. Thereafter he became one of the *Centumviri*, and eventually one of the *Decemviri*. The last office entitled him to a seat in the Theatre distinguished above that of the other Equites. O. had now definitely to decide whether he would follow a public life. He was eligible for the Quæstorship, but declined to become a candidate. He accordingly exchanged the broad purple stripe of a possible senator for the narrower one of his hereditary rank of knight, and entered upon the life of a private gentleman. O. from an early age seems to have evinced a levity of disposition and a marked inclination towards gallantry. These symptoms may have induced his parents, who seem to have been people of staid character, to provide a wife for their son while he was still very young. The union proved a most unfortunate one, and the lady was speedily divorced. A second wife was soon found for young O. and as speedily discarded. The poet's affections had indeed long ere this been given to Corinna, who is believed to have been no other than Julia, the clever but dissolute daughter of Augustus. Probably about his 30th year O. married his third wife, by whom he became the father of Perilla, and whom he invariably mentions with great tenderness and affection. O. mixed in the best society in Rome, and numbered among his literary friends the poets Æmilius Macer, Propertius, Ponticus, Bassus, and Horace. At the age of fifty, by an edict of Augustus, he was banished to Tomi, a town on the borders of the Euxine. The edict condemned him to a *relegatio*, not an *exilium, i.e.*, he was allowed to retain his citizenship and property. The sole ground of his banishment stated in the edict was the publication of his *Art of Love*. O. himself says it was due to *Carmen et Error*. The *Carmen* was a mere pretext, for the *Ars Amatoria* had been in circulation for ten years; the *error*, whatever that might be, was the real cause. Though O. has most closely kept the secret from the world, probably from the notion that his divulging it would lessen if not entirely dissipate his chances of recall, he unmistakably points to something seen by, or well known to, him involving the disgrace of the imperial family.

The common opinion, or rather suspicion, is that O. was an accomplice in the adultery of Julia, the grand-daughter of Augustus, with D. Silanus. Be that as it may, O. left Rome for Tomi in the autumn of 9 A.D. His whole life hitherto had been spent in Rome in the society of the polished, the brilliant, and the gay, in a sort of magic circle in which culture and mirth met and lived in amity; in short, the distinguished *coterie* in which he moved and breathed included the imperial family. Banishment to a foreign and barbarous clime, therefore, could not prove otherwise than fatal to his gentle and effeminate nature; and after a long series of piteous and humiliating letters written to friends at Rome, but to no purpose, the gifted poet died, revered, at Tomi, A.D. 17. His wife remained true to him to the last. The works of O. appeared in the following order:—*Amorum Libri III.*, *Epistolæ Heroidum*, *Ars Amatoria*, *Remedia Amoris*, *Nux*, *Metamorphoseōn Libri XV.*, *Fastorum Libri XII.* (the first six only remain), *Tristium Libri V.*, *Epistolarum ex Ponto Libri IV.*, *Ibis*, *Consolatio ad Liviam Augustam* (held spurious by some critics), *Medicamina Faciei*, and *Halieuticon* (genuineness uncertain). O.'s tragedy entitled *Medea*, and other of his works have perished.

Ovid's genius has always commanded the admiration of scholars. His vigorous fancy and exquisite pathos, richness of imagery, intensely sensuous expression, and his vast mythological and antiquarian lore, combined with the tuneful melody and bell-like recurrent chime of his verse, have made him a favourite with all modern poets, and won for him from Niebuhr the high praise of being, next to Catullus, the most poetical of the Roman poets.

The *Editio Princeps* of O. was published at Bologna (1471, 2 vols. fol.); also one at Rome, same year; *Aldine* (1502, 3 vols. 8vo); *Elzevir* (Leyden, 1629); *Burmann* (Amst. 1727). Of modern editions containing the complete works that by R. Merkel (Leips. 1853, 3 vols.) is the best. Though *Ovid* has been done into most of the European tongues in whole or in part, there is no good translation of the works by a single hand. The versions of portions of the *Metamorphoses* by Dryden, Addison, Cowper, and others are fair; a number of pieces from the same poem by Professor D'Arcy Wentworth Thompson are most felic-

citously rendered, but the translation of the whole work in blank verse by Mr. Henry King (Edin. Blackwood, 1871) is by far the best yet offered to the English public.

Ov'iduct, the name given to the canal leading from the Ovary (q. v.) of animals to the *uterus*, or to the external surface of the body, and through which the eggs or *ova* are conveyed. In *Mammalia* the oviducts are named 'Fallopian tubes,' after the anatomist Fallopius, who first described them.

Ovie'do, a town of Spain, capital of the principality of Asturias, in a fertile plain between the rivers Nalon and Nora, 748 feet above the sea, and 26 miles S.S.W. of the seaport of Gijon by rail. O. is a well-built town, with wide streets and promenades (*alamedas*), and a beautiful Gothic cathedral, founded in 760 by Froila, son of Pelayo (q. v.). It has a fine library and theatre, and is the seat of a bishop and of a university (founded 1850). Over 4000 workmen are here employed by the Government or by private persons in the iron manufacture, 20,400 tons of cast-iron, and 5000 of bar-iron being annually produced. The royal gun-factory at O., with over 500 workmen, makes every year from 600 to 1500 muskets. 12 miles W. of O., at the confluence of the Nalon and Trubia, is the royal iron foundry and manufactory of Trubia (established 1844), employing 1200 men, and annually producing 365 cannon of 3 to 4½ tons' weight, besides 12,000 rifles and carbines, as many bayonets, 900 revolvers, and 36,000 files. Pop. 14,156.

Ovie'do y Valdez, Gonzalo Fernandez de, was born at Madrid in 1478, and as page to Prince Juan of Castile witnessed the closing campaigns of the Moorish War (1490–92). In 1514 he sailed for the New World, with the appointment of inspector of mines, and later he became alcaide of Hispaniola, and historiographer of the Indies. O. died at Valladolid in Spain, in 1557. His *Sumario* (1526) was followed by the fuller *Historia General y Natural de las Indias Occidentales*, in 50 books, 21 only of which were printed at Seville in 1535, the first complete edition being published by the Real Academia Espagnola (4 vols. 1850). He also wrote an *Historia de Nicaragua*, several Spanish chronicles, and *Las Quinquagenas*, fifty dialogues on the men and manners of the age, which, still unpublished, is preserved in MS. at Madrid. See Ticknor's *History of Spanish Literature* (3 vols. 1849).

Ovip'arous, a name given to those animals that produce eggs which are afterwards hatched outside the parent-body; *e.g.*, birds. *Ovo-viviparous* animals are those which produce eggs, but also retain the eggs within their bodies until such time as the young escape therefrom—the process of hatching being thus carried on within the parent-body. Some reptiles (*e.g.*, vipers, and some lizards, viviparous lizard—*Zootoca vivipara*) are ovo-viviparous, as also are the land salamanders or land newts among the *Amphibia*.

Ovipos'itor, one of the appendages of the last abdominal segment of certain insects, used for the purpose of depositing the eggs in various situations. Other modifications of the terminal appendages form the 'sting' (*aculeus*) seen in bees, &c. The O. in all insects is formed on one and the same type. By the O. some insects (*e.g.*, gall-flies), slit open the bark of trees, and deposit their eggs therein, while others use the organ to penetrate into the tissues of animals for the same purpose.

O'volo (Ital.; from Lat. *ovum*, 'an egg'), a convex moulding, generally a quadrant of a circle. In classic architecture it was invariably decorated with the 'egg and dart,' or other ornament. See MOULDINGS.

O'vo-Vivip'arous. See OVIPAROUS.

Ov'ule, in Botany, is the earliest condition of the future seeds. They are fixed to certain parts of the wall of the ovary termed the *Placenta* (q. v.), and are either *sessile* (as in the primrose), or attached to the end of a stalk or *funiculus* (as in the ash). Each O. when fully formed usually consists of a central mass or *nucleus* (with an internal large cell called the *embryo sac*) enclosed in two bag-like coats, the outer one called *primine*, the inner one *secundine*. The *chalaza* is the point of the O. at which the base of the nucleus is confluent with the coats. The *foramen* or *microphyle* is a minute aperture in the coats over the *apex* of the nucleus. Ovules are (1) *orthotropous* or *straight*, when the chalaza coincides with the base (*i.e.*, the point of attachment) of the O., and the foramen is at the opposite extremity, the axis of the O. being straight (example, wall pellitory). (2.) *Campylotropous* or *incurved*, when the chalaza still coinciding with the base of O., the axis of the O. is curved, bringing down the foramen more or less towards that base (example, stock). (3.) *Anatropous* or *inverted*, when the chalaza is at the apex of the O., and the foramen next to its base, the axis remaining straight. In this, one of the most frequent forms of O., the chalaza is connected with the base by a cord, called *rhaphe*, adhering to one side of the O., and becoming more or less incorporated with its coats as the O. enlarges into a seed (example, dandelion). Between these three forms various intermediates occur, as for instance in what is called the *amphitropous* or *half-inverted*, when the O. being as it were attached laterally, the chalaza and foramen at opposite ends of its straight or curved axis are about equally distant from the base or point of attachment.

O'vum or **Egg**, the product of the *Ovary* (q. v.), or female organ of generation, which, when duly fertilised, is capable of developing into a new being. It may be said that Harvey's dictum *omne animal ex ovo* is in the main true, inasmuch as, while asexual methods of generation—*e.g.* Fission (q. v.), and Gemmation (q. v.)—do exist, the sexual method of reproduction by *ova* or eggs ultimately comes into play in the history of all animals—even perhaps in the very lowest animals or *Protozoa*. The human ovum has a diameter of the $\frac{1}{175}$th, or $\frac{1}{175}$th of an inch. It is a minute mass of protoplasmic matter, and like all ova exhibits an outer covering—the *vitelline membrane* or *zona pellucida*. Within this membrane is contained the *vitellus* or *yolk*, and within the yolk-substance is found the *germinal vesicle*, and *germinal spot*, or *macula germinitiva*. The germinal vesicle measures about the $\frac{1}{175}$th of an inch in diameter, the germinal spot being about the $\frac{1}{1750}$th of an inch in breadth. The O. itself lies embedded within its *Graafian vesicle* (see OVARY), and within a mass of cells which collectively form the *membrana granulosa*. The germinal vesicle and germinal spot are the first formed parts of the O. While the parts or structures first mentioned are common to all ova, their relative degrees of development vary greatly in different groups of animals. The differences between ova chiefly consist in the development of the yolk as compared with other parts of the egg. In the egg of the hen, the germinal vesicle and germinal spot, representing the actual seat of the developmental changes, occupy a very limited portion of the O., which is largely made up of the yolk and other structures adapted for the nutrition of the developing embryo.

Ow'en, John, D.D., the famous Nonconformist divine, was the son of Henry Owen, vicar of Stadham, and was born in 1616. At the age of twelve he entered Queen's College, Oxford, where he studied with extraordinary diligence. He ultimately entered the Church, but his Puritan tendencies were so pronounced, and his opposition to the innovations of Laud so violent, that soon after obtaining holy orders he was forced to quit Oxford. Having for the same cause been disinherited by a rich uncle, who had maintained him at Oxford, and whose heir he was to have been, he removed to London. Here he attracted attention by the publication (1642) of his *Display of Arminianism*, and he was presented by one of the 'Committees for inquiry into the Scandalous Immoralities of the Clergy' to the living of Fordham in Essex. From this he soon removed to Coggeshall, and about this time his views underwent a change from Presbyterianism to Congregationalism. Meantime his fame as a preacher had grown. He preached before Parliament the day after the trial of King Charles, and afterwards accompanied Cromwell as chaplain to Ireland and Scotland. In 1651 he was made dean of Christ Church, Oxford, and vice-chancellor of the University, and in 1653 received the degree of D.D. He was a member of the new Parliament of 1654, and, beginning to suspect Cromwell's ambition, joined the officers who drew up the petition which is said to have scared the latter from accepting the crown. For this or some other reason, O. lost the favour of the Protector, and with that, soon after, his deanery and vice-chancellorship. After the Restoration O. retired to his native place, where, notwithstanding his legal disability according to the Act of Uniformity (1662), he continued to preach, as well as to write. He preached again to a congregation in London during the time that Charles' proclamation permitted the Nonconformists (q. v.) 'to perform their devo-

tions in their own way.' During the last years of his life he suffered much from ill-health. He died at the village of Ealing, 24th Aug. 1683. O. was a man of profound piety and great learning, whose influence on the age, by practical usefulness and by his writings, was great. Indeed, as a preacher and writer he was only second to Baxter and Howe. Of his multitudinous writings, the one which is of real, permanent value is his *Exposition of the Epistle to the Hebrews* (4 vols. fol., Lond. 1668-84), which is yet the most valuable exposition of that epistle ever published in this country. See Orme's *Memoirs of John O.* (Lond. 1820), *Works* (28 vols. 8vo, Lond. 1826, ed. Russell; 24 vols. 8vo, Edinb. 1850, ed. Goold).

Owen, Richard, C.B., F.R.S., a celebrated anatomist and biologist, was born at Lancaster, July 20, 1804. He studied at Edinburgh, became assistant physician in the Fleet in 1826, and in 1835 was appointed Hunterian Professor of Anatomy and Physiology and Conservator of the Museum in the Royal College of Surgeons, London. For several years previous he had been engaged in preparing catalogues of the specimens in this museum; and these catalogues are his first literary work. He took an active share in the organisation of the Great Exhibition of 1851, and also of the Paris Exhibition of 1855. In the latter year he entered upon new duties as superintendent of the Natural History Departments (Zoology, Geology, Mineralogy) in the British Museum, a position which he still holds. As a comparative anatomist, he stands among the foremost of his time; and has, indeed, been named 'the Cuvier of England.' He first drew attention to the disappearance within historic times of the *Dinornis* of New Zealand; and in 1855 propounded his theory of 'natural rejection,' by which, in virtue of the 'contest of existence,' certain genera, among which are the Aptornis, Notornis, Chemiornis, Dodo, &c., became extinct. In this, as also in his views regarding the evolution of species, he prepared the way for the wider and more thorough hypothesis of Darwin —the origin of species by natural selection. His works and memoirs are numerous. The principal are *Odontography* (2 vols. 1840-45), *Lectures on the Comparative Anatomy and Physiology of the Invertebrate Animals* (1843, 2d ed. 1855), and on the *Vertebrate Animals* (3 vols. 1846, 2d. ed. 1866-68), *History of British Fossil Mammals and Birds* (1846), *On Parthenogenesis* (1849), *History of British Fossil Reptiles* (1849-51), *Palæontology* (1860, 2d ed. 1869). He is a Fellow and Associate of most of the scientific societies at home and abroad, and was created a Companion of the Bath, June 3, 1873.

Owen, Robert, social philanthropist, was born at Newton, Montgomeryshire, May 14th, 1771, received a scanty education, and in his fourteenth year became an under-master in a school in his native place, and afterwards a draper at Stamford, London, and Manchester. In 1801 he married a daughter of David Dale, a cotton-millowner in the village of New Lanark on the Clyde. Upon the workers at the mills O. put into practice several social and educational theories. In his school he abolished all prizes and penalties, and to each family he endeavoured to give a larger space to live in, purified by proper sanitary arrangements. At the same time he carried on an extensive propaganda by means of lectures and pamphlets, having in view the universalising of his schemes. In 1812 appeared his *New Views of Society; or Essays on the Formation of the Human Character*. Having dropped his connection with New Lanark, O. made similar efforts in the United States, in the parish of Bothwell, Lanarkshire, in Hampshire, and in Mexico, but without realising his ideal in any of them. In 1848 he crossed to Paris, in order to seize the revolutionary opportunity with a view to gaining adherents, but he made no headway. He died at Newtown, November 19, 1858. O.'s character showed a curious mixture of practical sense and Utopianism: his entire singleness of purpose was a virtue beyond all praise. See Booth's *Life of O.* (Lond. 1869).—**Robert Dale O.**, eldest son of the preceding, born in 1801, assisted in founding the colony at New Harmony, was an active Democratic member of Congress, 1843-47, and United States Minister at Naples, 1855-58, took part in the abolition movement, and was the author of *System of Education at New Lanark* (1824), *Moral Physiology* (1831), *Personality of God*, and *Authenticity of the Bible* (1832), *Footfalls on the Boundary of Another World* (1860), *The Debatable Land between this World and the Next* (1872), and *Threading my Way, an Autobiography* (1874). He died 25th June 1877.

Ow'ens College, Manchester, was founded in 1846 by John Owens, a Manchester merchant, who bequeathed £100,000 'for providing or aiding the means of instructing and improving young persons of the male sex (being of an age not less than fourteen years) in such branches of learning and science as were then, and might be thereafter, usually taught in English Universities.' It is in connection with the University of London, and holds yearly examinations for matriculation and the B.A. and B.Sc. degrees in that University. The Council is composed of 14 members, and the Senate of 20; and the number of professors and lecturers, exclusive of those in the medical department, is 32. O. C. was opened March 10, 1851; but the original edifice proving insufficient, new buildings have been erected, since 1870, by Mr. A. Waterhouse, at a cost of £120,000. They are in the Domestic Gothic style, in the form of a quadrangle, and include a chemical laboratory, medical school, and natural history museum. A scheme is now (1878) on foot, for the erection of O. C. into an independent university, with the power of granting degrees of its own.

Owl (from the 'hooting' or 'howling' sound made by the bird), the name given to the members of a well-defined family of *Raptorial* birds, forming the section of that order named *Nocturnal* Raptores from their habit of flying about by night. The family *Strigidæ*, or that of the O., is distinguished by a small bill. The beak is, however, much arched and acutely curved, and has its sides compressed. At the base a development of downy plumes is found, and the tip is hooked. The feathers of the O. are soft and downy, evidently adapted to the nocturnal habits of the bird, by enabling it to fly in a noiseless manner. The tarsi are feathered to the toes, and the talons are long and sharp. Several distinctly-marked sub-families are found within the limits of the *Strigidæ*. In the sub-family *Surninæ*, the head is small and there are no 'ear-tufts,' while the circles of feathers (known as *facial discs*), which surround the eyes in some species are not represented. The genus *Surnia* has long pointed wings, of which the third is the longest. The tail is also long and wedge-shaped, and the tarsi and toes are short and feathered. This genus is represented in N. Europe and America. The general peculiarities and features of the structure of the O. may be well studied even in this first and by no means very typical genus. The eyes are very large, and the *nictitating membrane*, by means of which the surface of the eye is kept clear, is especially well-developed, and acts as a kind of curtain by means of which the light is modified. It is necessary to remark that although the O. is *nocturnal* in habit as a rule, its period of activity is by no means confined to the night. Some owls fly abroad during the day; others are active during twilight. To the genus *Surnia* belongs the Canada or Hawk O. (*S. ulula*) found in N. America, and which is a daylight-loving species. The male is smaller than the female; the food consists largely of game-birds, mice, and the smaller quadrupeds. The Hawk O. is brown above, and white below, and is spotted and barred with black or dark tints. The Snowy O. (*Nyctea nivea*) represents another genus of the sub-family *Surninæ*. The wings are long, and the tail short and rounded. This bird inhabits N. Europe and N. America. It attains a length of from 22 to 27 inches, and is of pure white colour when full grown. The Burrowing O. (*Athene cunicularia*) is so named from its inhabiting burrows excavated in the American prairie-lands by the prairie-dogs; the quadruped and the bird living harmoniously as co-tenants of the burrow. The colour is a rich brown above, and a greyish-white below; and the average length is 11 inches. The *Athene connivens* of Australia is another example; while the Little O. of Britain is the *A. passerina* of ornithologists. It is common on the Continent, and is of a dark-brown colour, with yellow and white markings.

The members of the sub-family of the *Buboninæ*, or eagle owls, have a large head, flattened on the top, whilst two feathery tufts or 'ears' are seen at the sides of the head, and the 'facial discs' are incomplete. To this sub-family belongs the genus *Ephialtes*, represented by the *E. Scops*, or scops-eared O., rare in England, but common in S. Europe and in some parts of Asia. It is a diminutive bird, measuring about 7½ inches in length, brown above and greyish-white below. The typical genus (*Bubo*) of this sub-family is that including the well-known eagle and great O. In this genus the wings are long and powerful, and the tail is rounded. The great O. (*Bubo max-*

nus) attains a length of 2 feet. It is of a brownish-yellow colour, with the usual variegation of black-brown spots and bars. The bird is common in N. Europe, and extends as far S. as Italy and Turkey. A typical American species is the Virginian Eared O. (*B. Virginianus*) which measures about 2 feet in length, and is very destructive to game birds of all kinds, as well as to poultry and small quadrupeds. Several genera are nearly allied to those included in the sub-family *Surninæ*. Such are the genera *Surnium* (represented by the brown or tawny O. (*S. aluco*) of Britain, and *Otus*, represented by the long-eared O. (*Otus vulgaris*), also common in Britain. The tawny O. is about 15 inches long, and is ashy-grey above, variegated with dark brown; the facial disc being white. Two small tufts are borne on the head. Another species is the *S. Uralense*, or Ural O. of N. Europe. The long-eared O. is of a pale-brown above, the under parts being greyish-white. It occurs in Europe and Asia, and is also found in America. The short-eared O. (*Otus brachyotus*) has a small head. It is found in England, and also occurs in N. America, Asia, and Africa. Some very familiar species of O. belong to the sub-family *Striginæ*. In this group there are no ear-tufts, and the 'facial discs' are complete. The bill is long and the wings are large, their second quills being the longest. The tail is short and the toes are long and hairy, the outer toe being shorter than the inner. Members of this sub-family of O. are distributed throughout the world. The White or Barn O. (*S. flammea*) only requires mention as a very familiar example of a British O. Its colour is a buff of varying tints, marked with grey, white, and black, the under parts being white. The young present a very curious appearance, and look like masses of white down. These birds are very prolific, and are said to feed one brood while sitting on the eggs of another.



Tawny Owl.

Owl'glass. See EULENSPIEGEL.

Ox (Old Eng. *oxa*, Dan. *oxe*, Ger. *ochs*, Goth. *auhsa*, Sansk. *ukshan*), the name given to various breeds of ungulated or 'hoofed' quadrupeds, belonging to the *Ruminant* group and to the family *Bovidæ*. In their dentition the oxen agree with their ruminant neighbours in having no upper incisor or canine teeth. The lower incisors number eight, and bite against a hardened pad of gum in front of the upper jaw. There are six molars on each side of each jaw. The two toes of each foot are hoofed and separated, while there are accessory or rudimentary toes on the hinder part of the feet. Oxen are distinguished as a family by the simple and rounded structure of their horns. No *lachrymal sinuses* or 'tear pits' exist. Being typical *ruminants* their digestive system exhibits the division into four compartments which characterises that group. Having been specially domesticated by man, the result has been the formation of very many *breeds*, *races*, or permanent *varieties*. The original stock from which the ordinary breeds have been derived it is, probably, impossible to trace. Whether the existing breeds are the descendants of more than one original or wild stock is a question perhaps equally insoluble. With the view of placing the chief facts relative to the wild races of cattle before the reader, we may briefly refer in the first instance to those members of the family *Bovidæ* which may be regarded as most nearly approaching the wild or original stock.

The existing *Chillingham Cattle* form a breed which appears in a very striking manner to present traces of immediate wild descent. The Chillingham cattle are of a creamy white colour, the ears being reddish and the muzzle black. Allowed to roam at will through the domain of their owner, these cattle retain many of the habits of their wild state. They are bold and aggressive, and herd together under the command of a leader, whose authority is paramount. By good authorities the Chillingham cattle are believed to be the descendants of the so-called 'mountain bull' or *Urus*, an O. which was tolerably plentiful at the time of the Roman invasion. Those naturalists who assign such an origin to the Chillingham breed, maintain that most of the smaller races of cattle have sprung from a species now extinct, and known as the British shorthorn (*Bos elongifrons*). Of wild cattle, somewhat removed from the ordinary type of existing oxen, the Aurochs or Lithuanian bison (*Bos bison*) is a good example. This animal is still found wild in the Caucasian forests. The 'humped' cattle of the East have probably originated from a widely different stock to that from which the common cattle have descended. The domestic O. is an animal used in many parts of the world, and in a very few districts of Britain as a beast of draught, being employed to draw the plough and in carts. The ordinary breeds of cattle are valued for the sake of the flesh and the hides; the breeder paying particular attention to the formation of a race which will be suitable for the purposes of the feeder and butcher. On the other hand, there are breeds of oxen which are specially valued for the richness and abundance of their milk. Such are the Ayrshire and Alderney oxen. In ordinary cattle the period of gestation or carrying the young is about 270 days, or nine months. The calf or young attains maturity in from two to three years, and becomes aged at periods varying from seven to ten years. In a state of nature oxen are gregarious; one bull, or male, mates with several females, or is polygamous. Oxen require large quantities of vegetable food, and subsist largely upon grasses, although their dietary in a domesticated state also includes a large number of substances intended to fatten them in the shortest possible time. Of the ordinary varieties or breeds of oxen, one of the best known is the *Shorthorn*, so named on account of the relatively small size of its horns. This breed was formed about the beginning of the present century in the N. of England, and shows a hardy race of animals, readily fattened, and when crossed with Ayrshires forming splendid milking cows. The *Longhorns* have been to a great extent superseded by the previous breed. The *Hereford* breed are stoutly built oxen; they have also, however, been largely supplanted by the shorthorn race; and the *North Devon* breed are now surpassed by others, both as regards feeding and milking. The *Suffolk Dun* is a hornless, or as it is termed, a *polled* breed of cattle. In shape this breed is decidedly inelegant, while the flesh is not regarded as being of fine quality, although the Suffolk cattle are rather celebrated as 'milkers.' Chief of the milk breeds are the *Alderneys*, which give the richest milk, but in small quantity, while for feeding purposes the race is valueless. The *Ayrshire* cattle are similarly inferior as a feeding race or for grazier's purposes, but afford an abundance of very rich milk. They are small in size, and difficult to fatten. Other breeds include the *Welsh* cattle, which are usually small; the *Shetland* cattle, which are very small, but hardy, and can subsist on very scanty pasturage; the *Galloways*, a 'polled' race, which feed tolerably well; and the *West Highland* cattle or *Kyloes*, usually of black colour, with long and extended horns, a short muzzle, shaggy hair, and muscular limbs. This last breed, when fattened in the Lowlands of Scotland or in the N. of England, furnishes the richest beef for the London market.

The foreign races of oxen include the humped cattle already mentioned, of which the *Zebu* (*Bos Indicus*) of India is a good example. The Brahmin bull of India is a variety of the zebu. In S. Africa there is a breed of cattle allied to the Indian cattle, but wanting the hump. They are extensively employed as beasts of draught and burden. The influence of the extension of the railway system upon the traffic in dead meat has been of the most remarkable kind. Remote districts, both in England and Scotland, transmit daily to London many tons of beef ready for the market.

Oxal'ic Acid ($C_2H_2O_4$), a very poisonous acid, whose salts are found pretty abundantly in the vegetable kingdom—in the leaves of wood sorrel, in the stalks of rhubarb, in certain seaweeds and lichens. It may be produced by oxidation of a great variety of organic compounds, and especially from highly carbonised substances containing no nitrogen, such as sugar, starch, cellulose, &c., by treating them with nitric acid, or by fusing them with caustic alkalies. It is manufactured on a large scale by oxidising saw-dust with a mixture of the hydrates of potash and soda, consisting of one molecule of the former and two of the latter. The mixture is made into a thick paste, and then laid in thin layers on iron plates. Here it is gradually heated and stirred. The water in the alkaline hydrate is decomposed,

hydrogen is evolved, and the oxygen goes to convert the wood into O. A., which forms more than a fourth of the grey mass ultimately obtained. This mass is treated with cold water, and oxalate of soda is left undissolved. This is boiled with slaked lime, and the double decomposition which ensues results in the formation of the oxalate of lime, which, by the action of sulphuric acid, yields crystals of O. A. These crystals contain two molecules of water, which may be expelled by a gentle heat, an operation which results in the crumbling of the acid to a soft, white anhydrous powder. If subjected to a high temperature, the crystallised acid decomposes into prussic acid, carbonic oxide, carbonic acid, and water. O. A. is dibasic, and forms an important series of salts known as the oxalates. Of these the oxalates of the alkali metals are soluble in water, the others for the most part insoluble. They all decompose by heat. The most important of these compounds are binoxalate of potash (KHC_2O_4,H_2O), or *salt of sorrel*, the oxalate of ammonia, and the oxalate of silver.

Oxalida'ceæ, or **Oxalid'eæ**, now pretty generally considered a tribe of the natural order *Geraniaceæ*. It consists of about 350 species of herbs, shrubs, or trees, many of the first being tuberous rooted. The alternate leaves are simple, trifoliate or more compound, and are often sensitive; the flowers are generally solitary, on long footstalks, usually of showy colours; the fruit is either a membranous or succulent valved capsule. The plants abound in oxalic acid. The type genus, *Oxalis*, contains considerably more than 200 species, a few of which are scattered over the world, but the bulk are S. African and S. American. The charming little *O. acetosella*, or wood sorrel, so common in woods and moist shady places in Britain, bearing its solitary white flowers, veined with purple, from amidst a carpet of trifoliate leaves, occurs in each of the four continents. It has a pleasant acid taste, arising from the calcium oxalate it contains, and was formerly used as a refrigerant in fever. *O. corniculata* and *O. stricta*, occasionally found in England, are not native; they may be called cosmopolitan weeds. Of the edible species belonging to *Oxalis* the following are most noteworthy. *O. crenata*, the Arracacha of tropical America, is cultivated for its tuberous roots, which are of the size and shape of a small potato. Some years ago it was introduced into England on the likelihood of being a useful garden vegetable, but it was found to be watery and insipid. In Peru it is also grown for its very acid leaf-stalks. *O. Deppei*, a native of Mexico, has tubers more farinaceous than the preceding. In France the stalk and leaves are used cooked in various ways, as also for salad purposes. *O. tuberosa* is cultivated in Bolivia, under the name of Oca, for its potato-like tubers; and *O. crassicaulis* of Peru, and *O. esculenta* of Mexico, also yield wholesome tuberous roots. Several Cape species, as *O. Bowei*, are showy garden and greenhouse plants. In the genus *Biophytum* the pinnate leaves are sensitive, particularly in *B. sensitivum*, in which both leaves and leaflets close downwards. *Connaropsis Griffithii* of Malacca also has irritable leaves. It bears an acid fruit that is eaten cooked, pickled, or preserved with sugar. *Averrhoa Carambola* is cultivated in many hot countries for its fruit (see CARAMBOLA), as also *A. Bilimbi*.

Oxalu'ria, or **The Oxalic Acid Diathesis**, is a morbid condition of the system, the most prominent symptom of which is the constant presence of crystals of oxalate of lime in the urine. The crystals appear (1) as octahedra; (2) as hour-glass contracted, or dumb-bell like bodies; (3) as compound octahedra; and (4) as small, flattened, bright discs, very readily mistaken for blood discs. The octahedra grow in the urine after it is voided, but the dumb-bell crystals do not, and are mainly formed in the kidney tubes. The significance of the deposit, which is probably a result of chemical changes in the renal passages, is undecided. Dr. Parkes considers that the oxalic acid of urine most probably results from uric acid, and may be a substitute for the excretion of carbonic acid of the lungs. The crystals are insoluble in water, are unaltered by boiling either in *acetic acid* or in *liquor potassæ*, but are soluble in nitric acid without effervescence. The deposit does not indicate structural kidney disease unless tube casts be also present. The persistent presence of oxalate of lime in the urine may give rise to a concretion of the same nature (mulberry calculus) in the kidney or bladder, or to enfeebled health from the action of the oxalic acid on the digestive organs, the heart, and the nervous system. The treatment of such cases is hygienic and tonic, and articles of diet containing oxalic acid, such as sorrel, rhubarb, tomatoes, &c., should be avoided.

Ox'enstjerna, an old Swedish family, whose founder was Bengt Nilsson, in the latter half of the 14th c. The most celebrated of the family was the statesman **Axel Gustafsson O.**, born at Faanö in Upland, 16th June 1583. After his father's early death, O. studied at Wittenberg and other German universities, until recalled by Karl IX. in 1602 to enter the service of the State. A privy councillor in 1609, he was named by Karl IX.'s testament as a member of the provisional government that should succeed him; but this did not last long, as in 1611 O. prevailed on his colleagues and the Estates of the Realm to declare of age Gustaf Adolf II. Thereafter (1612) he became Chancellor, and from this date he was the chief power in the home government and in diplomatic business. O. was plenipotentiary at the Peace of Knæred in 1613. During the wars with Russia and Poland he showed great energy, being summoned now to lead the army, now to superintend the levying of fresh troops, and again to govern newly-acquired lands. In 1631 he was called to Germany, to be governor of the Rhine Lands. After Gustaf Adolf's death, O. received the management of Swedish affairs in Germany, and at the Heilbronn Conference (1633) was chosen chief of the Evangelical League. In 1636 he returned to Sweden. Here his experience and insight kept him at the head of affairs, and his influence continued undiminished during the first years of Christina's reign. In 1645 he concluded the Peace of Brömsebro, on terms more favourable to Sweden than those which the queen herself had arranged. In the same year he was appointed Count of Södermöre, 'Lagmand' of Herjedalen, and Chancellor of Upsala University. But Christina's vanity was wounded by O.'s great reputation, and his influence in consequence beginning to yield to that of younger favourites, he gradually retired from public business. O. strongly remonstrated against the resignation of the queen, and died soon after that event, 28th August 1654. See Lundblad, *Svensk Plutarch* (2 vols. Stockh. 1824; Ger. trans. 2 vols. Stuttg. 1826–27).

Ox-Eye. See CHRYSANTHEMUM.

Ox'ford (Cymr. *wysg*, 'water,' and Eng. *ford*), a city of England, the capital of Oxfordshire and seat of a university, stands at the confluence of the Cherwell with the Thames or Isis, 63 miles W.N.W. of London by rail. Bordered on the N.W. by the Parks of 93, and on the S. by the Christ Church Meadows of 50 acres, it is traversed from N. to S. by St. Giles's or Aldgate's Street, at right angles to which run Broad and the famous High Street, the latter leading to Magdalen Bridge. Most of the colleges are Gothic, the chief exceptions being Queen's (1714), Worcester (1760), Hertford (1820), the Chapel of Trinity (1694), and the Library of Christ Church (1716), which are all in the Grecian style. Christ Church (1528), the largest, has a quadrangle 264 by 261 feet; a hall, 115 feet long by 40 wide and 50 in height, hung with seventy portraits; and a library, with a collection of 254 paintings. The chapel is also the Cathedral of St. Frideswide (1120–80; restored 1856–73), which retains much of its original character, is 168 feet long by 116 wide, and has a spire (the earliest in the kingdom) of 140 feet. Of the other colleges the most beautiful chapels are those of Magdalen (1480), New College (1385), and Merton (1310–1450), all three with lofty towers; Exeter, New, and Magdalen possess the finest halls; and the cloisters of the last two colleges, Mob Quad at Merton, and the cedar carvings by Gibbons in Trinity Chapel, are among the lions of O. The present century has witnessed the restoration of most of the colleges; the rebuilding of the chapels of Balliol (1856), Exeter (1858), and St. Alban's (1863), and of the halls of Pembroke (1848) and Balliol (1876); the erection of Keble College (1868–76), and of new blocks of rooms at Christ Church (1865), Merton (1865), Balliol (1868), and New (1877). Besides the Botanic Garden (1632), there are pleasant college gardens at St. John's, New, Worcester, &c. A striking group of buildings is formed by the Schools (1439; rebuilt 1613–18), comprising the Bodleyan Library (q. v.), Picture Gallery, Divinity School (1445–80), and Convocation House (1639); the Radcliffe Library (1737–49), a domed edifice 100 feet in diameter and 84 in height, which now serves as a reading-room to the Bodleyan; the Sheldonian Theatre (1664–69), in which the Commemoration is held; the Clarendon

Building (1712–30), till 1830 the University Press; and lastly the Ashmolean Museum (1679–83). To the W. of these lie the Taylor Institution (1845), containing Chantrey's models and drawings by Raphael and Michael Angelo; the Martyrs' Memorial (1841), 71 feet high, built on the model of the Eleanor Cross at Waltham; the Union Debating Rooms (1859), with frescoes by Morris and Rossetti; the Radcliffe Observatory (1772–95), 106 feet high; and the University Press (1830). To the N. is the Museum, erected (1856–58) at a cost of £30,000, with a library and a laboratory (1871). Of twenty-seven churches, the principal are the University Church of St. Mary (1300–1488; restored 1827–71), 162 feet long by 50 wide, with an exquisite spire 180 feet high; St. Peter's-in-the-East (1150–1350), with a Norman crypt and chancel; All Saints' (1706–8), St. Mary Magdalen (1320–1531; restored 1875), St. Giles (1120–1220), St. Philip and St. James (1862), and St. Barnabas (1869), built on the model of a basilica. The Roman Catholic Church of St. Aloysius (1875) is the finest of the non-established places of worship. The civic buildings include the Norman castle, built by Robert d'Oilli (1071), now the county prison; a town hall (1752), county hall (1840), corn exchange (1863), the Radcliffe Infirmary (1770), and a workhouse (1863–65). The chief schools are Magdalen College School (1456; rebuilt 1851), St. Edward's, and the Military College. O. has no manufactures of importance, its industries being mainly devoted to supplying the wants of the university. There are eight weekly newspapers; and two members are returned to Parliament by the city, two by the university. Pop. of municipal borough (1871), 31,404. O. (the *Vadum Boum* of the chroniclers, who followed the popular mistaken etymology) is spoken of by legend in the 8th and by history in the 10th c. Its position, commanding the valley of the Thames, gave it a high strategic importance, and it was stormed by the Danes (976 and 1009), by William the Conqueror (1067), and by Stephen (1142). From the 12th c. the history of the city becomes blended with that of the university, the chief events in the municipal annals being the meeting of the 'Mad Parliament' in 1258, when Henry III. (q. v.) granted the Provisions of Oxford; the murderous 'town and gown row' of 1354; the burning of Ridley, Latimer, and Cranmer (1555–56); the Black Assize (q. v.) of 1557; the residence here of Charles I. (1642–43); and the visit of the allied sovereigns (1814). See Ingram's *Memorials of O.* (3 vols. Oxf. 1837), and Parker's *Handbook to O.* (Oxf. 1875).

Oxford, The University of, seems to have had its germ in the cloister schools of Osney and St. Frideswide. First in the reign of Edward the Confessor does Oxford clearly appear as the place of study, where in the 12th c. the Frenchman Robert Pulein lectured on divinity, the Lombard Vicarius founded a school of civil law, and Giraldus Cambrensis propounded his *Topography*. The immigration of Paris students (1229) was immediately preceded by the arrival of the Friars of Dominic and Francis, who, supported by Grosseteste and Adam Marsh, raised the university to a rank second only to that of Paris. To Edmund Rich, Canterbury's sainted archbishop, Roger Bacon owed his introduction to the Aristotelian philosophy, and in his turn delivered to his pupils the sciences of languages, mathematics, and optics, and to the world at large the *Opus Majus*. Close on Bacon, and like him Franciscans, followed Duns Scotus and Ockham, the leaders of the Realists and Nominalists, of those Northern and Southern 'Nations,' whose feuds in the Barons' War had caused the migration to Northampton of half the students (1260), and who a century later, when Wyclif was master of Balliol, ranged themselves in or against the Lollard ranks. Medieval Oxford was far different from the Oxford of to-day. Though named by Clement V. as one of the four great seats of learning, in a decree (1311) calling on it with Paris, Bologna, and Salamanca to appoint lecturers in Hebrew, Chaldaic, and Arabic, it had no university buildings, its stately colleges were but beginning to arise, and the students lived huddled together in halls and inns, whence they poured forth to frequent and deadly conflicts with the townsfolk. Yet, with few outward attractions, Oxford five centuries ago could reckon its students by thousands—English, French, Scotch, and Welsh, some, like Chaucer's scholar, hollow and threadbare, others richly clad and attended by rascally varlets. The storm of Lollardry over, Oxford subsided into a state of wealthy indolence; its numbers dwindled, its Latin became a byeword, and in the lordly foundations of Wykeham and Waynflete the Italian Poggio found (1420) 'but few lovers of learning, and those barbarous, skilled more in quibbles and sophisms than in literature.' But with the Renaissance came a quick awakening, and Erasmus, writing in 1497, lauds to the skies the Oxford scholars, Colet, Grocyn, Linacre, and More. Heedless of the fierce opposition offered by the 'Trojans' to the 'Greeks,' Fox founded professorships of Greek, Latin, and theology (1516), and Wolsey invited to Cardinal College all Europe's greatest schoolmen. The Cambridge scholars who answered Wolsey's call brought more with them than the New Learning—a new religion, which was shortly to purge the 'asses' stall' of the pagan classics, the Babylonish philosophy, and the whole literature of the Middle Ages. Under Edward VI. all studies save theology were despised, all lecture-rooms deserted but those of Peter Martyr, Bucer, and Fagius; and a Greek line occurring in the midst of a Latin author was passed over with the remark, 'Græcum est, non potest legi.' In 1550 only fifteen students graduated. Of twenty-one colleges thirteen were founded before the Reformation, and two in the brief reaction of Mary's reign, when also the ancient schools were re-established, to be once more abolished by Elizabeth. The latter expelled four Catholic heads of colleges and ninety fellows, while she persistently harassed the Puritans whom Leicester the Chancellor favoured, and it is of her reign that Wood says: 'In Oxford itself you have to search after Oxford University, so greatly is everything changed.' With the Stuart dynasty and with Laud for Chancellor came Arminianism and passive obedience, but withal a reform that founded eight new professorships (the first since 1535), established the principle of public examinations (1638), and required from bachelors a knowledge of classics, grammar, rhetoric, logic, moral philosophy and geometry; from masters, of classics, natural philosophy, metaphysics, astronomy, optics, history, and geography. Bacon looked on the universities as opponents of *his* learning, and indeed the *Novum Organum* had long to contend with the pseudo-Aristotelian metaphysics of the Schools, but it was at Oxford that the Royal Society was founded (1648). In January 1641 the alarums of St. Mary's and St. Martin's rang Royalist student and Roundhead townsman to arms, and the loyalty of the university in the ensuing troubles is still attested by the scarcity of college plate bearing date prior to Charles's residence at Oxford (1642). That loyalty, shaken by James's ill-judged attempt to restore by force the ancient faith (1687), survived in the Jacobitism and Toryism of the next 150 years, the age of 'organised torpor,' when proctors were proctorised for boozing in taverns of a Sunday (1723), when, according to Gibbon, professors 'gave up even the pretence of teaching,' when Gaisford held the chair of Greek for twenty years without delivering a single lecture, and the proctors were paid from the funds of the professorship of moral philosophy. The university sank to a mere seminary of education, whose value may be estimated from the two solitary questions put to Lord Eldon for his degree (1770), quoted by the University Commissioners—'What is the Hebrew for the place of a skull?' and 'Who was the founder of University College?' The first signs of recurring vigour were the passing of a new Public Examination Statute (1802) and adoption of the class system (1807), the throwing open of the Oriel fellowships, and the great religious movement known as Tractarianism (q. v.). The Oxford Reform Act (1854) led to various important changes—the increase and re-endowment of the professoriate, the general abolishing of close fellowships and scholarships, the assignment of fresh schools to law, modern history, and natural science, the admission of Unattached Students (q. v.), the University Tests Abolition Act (1871), the establishment of local middle-class examinations (1857) and of an Oxford and Cambridge Schools' Examination Board (1873). The chief results of the New Reform Act of 1877 will probably be further secularisation, and the endowment of research by the suppression of 'idle' or 'prize' fellowships, as they are variously termed.

By 17 & 18 Vict. c. 81, the constitution of the University is framed on (1) the weekly Hebdomadal Council, with the initiative in all legislation; (2) Congregation, with powers of amending any new statutes; (3) Convocation, composed (1877) of 4870 members, whose sanction to such statutes is necessary before they can become law, and who confer honorary degrees and elect to university offices; and (4) the House of Congregation, by which ordinary degrees are granted and the nomination

of examiners ratified. The life office of Chancellor is now purely honorary, his duties being discharged by a vice-chancellor, nominated for four years from the heads of colleges in rotation. Subordinate to the latter are two proctors, charged with the oversight of order and morality, the assessor of the Chancellor's court, the public orator, registrar, &c. There are forty-one professorships, viz., six of divinity, seven of *literæ humaniores*, twelve of mathematics and physical science, four of law, three of modern history and political economy, three of the fine arts, and six of languages. The Sanskrit Professor receives £900, the Professor of Poetry £100 per annum, but the ordinary stipend is £500. There are also readers, demonstrators, and teachers attached to the university. Of twenty university scholarships the principal are the Craven (1647) for Greek and Latin, open to fourth-year students; the Ireland (1825) for Greek; and the Hertford (1834) for Latin. Besides these there are eighteen prizes, including the three Chancellor's prizes for Latin verse, an English and a Latin essay, the Newdigate (1826) for English verse, the Arnold (1850) and Stanhope (1855) prizes for historical essays, and the two Gaisford prizes (1856) for Greek verse and prose. Degrees are conferred in arts, music, civil law, medicine, and divinity. The ordinary college residence is twenty-five out of the fifty-two weeks, the academical year being divided into four terms, with three vacations—the Christmas, Easter, and Long (June–October). Candidates for a B.A. degree must keep twelve of these terms, and have three examinations to pass—Responsions ('Smalls') the First Public Examination ('Moderations'), and the Second Public Examination ('Greats'), all three of them partly in writing, partly *viva voce*. Responsions (from which all are exempted who have satisfied the examiners appointed by the delegates for the examination of schools) is a simple examination in classics and mathematics. In Moderations passmen are examined in portions of three Greek and Latin authors, logic or geometry and algebra, Latin prose, and unseen passages; and candidates for classical honours in unseen passages, Latin prose, and five Greek and Latin authors (textually and critically), with optional papers on Greek prose, Latin and Greek verse, comparative philology, the Greek drama or Latin Augustan literature, and logic; candidates for mathematical honours, in algebra and the theory of equations, trigonometry, plane geometry, geometry of three dimensions, the differential calculus, the integration of differential expressions, and the elements of the calculus of finite differences. For Greats passmen must take up either classics or a modern language, with two other subjects selected from classical or modern history, political economy, law, geometry, mechanics, chemistry, and physics; whilst classical honoursmen are examined in classics, moral and political philosophy, and classical history. There are also final honours schools in mathematics (pure and mixed), in natural science, jurisprudence, modern history, and theology. All candidates must pass a preliminary examination in divinity, or, where they are excused on the ground of religious scruples, in equivalent subjects. In the class-lists names are arranged alphabetically, not, as at Cambridge, in order of merit. Responsions are held thrice, Moderations and Greats twice every year. The M.A. and other degrees require no residence or examination, being simply a matter of fees.

The colleges of Oxford are corporate bodies, comprising a head (variously styled dean, warden, provost, principal, master, president, or rector), fellows and scholars, and also receiving students not on the foundation, who are termed commoners. The halls are not corporate bodies, and have no fellowships, but otherwise resemble the colleges. The following list gives the reputed date of foundation and the number of undergraduates in 1876:—*Colleges:* University (872), 109; Balliol (1268), 196; Merton (1274), 76; Exeter (1314), 172; Oriel (1326), 83; Queen's (1340), 100; New (1386), 130; Lincoln (1427), 66; All Souls' (1437), 5; Magdalen (1458), 101; Brasenose (1509), 131; Corpus (1516), 60; Christ Church (1546), 244; Trinity (1554), 96; St. John's (1555), 110; Jesus (1571), 57; Wadham (1609), 52; Pembroke (1624), 84; Worcester (1714), 98; Keble (1870), 142; and Hertford (1874), 69; *Halls:* St. Edmund (1317), 35; St. Mary (1333), 46; New Inn (1438), 15; and St. Alban (1547), 60—the total number of undergraduates being 2590. The fellowships, 380 in all, are mostly like the scholarships obtained by open competitive examination, are tenable for life, but are vacated by marriage or by accession to a fixed income of £600. Their average annual value is £300, which may be increased by tuition, or by holding the post of dean, bursar, &c. Parliamentary returns show that in 1870 nearly half the fellows were resident, fully half were in Orders, and of resident fellows almost all were engaged in public or private tuition. There are 422 college scholarships, of an average value of £80 for five years, and a still larger number of exhibitions, ranging from £20 to £110. Commoners are required to pass a matriculation examination at most of the colleges, and their names should be put down some time beforehand. The general allowance to an undergraduate is £200 per annum, but expenses vary at the different colleges, being higher at Christ Church and Merton than at Corpus or Keble. There are two services daily in each of the college chapels, but compulsory attendance has been abolished in some cases, in others substituted by a morning roll-call. Lectures occupy from three to four hours. The students dine together at six in the college halls, but all other meals are supplied from the buttery in their own rooms. Each college has its boat and cricket club and yearly athletics, and hunting, football, racquets, polo, and the rifle-corps find plenty of votaries. The steeplechases ('horse-grinds') of Christ Church, Merton, and University have been well-nigh suppressed by the authorities. See Wood's *Historia et Antiquitates Universitatis Oxoniensis* (2 vols. 1674), and *Athenæ Oxonienses* (2 vols. 1691–92; edit. by Dr. P. Bliss, 1813-20); F. Huber, *Die Englischen Universitäten* (2 vols. Kass. 1839-40; Eng. trans. by F. Newman, 3 vols. Lond. 1843); J. C. Jeaffreson, *Annals of Oxford* (2 vols. Lond. 1870); Green, *History of the English People* (vol. i. Lond. 1877); F. Seebohm, *The Oxford Reformers of* 1498 (Lond. 1867); C. Wordsworth, *Scholæ Academicæ: Studies at the Universities in the 18th c.* (Camb. 1877); G. V. Cox, *Recollections of Oxford* (Lond. 1868); Thorold Rogers, *Education in Oxford* (Lond. 1861); and T. Hughes, *Tom Brown at Oxford* (Lond. 1861).

Oxford Blues. See HORSE GUARDS, ROYAL.

Oxford Clay, the lower and principal member of the Middle Oolite (see OOLITIC SYSTEM), consists of dark blue or blackish clay, which gives place below, however, to a tough calcareous sandstone known as the Kelloway Rock. The fossil shells of helemnites, ammonites, &c., which abound in the O. C. are most beautifully preserved. Associated with these are also species of crustacea, fish, and reptiles characteristic of the Oolitic period. The formation can be traced N.E. from Oxford to the lands S. of the W., and then N. to Yorkshire.

Ox'fordshire, a midland county of England, bounded N. by Warwick and Northampton, E. by Buckingham, S. by Berkshire, and W. by Gloucester. Area, 470,095 statute acres; pop. (1871) 177,975. The surface is undulating, the chief elevations being Broom Hill (836 feet) in the N.W., Shotover Hill (599 feet) near Oxford, and Nettlebed Hill (820 feet) in the S.E. The Thames, or Isis, flows along the southern boundary of the county for some 70 miles, during which it receives on the O. side the Windrush, Evenlode, Cherwell, and Thames. The soil is a light loam, formed by the decomposition of the chalk and limestone of the Cretaceous and Oolitic series. In 1876 the gross rental was £1,232,141, and there were 162,749 acres under corn crops, 57,944 under green crops, 46,071 in clover, sanfoin, and grasses in rotation, 138,827 in permanent pasture, and 15,563 woods. The chief crops are barley, wheat, turnips, oats, and beans. In the same year there were 16,962 horses, 51,724 cattle, 328,657 sheep, and 34,870 pigs. The rich pastures of the Thames basin have made stock-rearing the leading industry, and the manufactures—of gloves, blankets, and lace—are unimportant. Three members are returned by the county, the chief towns of which are Oxford (the capital), Woodstock, Witney, and Banbury.

Oxida'tion. See OXIDE.

Ox'ide is generally any chemical compound of oxygen with another element. With the exception of fluorine, all known elements unite with oxygen, and these as a rule combine directly with it. Of the important elements only six are known which cannot be made to form an oxide without the intervention of a third substance. These are chlorine, bromine, iodine, gold, silver, and platinum. Combination with oxygen, or oxidation, is generally accompanied with the evolution of heat, which, when sufficiently rapid, results in combustion. In many cases the

application of heat hastens the oxidation; but if raised to a sufficiently high temperature oxides in general decompose. The metallic oxides form an important group, the members of which are ordinarily bases. The properties of oxides are treated under the various elements—arsenic, carbon, chlorine, iron, lead, manganese, &c. In organic chemistry, the ethers are frequently regarded as the oxides of the corresponding alcohol radicals—ethyl, methyl, phenyl, &c.

Oxley'a is a genus of *Cedrelaceæ* represented by *O. xanthoxyla* (now *Flindersia Oxleyana*), a sombre-looking tree, 50 feet high and 6 feet in girth, producing the 'yellow wood' of Queensland—a valuable timber.

Ox'us, the ancient name of the *Amú-Darya* (Arab. *Jihún*), a river of Central Asia, which, rising in Lake Serikul, on the Pamir plateau, nearly 15,000 feet above the sea-level, flows in a N.W. direction, and enters Lake Aral by three large streams (Loudon, Taldyk, and Ulkun), and several smaller ones. It separates Badakshan, Balkh, the Kara-Kum desert, and Khiva on the S. from Bokhara and the desert of Kizil-Kum on the N., and forms the southern boundary of Russian possession in Central Asia, according to the treaty of 24th August 1873. In its upper course it receives many streams from the Hindu Kush, the Pamir plateau, and the boundary range in the N. of Bokhara, but in the last 800 miles of its course it is altogether without affluents. Below Khiva its aspect is singularly monotonous and dreary, and towards its mouth there are extensive sand dunes and marshes, partly covered with rushes and tamarisk jungles. As late as 75 B.C. the O. flowed into the Caspian; subsequently it changed its course, and entered the S.E. corner of Lake Aral; again prior to the 14th c. it flowed to the Caspian; and finally, towards the end of the 16th c., it discharged its waters into Lake Aral, near its S.W. extremity. Some light seems to be thrown on the cause of the change in its course by a consideration of the uses to which its waters are put in Khiva at the present day. The result of eight measurements during the flood season of 1874 shows that the average discharge of the stream at Toyuboyin ('camel's neck'), above the irrigation canals at Khiva, was 122,000 cubic feet per second, while at Núkús, below the same canals, it was only 59,600. During the 80 days of flood about one-half of the whole volume of the O. is diverted to make Khiva a luxuriant oasis. General Ivanien states that 2½ feet of earthy matter is deposited during a single flood season in Khivan canals, and this is removed annually by manual labour. But the yearly deposits in the main stream accumulate, and must consequently tend to choke the passage of the river. At Toyuboyin the O. rushes along a narrow pass cut through a bed of compact limestone. Some 60 miles farther on, at Surakhan, it rather suddenly attains its maximum breadth of 10,000 feet, and here the great waterspread is gemmed with alluvial islands, covered towards the end of summer with high, golden-eared, waving grass. From this point its breadth gradually decreases to 1500 feet at Khodjeili, and to 1200 feet at Kungrad. During floods its depth varies from 15 to 30 feet in various localities. Its velocity in some places is 6 miles an hour, but is very variable, mainly on account of the irregular slope of the channel, which varies from 11 to 3½ inches per mile between Toyuboyin and its mouth. During the flood of 1874 the *Petroffsky*, an Aral flotilla steamer, made a slow and troublesome ascent as far as Surakhan. The chief difficulties of navigation are the shoals and the scarcity and cost of fuel (30s. a ton). The restoration of the O. to its old channel, a work of no great engineering difficulty, is said to be under the serious consideration of the Russian government. See J. Wood's *Journey to the Source of the O.* (1873), Vámbery's *Sketches in Central Asia* (1868), Hellwald's *Russians in Central Asia* (1874), Major Herbert Wood's *Notes on the Lower Amu-Darya, Syr-Darya, and Lake Aral in* 1874 (*Journal of the Royal Geographical Society*, 1875), the official *Report of a Mission to Yarkund in* 1873–74, *under command of Sir T. D. Forsyth*, and Petermann's *Mittheilungen* (*No.* 52, 1877).

Ox'ygen (symbol O, atomic weight 16) is the most widely distributed of all elements. It exists *free* in the atmosphere, forming about one-fifth part by volume, and in chemical combination with other elements constitutes at least one-half by weight of the known crust of the earth. At ordinary temperature and pressure it is a colourless, tasteless, odourless gas; its specific gravity is 1·1056; it dissolves in water to the extent of 3 volumes in 100. Until recently it was classed among the *permanent* gases, those namely which had never been condensed to a liquid state. Towards the close of 1877, however, Cailletet of Paris and Pictet of Geneva, working independently, succeeded in liquefying it. The former employed the same means to liquefy the other gases, hydrogen and nitrogen; and the latter supplemented this by reducing O. and even hydrogen to the *solid* form. The year 1877 has, therefore, seen the last of the permanent gases. Pictet has estimated the density of liquid O. as equal to that of water—a result in strict accordance with the theoretical views formerly published by Dumas of Paris.

Though O. exists free in the air it is not from this source that it is most conveniently obtained. It was in this way, however, that Lavoisier first obtained pure oxygen towards the end of last century. His method consisted in keeping mercury at its boiling point exposed to the air, thus eventually forming the *red oxide*. By raising this compound to a higher temperature it is decomposed into O. and mercury. Oxide of silver (Ag_2O) decomposes similarly under the action of heat. Other metallic oxides, such as peroxide of manganese (MnO_2), peroxide of barium (BaO_2), and anhydrous chromic acid (CrO_3) are also a source of O., and decompose when heated into the gas and a less oxygenised oxide. The chlorate of potash ($KClO_3$) when heated sufficiently high yields all its O., being decomposed into the chloride of potassium and the gas. A small quantity of peroxide of manganese hastens the action which then takes place at a more moderate temperature. This is perhaps the most important of the various methods for the preparation of O. Sulphate of zinc ($ZnSo_4$) decomposes when heated into oxide of zinc (ZnO), sulphurous acid (SO_2) and O. gas. Still another method of obtaining O. is by electrolysis of water, decomposing water by an electric current. The O. is given off at the electrode which is connected with the positive pole, the hydrogen being disengaged at the negative electrode. The disengagement of O. and its combination with other elements are continually taking place in nature. It is essential to the support of animal life. Absorbed by the lungs or the gills of animals, it enters into feeble combination with the red colouring matter of the blood, and is thus carried to all parts of the body. The hydrogen and the carbon of the tissues unite with it to form water and carbonic acid, a combination attended by the evolution of heat. The blood returns to be again aerated and oxidised, while the carbonic acid is expired. Under the influence of sunlight the green colouring matter of plants decompose carbonic acid in the presence of water, absorbing the carbon into the plant tissues and evolving O. The plant and the animal thus play into each other's hands, the one undoing what the other is doing. As indicated before O. is present in nature combined with other elements in great abundance. Its compounds will be treated of in detail under the elements of which they are the oxides. As a general rule it may be taken that at least one oxide of a metallic element is a base, and that the oxides of the non-metallic elements (excluding of course fluorine, which has no known oxide) are generally acids. Many elements form more than one oxide, but the quantity of O. present in one always bears a simple proportion to the quantity present in another. The important theoretical bearing of this is noticed under ATOMIC THEORY. The presence of O. in the sun has been lately proved by Draper. In what manner it is present is not yet understood, since it does not give absorption lines like the other elements, but instead is detected by its *bright* lines. See SPECTRUM ANALYSIS. A peculiar alltropic form of O. is Ozone (q. v.).

Oxyrhyn'chus, a genus of Teleostean fishes probably belonging to the genus *Mormorus*, in which the snout is pointed and a long dorsal fin exists. This fish was the Egyptian *Kha*, was accounted sacred, and was dedicated to the goddess *Athor*. In modern Egyptian it is named *Miseleh*.

Oxyu'ris Vermicula'ris, the common thread-worm, is small, white, and thread-like, the female being about one-third of an inch long, and the male about half that length. It exists, generally in great numbers, in the colon or rectum of badly-fed, delicate children. The symptoms are, itching at the anus or nose, and the worms may be observed in the fæces. *Treatment*—Enemata of cold water, infusion of quassia or tea, or of liquor calcis, repeated daily. In the case of adults, perchloride of iron, half an ounce to a pint of water, is recommended. See articles VERMIFUGES, and WORMS.

Oy'er and Ter'miner, an English law term derived from the French *ouir* and *terminer*, to hear and determine. It is the first and largest of the five commissions by which the judges of Assize (q.v.) sit in their circuits. It empowers them to judge in cases of treason, felony, and trespass. In the event of any sudden insurrection or riot, a special commission of O. and T. may be granted to try specified persons and offences.

Oys'ter (*Ostræa*), a well-known genus of *Lamellibranchiate* Mollusca, the type of the family *Ostræidæ*, in which the shell is inequivalve (*i.e.*, one half or valve is larger than the other), and slightly inequilateral. It may be free or attached, and the 'hinge,' or portion by which the valves are articulated, usually wants teeth. There is an internal ligament, used in opening the shell, and the lobes or halves of the mantle are entirely separated. The foot is small, and has a *byssus* or 'beard' in the young state only. Only a single *adductor muscle*, for closing the shell, is developed; the O. being thus a Monomyarian bivalve. Of all molluscs, the O. is the most famous and valued. It occurs in many seas, but apparently attains its greatest excellence and abundance in the seas of temperate zones. The lower valve or half of the shell, by which the animal attaches itself to the sea-bed, is the largest; a result probably due to the increased nutrition and growth of the under valve of the shell. The interior of the valves is lined with a delicate and smooth layer of *nacre* or *mother-of-pearl*, which in other species of oysters (*e.g.*, the Pearl O.), may form *Pearls* (q. v.) The Pearl O., however, belongs to a different family from the Common O. The following account of the structures connected with the opening and closing of the shell is taken from Dr. Andrew Wilson's *Sketches of Animal Life* (Chambers, 1877):—

'Whoever has tried to open an O., well knows the extreme difficulty experienced in gaining access to the delicate morsel within. And a very slight examination of the animal and its shell after the operation has been performed, would serve to show that the chief obstacle which resisted the efforts of the knife consisted of a bundle of strong fibres, which connected the valves of the shell internally, roughly speaking, at about their middle. When this bundle of fibres is cut across, the O. is rendered utterly helpless; and any one who has simply tapped a living O. as it lay in the water with the shells slightly opened for breathing purposes, must have formed some idea of the power of these fibres to close the shell, from the quick snap with which the animal brings the shells together.

'The bundle of fibres thus seen in an O. simply represents a single great *muscle*, the function of which is to close the shell. Hence this muscle is appropriately enough named the 'adductor.' Its fibres act precisely in the same manner as that in which those composing human muscles act—namely, through the peculiar property possessed by muscle-fibre, and which is named *contractility*. In virtue of this power, muscle-fibres can shorten themselves in obedience to some stimulus, and by shortening themselves they of necessity bring together the structures between or to which they are attached. The tap on the outside of the oyster's shell represents the stimulus, which incites the contraction of the muscular fibres, thus producing the closure of the shell. Some shell-fish possess two of these muscles, and are thus doubly provided in the way of protective apparatus. It is clear, however, that the muscle in the O. can play no part in the reverse action of opening the shell. In the performance of this action a most economical arrangement is witnessed. Between the shells, and at the hinge or that surface by which the shells are joined together, a stout structure may be found in the O. and its allies, named the *ligament* of the shell. This is a highly elastic structure, and its elasticity forms the means whereby the opening of the shell is effected. For, as the ligament is greatly compressed when the shells are brought together by the muscles, it follows that when the muscles are relaxed, the elasticity and recoil of the ligament will force the shells apart. We thus note that whilst the closure of the shell is a muscular act, and one involving a considerable amount of exertion, the opening of the shell is due to a purely mechanical arrangement, and is an action effected without trouble to the animal. When the shell is kept closed, the muscles are in a state of tension, since the elasticity of the ligament is opposed to the action of the muscles. But as the closure of the shell is not an act of frequent performance—the normal state of these animals being that of existing with an unclosed shell—the muscular power of the animal is thus husbanded, and the shell is kept open by the elasticity of the ligament—an action, as we have seen, requiring no effort on the part of the mollusc. No better instance, perhaps, could be found than the present of the economical ordering of Nature's ways and works.'

Lining the interior of the shell a soft delicate membrane named the *mantle* is found. This membrane is that on which the formation and growth of the shell depends; and as already stated in the definition of the O. family, the halves of this mantle are completely separated from one another, so that when the shell is opened the water required for breathing in the gills of the animal flows into the body by the simple unclosure of the shells. The O. has a complete digestive system, comprising a mouth, stomach, intestine, and liver; its food consists of the minute organisms and particles of matter which are swept into the mouth by the currents of water passing into the gills. It has a heart for the propulsion of the blood, and the gills appear in the form of four delicate folds of membrane, disposed two on each side of the body, and richly provided with *cilia*. By the constant action of these microscopic filaments the circulation of water already mentioned is duly maintained. The nervous system consists of three chief nerve masses or *ganglia* connected by nerve cords, and disposed in the various regions of the body.

The reproduction and development of the O. forms a subject of the greatest importance, and one upon which the legislation regarding the mollusc is founded. The sexes are united in the O., and fertilisation of the eggs therefore takes place within the body of each mollusc. The O. produces enormous numbers of eggs, collectively named *spat*. The exact number of eggs is difficult to calculate, but it is certain that not less than half-a-million of eggs, and in all probability many thousands more, are produced by each mollusc. The O. spawns from the month of June to near the end of September. The old saying that oysters may be eaten in any month the name of which does not contain the letter 'r' is thus founded upon the fact that in the names of those months in which the O. breeds that letter does not occur. The egg-mass, whilst still within the parent-body, becomes of a milky, creamy colour and appearance, and the eggs are retained within the body until the preliminary stages in development have been concluded. The chief information regarding the development of this mollusc has been obtained from the memoir of Lacaze-Duthiers, of date 1854-55; while more recently (1874) Salensky has studied the subject. After the yolk of the egg has become augmented so as to produce the *morula* stage (see DEVELOPMENT), the layers of the *blastoderm* or germinal membrane divide into an outer (*ectoderm* or *epiblast*) and an inner (*endoderm* or *hypoblast*). A few cilia next appear on the portion of the young O. known as the *velum*, at which point the ill-defined head-extremity is afterwards developed. At the hinder extremity of the embryo the shell next begins to be developed, while the digestive system is duly formed from the germinal substance within. In what is known as the *veliger-stage* the young O. appears to possess a *velum* or fold of membrane, composed of 2 lobes and possessing *cilia;* and by means of the vibratile action of the latter filaments the young animal—or the 'spat' generally—is conveyed for immense distances through the sea. After the stage in which the shell has grown larger, the young O. leaves the body of the parent, and, according to Lacaze-Duthiers, it remains for forty-three days in this stage without altering its form. It appears soon to attach itself after this stage, and the gills and heart then become developed. As regards the period at which the O. attains its full growth, these molluscs are said to be full grown at three years. At the end of one month the O. is said to be of the size of a pea; at the end of six months it attains the length of ⅜ths of an inch; and a year old may measure from 1½ to 2 inches.

The oysters which are best known are the Common O. (*Ostræa edulis*), with its especial varieties and breeds; the Horsefoot O. (*O. hippopus*) of the Mediterranean; the Milky O. (*O. lactea*); the Folded O. (*O. plicata*), &c. Oysters congregate in great 'beds,' the exact localities and extent of which have been pretty well defined, although there is little doubt that many O. beds exist which are as yet barely known, and which present a rich field for future enterprise. The demand for oysters has originated the cultivation and growth of these molluscs in specially-formed or artificial beds. The latter are well seen at Lake Fusaro at Naples, and in the Bay of St. Brienne, the Bay of

Arcachon, and the Ile de Ré in France. The green oysters of Marennes are equally celebrated. Whitstable in England is the chief place for artificial O.-beds. On the N. American coasts immense supplies of a species of O., the *O. Canadensis* or long-hinged O., are found. The celebrity of the O. dates from antiquity. The Romans consumed immense numbers of these molluscs. According to Pliny, Sergius Orata was the inventor of the O.-pond. *Fossil oysters* are well known. They are first represented in Carboniferous strata, and are common in both Mesozoic and Tertiary rocks. *O. Couloni*, *O. aquila*, and *O. Marshii* are three familiar extinct species.

Law Regarding O. in Great Britain.—31 and 32 Vict. c. 45, empowers the Board of Trade to grant parts of the sea-shore of Great Britain to persons for the forming of O.-beds. It also appoints a close season between the 15th June and the 1st of September. In Ireland the Irish Fishery inspectors have powers similar to those exercised by the Board of Trade in Great Britain. Any one stealing oysters or O.-brood from an O.-bed, knowing the same to be the property of another, is guilty of larceny; and any one using a net or dredging instrument on the ground of the bed, though no oysters be taken, is guilty of a misdemeanour, punishable by fine and imprisonment; but the Act does not prevent any one from catching floating fish within the limits of the O.-bed, with instruments suitable for catching floating fish only. The close season by convention with France is maintained in the sea between France and England; and O. fishing-boats are at that season subject to the surveillance of the officers of the coastguard or of the navy.

Oyster Bay, a post village and township of New York, U.S., to the N.E. of New York city. The village, situated on a sheltered bay, is a favourite watering-place. The township extends across Long Island from the Sound to the Atlantic, includes twelve villages, and has a pop. (1870) of 10,595.

Oyster-Catcher (*Hæmatopus ostralegus*), a species of *Grallatorial* or wading birds, otherwise known as the 'sea-pie.' It inhabits the sea-shore, and attains a length of 16 inches. Its plumage is black above and pure white beneath. The bill is very long, and is flattened from side to side. The food consists of molluscs, such as limpets, &c., which it detaches from the rocks, by aid of its beak. The nest is a mere hole scooped out of the ground, and the eggs, numbering three or four, are of a yellowish-olive colour spotted with brown. The O. C. is common in Lincolnshire fens.



Oyster-Catcher.

Ozæ'na (Gr. *ozō*, 'I smell') signifies a discharge of fetid, purulent matter from the nostrils. See NOSE, DISEASES OF.

Ozanam, Antoine Frédéric, a Frenchman of a singularly pure and earnest character, was the son of a physician, and was born at Milan, April 23, 1813. His father subsequently removed to Lyon, where O. was educated. In 1831 he published *Reflexions sur la Doctrine de Saint Simon*, went to Paris in the following year to study law, and was brought into relation with Chateaubriand, Ampère, Ballanche, Montalembert, and Lacordaire. Along with some other students, he founded (1833) a religious and charitable association which afterwards became the 'Society de Saint Vincent de Paul.' In 1839 appeared his *Dante et la Philosophie Catholique au XIIIe Siècle*, which is considered one of his finest works. After filling for a short time a chair of commercial law at Lyon, he was called at the close of 1840 to assist Fauriel at the Sorbonne in the chair of Foreign Literature, and was made professor in 1844. His career was a brilliant success. Gifted with a rare talent for exposition, both critical and poetic; rich in knowledge, and original in thought; of a sympathetic heart; winning in manner, and chaste in ethics, he drew crowds of admiring auditors, and inspired them for the time with something of his own exalted enthusiasm and religious faith. Withal, he was a robust Liberal in politics, and never wavered in his hatred of despotism and his hope for democracy. Even the miserable Revolution of 1848 did not discourage him. He died of consumption at Marseille, September 8, 1853. No finer embodiment of the Christian character has appeared in modern France. Among his other works may be mentioned *Études Germaniques pour servir à l'Histoire des Francs* (Par. 1847–49); *Documents inédits pour servir à l'Histoire d'Italie depuis le VIIIe. jusqu'au XIIIe. Siècle* (Par. 1850); *Les Poëtes Franciscains en Italie au XIIIe. Siècle* (Par. 1852). His *Œuvres Complètes* were published at Paris (8 vols. 1855). See Montrond, *Fr. Ozanam, Tableau Historique et Biographique* (Lille, 1869), and Kathleen O'Meara, *Frédéric Ozanam, Professor of the Sorbonne; his Life and Works* (Edinb. 1877).

Ozie'ri, a town near the centre of Sardinia, on Mount Acuto, about 1000 feet above the sea, near which are many of the peculiar round towers called *nuraglie*. Pop. 7965.

Ozo'cerite, or **Ozo'kerite** (Gr. *ozō*, 'I smell,' and *keros*, 'wax') is a native mineral wax or paraffin found in sufficient abundance to be of commercial importance in Moldavia and Galicia. It is of a dark greenish brown colour, sub-translucent, soft, and waxy, and can be kneaded in the hand. When purified it forms a hard paraffin, having a high melting point, which has been utilised in candle-making. O. is found in small nodular masses at Uphall in Linlithgowshire, and at Urpeth Colliery, near Newcastle-on-Tyne; but these deposits are of no commercial importance. See PARAFFIN.

Ozone' (from Gr. *ozō*, 'I smell') is a peculiar form of oxygen. There is still some doubt as to its true nature, since it has never yet been obtained free from ordinary oxygen. Oxygen can be ozonised in various ways, such as by the slow combustion of phosphorus or other substance, or by passing electric sparks through it. Oxygen prepared by electrolysis contains O. mixed with it. Heat, or even simple contact with a variety of substances, converts O. into oxygen again. Dr. Andrews has shown that if O. be shaken up with broken pieces of glass it is rapidly reconverted into common oxygen. The presence of O. is readily distinguished by its odour, from which the name is derived. All experiments go to prove that ozonised oxygen occupies less space than common oxygen—*i.e.*, is denser; and probably its molecular formula is O_2, that of oxygen being O_3. O. exists in minute quantity in country or sea-side air. In crowded cities no indication of its presence can be perceived. One of the best chemical tests for O. is a damp mixture of starch with potassic iodide. Strips of white cartridge paper brushed over with this remain unchanged in common air, but when exposed to ozonised air they become blue. With reference to the vital properties of O., Dr. Andrews has shown that it is more active than common oxygen, and rapidly renders an animal subjected to it insensible because of its energetic action.

P.

P the sixteenth letter in the English alphabet, having the same place and the same symbol as in Latin, and corresponding to the Semitic Pe and the Greek Pi, from which latter (Π) its form is directly derived. It is a thin labial, cognate with *b*, *f*, and *v*, with all of which it is frequently interchanged. In the affiliated languages it is also represented by the gutterals *q*, *k*, and *c*. Thus, Gr. *hippos* = Lat. *equus*; Gk. *ophthalmus* = Lat *oculus*; and a similar variation is found between Zend and Sanskrit. The following are examples of the more regular changes:—Gr. and Lat. *pater* = Ger. *vater*, and Eng. 'father;' Gr. *pous* and Lat. *pes* = Eng. 'foot;' Gr. *pente* = Lat. *quinque*, Sanst. *panch*, Ger. *fünf*, and Eng. 'five'; Gr. *episcopus* = Fr. *évêque*, and Eng. 'bishop.' In the Greek alphabet there existed two additional consonants compounded with P.—viz., ph (φ) and ps (ψ). The former is generally represented in other languages by the letter *f*, from which etymologically it is quite distinct; the latter was very little used, and is often weakened to simple *s*. *Cf.* Lat. *capsa* = Fr. *caisse*. 'Psalm' in English is pronounced without the *p*. In abbreviations, P.M. stands for *post meridiem*; *P.R.* for *populus Romanus*; P.P.C., on a visiting card, for *pour prendre congé*; P.C. for Privy Councillor, or sometimes for police constable.

Pa'ca (*Cælogenys*), a genus of *Rodent* quadrupeds inhabiting S. America, and noted for the size of their cheeks, the upper jaw overhanging the lower, and causing the muzzle to appear broad and clumsy. 'Cheek pouches' are developed. The Sooty P. (*C. Paca*) is the common species. It attains a length of about 2 feet, and is of a blackish brown colour, marked with longitudinal rows of white spots. The P. destroys large quantities of sugar canes in the W. Indian islands. It swims with great ease, and lives in burrows. The flesh is highly esteemed by the Indians.

Pacay' is a name given to *Prosepis dulcis*, a small thorny tree of Peru and other dry regions of S. America. The white succulent matter in which the seeds are imbedded is used as food, and the pods serve for feeding cattle. See MESQUIT and MIMOSÆ.

Pace (Lat. *passus*, Fr. *pas*) is vaguely used to denote a stride in walking. The Romans defined it as the distance between the raising of one foot to the setting down of the same again (see MILE); and this was the accepted meaning of the old so-called *Geometrical P.* The word has received a definite meaning only in military marching, when it is understood to be the distance between the two feet from heel to heel. In slow marching time its length is 30 inches; in double time, 36 inches.

Pacho'mius, an Egyptian monk of the 4th c., is known as the founder of the Cœnobites (q. v.), or of the cloister life. A soldier in his youth, P., when converted to Christianity, became a monk on the banks of the Nile. Disciples flocked to him to perfect themselves in asceticism, and he established (about 340) a residence on the island of Tabenna in the Nile, where they might dwell together (Gr. *koinobion*), distinguished from the *Laura* or association of separate dwellings of the Anchorites (q. v.) by the observance of certain rules; strict obedience to himself as president or Father (*abbas*) being one of the chief. The details of his 'rule' he left at his death (348) in *Precepta, judicia, et monita*, translated by St. Jerome.

Pachyder'mata (Gr. 'thickskins'), the name given to an order of mammals in Cuvier's classification. It included those quadrupeds which have thick skins;—*e.g.*, the elephant, rhinoceros, hippopotamus, tapir, and pig. In modern classifications of Mammalia this order is entirely abandoned, its members being distributed among other groups, and more in accordance with scientific arrangement and natural affinities. Thus the majority of P. are grouped together in the order *Ungulata* (q. v.), or that of the 'hoofed' quadrupeds. The elephant has been placed in a special order—that of the *Proboscidea* (q. v.). The hippopotamus belongs to the *Artiodactyle* (or 'even-toed') group of *Ungulata*, in which the swine also is included. The rhinoceros is an 'odd-toed' or *Perissodactyle* Ungulate, and so is the tapir.

Pacif'ic O'cean, the watery expanse between Asia, the Malay Archipelago, Australasia, and America. Its length from N. to S. is 9200 miles, and its greatest breadth, in 7° N. lat., about 10,300 miles. Its area is 80,000,000 sq. miles, equalling that of the other four oceans put together, and occupying two-fifths of the surface of the globe. On the American side the P. O. has few inlets or islands, but the Asiatic side contains the Behring, Okhotsk, Japan, Yellow, and China Seas, and abounds in countless islands, which stretch eastward for two-thirds of the breadth of the ocean. The Pacific is to a large extent girdled by volcanoes, *e.g.*, in the Andes and Central America, the Aleutian and Kurile Islands, Japan, the Philippines, New Hebrides, and New Zealand. Many of the islands scattered over its centre are also more or less volcanic, the chief active volcano in them being that of Mauna Loa in the Sandwich Islands. Mr. Dana is of opinion that in the central Pacific there has been a subsidence over a very wide area to a depth of not less than 9000 feet, and in the Coral Sea (q. v.) of 2000 feet. In Peru, Alexander Agassiz found indications leading him to conclude that the Pacific within a comparatively recent time extended through gaps in the coast range and formed an internal sea, which stood at a height of at least 2900 feet, and probably much higher.

The drainage into the Pacific is remarkably small for the extent of its coast line, the principal rivers falling into it being those of Siberia, China, and Siam. The watershed of America being very near the W. coast, the only large rivers debouching into the P. O. are the Yakon in Alaska, the Fraser in British Columbia, the Oregon a little farther S., and the Rio Colorado falling into the Gulf of California.

In spite of its name, which was bestowed upon it by Magellan, the P. O. is not very different from other oceans in regard to storms. Fearful Typhoons (q. v.) rage in the China Sea; there is an annual hurricane season in the tropical S. Pacific; and heavy westerly winds are usual between New Zealand and S. America. The trade winds are not so distinct as in the Atlantic, and are more powerful on the American side, on account of its freedom from islands. See TRADE WIND, and MONSOONS. A sargasso sea, smaller than that of the Atlantic, exists in 30°-40° N. lat., in long. 135° W., and another of yet smaller size about 600 miles E.S.E. of New Zealand. With respect to the currents of the P. O. see CURRENTS, OCEAN.

The investigations made by the *Challenger* Expedition have shown that the depth of the P. O. increases slowly from S. to N., the mean difference between the depth of the S. Pacific and that of the N. Pacific being about 6000 feet. Between Tahiti and Juan Fernandez the average depth was found to be 12,960 feet, between Tahiti and Hawaii 15,600 feet, and between Hawaii and Japan 17,148 feet. According to Sir C. W. Thomson, in the N. Pacific there is an enormous extent of water of great depth, in many cases going below 18,000 feet. Between the Caroline and Ladrone groups a sounding of 27,450 feet was obtained, and one of 23,700 feet off Japan. Notwithstanding

the increasing depth of the bottom, the temperature rises from the S. northwards. Still in the N. Pacific, at depths of from 300 to 1500 fathoms, the temperature is generally lower than that of the N. Atlantic at the same depths. Down to 12,000 feet the bottom is largely composed of a deposit of minute shells, called globigerina ooze. Below that depth the bottom consists of reddish-brown clay, silicate of the oxides of iron, and manganese with alumina. There is also much pumice and other volcanic matter lying about on this floor, but vegetation is believed to be impossible, so far out of reach of air and light.

Reports of the existence of the P. O. first reached Europe through Columbus, but the first European to behold it was the Spaniard Balboa, on 29th September 1513. In 1521 it was first traversed by Magellan, and among subsequent navigators of its waters the most distinguished names are those of Tasman, Dampier, Cook, Anson, the two Bougainvilles, La Perouse, Vancouver, and Flinders.

Pacini, Giovanni, an Italian composer, son of Luigi P., the famous bass buffo-singer of Syracuse, was born 11th February 1796, studied at Rome, Bologna, and Venice, in the last of which cities he brought out the first of his 90 operas, *Annetta e Lucinda*, at the age of eighteen. For thirty years he was Director of the Conservatorio at Viareggio, near Lucca. Among his best operas are *Saffo*, *L'Ultima Giorno di Pompeia*, and *Medea*. He was deficient in originality, imitating alternately Rossini, Bellini, and Donizetti. P. died December 6, 1867, leaving an interesting book of *Memoirs*.

Pacin'ian Corpus'cles, the name applied to bodies of oval shape, which occur on certain of the nervous trunks of the sympathetic and cerebro-spinal nervous systems. They are well seen in the mesentery, and have been named after Pacini, who first described them. They appear in many cases to receive the terminations of nerves, and to possess this relation to the cutaneous or superficial nerves of the hands and feet, while they are also found on the large branches of the sympathetic plexus in the neighbourhood of the *abdominal aorta*. Each Pacinian corpuscle is attached to its nerve by a very narrow and slender stalk. Microscopically investigated, it seems to consist of concentric layers of a very fine membrane, between the intervening spaces of which layers a fluid exists. A single nerve-fibre may be seen to pass through the narrow pedicle or stalk of the Pacinian corpuscle, this nerve-fibre entering a central cavity in the organ, and finally terminating at its free end in a dilatation or enlargement. The exact functions of the Pacinian corpuscle are quite undetermined.

Packfong', or **Tutenag**, a Chinese alloy essentially the same as that known in Great Britain as German or nickel silver, containing copper 8 parts, zinc 6½, and nickel 3. Although this compound has come into use in Europe only within comparatively recent years, it has been known and used in China from a very remote period.

Pack'horse, the name applied to a breed of horses formerly employed in England and in other countries for the conveyance of goods, which were contained in bundles or panniers slung across the back of the animal. The P. was short-legged and stoutly made, and was famed for its powers of endurance.

Pacou'ry-U've, the Brazilian name for the fruit of *Platonia insignis*, a beautiful tree of that country. It is said to be very sweet and delicious, whilst the seeds have an almond-like flavour. The wood of the tree, which belongs to the Gamboge family, is very hard.

Pacto'lus (mod. *Sarabat*), a small river of Lydia, in Asia Minor, which, rising on the northern slopes of Mount Tmolus (*Bos-Dagh*), flows northwards past Sardis and joins the Hermus (*Kodus*). Its golden sands, famed by the classic poets, had ceased to be productive in Strabo's time.

Pac'tum de Quo'ta Li'tis is an agreement between the counsel or agent, and client, for sharing the subject of an action. Such an agreement was void by Roman law, as it is by the law of England and of Scotland. In England, see CHAMPERTY.

Pac'tum Illi'citum, a term of Roman law (adopted into Scotch law) denoting an illegal contract—the general rule being that no action can lie for fulfilment of a contract contrary to law; but there is a distinction drawn between a case in which there is turpitude on both sides, and a case in which turpitude attaches to only one of the parties. In the former there can be no action for restitution. In the latter, the consideration given *ob turpem causam* must be restored whether the counterpart of the bargain has been performed or not.

Pacu'vius, Marcus, a Roman dramatist, the nephew of Ennius (q. v.), was born at Brundusium about 220 B.C., lived at Rome, where he earned his bread as a painter and actor, and died at Tarentum, having nearly attained the age of ninety. His dramas, modelled on those of Sophocles and Euripides, but less slavishly than was the case with his predecessors, were held in high esteem by his contemporaries and by the later Romans. The fragments still extant have been collected by Ribbeck in his *Tragicorum Latinorum Reliquiæ* (Leips. 1852).

Padang', the capital of the W. Coast Residency in Dutch Sumatra, is situated at the mouth of a river of the same name in lat. 1° S. It is a free port, and has Protestant and Roman Catholic churches, a military hospital, and various government buildings. The climate, although very hot, is comparatively healthy, and there is an extensive trade, chiefly in coffee, not only with Java but directly with Europe. The part of the town on the left bank of the river is inhabited almost solely by Malays, who live in bamboo huts; that on the more elevated right bank is occupied by a mixed population of Europeans and Chinese, living in substantial houses of wood and stone. Pop. 25,000.—The *districts* of Upper and Lower P., together with Singkel and Tapanoeli, form the Residency of the W. Coast, and include some of the most beautiful and fertile regions in the tropical zone. Only the low and marshy coast lands are oppressively hot and unhealthy; the slopes of the high volcanic mountains which intersect the districts have a delightful climate, and produce abundance of coffee, pepper, indigo, rice, cassia, ratans, cocoanuts, and caoutchouc. In Upper P. are the most extensive coffee plantations. Throughout the Residency there is also a considerable yield of gold, quicksilver, iron, copper, lead, and diamonds. The Dutch established their settlement at P., the first in Sumatra, in 1660. See SUMATRA.

Paddle, a spoon-shaped wooden instrument for propelling boats or canoes, still in use among savage nations, but among civilised peoples superseded almost entirely by the oar. The paddler sits or stands with his face looking forwards, and if he is alone in his canoe propels it by dipping the P. alternately on either side. This is the one advantage which the P. possesses over the oar, in using which the rower must necessarily sit looking backwards; but it is an advantage which is appreciable only in threading narrow and winding streams, since in propulsive power the oar is infinitely superior.

Paddles or Paddle-wheels are a modification of the ancient P., suitable for being driven by machinery. A number of paddles are, so to speak, fitted together radially as the spokes of a wheel which is made to revolve so that the blades are successively immersed in the water; and by the reaction of the water upon them the vessel is propelled. These blades are simply flat boards, and are technically called *floats*. Most power is of course gained when the floats all pass through the water perpendicular to the direction of greatest pressure—*i.e.*, when they are vertical. This evidently is not possible if the floats are fixed rigidly to the radii of the wheel. The *feathering paddle-wheel* of Elijah Galloway, patented in 1829, remedies this drawback by adjusting movable floats mechanically, so that they are kept in position as long as they are in the water. The liability to derangement of this adjustment, however, prevents its use in sea-going steamers, which are usually provided with the ordinary radial wheel with fixed floats. By making the wheel as large as possible, and by setting the axis of the wheel as high as possible above the surface of the water, the floats may be made to enter the water *nearly* vertically, and deviate but little from the true vertical position during its passage through the water. The lowest float should always be fully covered by water. Though of ancient date, paddle-wheels were not effectively used till the introduction of steam as a motive power. See STEAM NAVIGATION.

Paddlefish (*Spatularia* or *Polyodon Spatula*), a peculiar species of *Ganoid* fishes, belonging to the *Sturionidæ* or sturgeon family. The snout is long and flattened, while the body is smooth and destitute of the hard bony plates and scales so typi-

cal of other members of the sturgeon family. The P. inhabits several N. American rivers.

Padd'y, a word of Malayan origin, which has been universally adopted by Europeans in India for rice in the husk, whether growing or cut, before threshing. The native name is *dhan*. The proportion of 'paddy' to husked rice is about as 7 to 10, estimated by weight.

Padell'a (It. 'a frying-pan') is an earthenware dish, like a broad flat flower-pot without any hole in the bottom, filled with fat, and having a stout wick in the centre. The apparatus when lighted forms a very effective means of illuminating public buildings, arches, and open spaces.

Pa'derborn, a town of Prussia, province of Westphalia, at the source of the Pader (whence its name), an affluent of the Lippe, 19½ miles E. by N. of Lippstadt by rail. It has one Evangelical and four Catholic churches, among which are the Cathedral (11th–13th centuries), in the Byzantine style, with two beautiful portals, and the silver sarcophagus of St. Liborius (1627). P. is the see of a Catholic bishop—at present (1878) suspended by the German Government—and has a Catholic priests' college, which from 1592 to 1819 was a University, several cloisters for nuns and monks, and a Catholic and Jewish orphanage. There is an important wool-market. The industries of the town are brewing, and the manufacture of oil, tobacco, wax-cloth, starch, and flour. Pop. (1875) 13,728. P. was founded by Karl the Great, who held a diet here in 777. The *bishopric* of P., founded in 795, was the first in Saxony, and reached its greatest importance under Meinwerk (1009–35). Under the prince-bishop Theodor of Fürstenberg (1585–1618), it rejected Lutheranism, which it had previously embraced. Its territory, which fell to Prussia in 1802, after being part of Westphalia from 1807–13, was restored to Prussia in 1815. See Bessen, *Geschichte des Bisthums P.* (2 vols. Paderb. 1820), and Giefers, *Die Anfänge des Bisthums P.* (Paderb. 1860).

Pad'iham, a town of Lancashire, England, on the N. bank of the Calder, 9 miles N.E. of Blackburn, near the Rose Grove station of the Lancashire and Yorkshire Railway. It has an old parish church, a modern church (1866) with a tower 96 feet high, and several large cotton factories. There are extensive stone-quarries and coal-mines in the vicinity. Pop. (1871) 6675.

Padill'a, Juan de, a Spanish noble, sprung from an illustrious Toledan family, headed the rebellion against Charles V. which originated in Toledo, and which soon spread itself over the whole of Castile. Appointed in 1518 commander of the Spanish troops at Saragossa, P. soon afterwards accepted the chief command of the rebel army. He made himself master of Segovia, Tordesillas, and Valladolid, but was completely routed in the battle of Villalos, 23d April 1521. After a heroic resistance he was wounded, taken prisoner, and executed next day. P. and his noble-hearted wife, Dona Maria de Pacheco, who defended Toledo for some time after her husband's death, and then escaped to Portugal, have always been most popular figures in Spanish history, and have formed the subject of many dramas and poems.—**P.** is also the name of two Spanish poets, the elder of whom, known as *El Cartujano* ('The Carthusian'), born at Seville in 1468, died 1518, is notable as the first imitator of Dante. His poem, *Los doce Triunfos de los doce Apostoles*, was republished in London as late as 1843. The younger P., a contemporary and friend of Cervantes, died in 1599. He wrote popular poems in all styles. His chief collections are *Eglogas, Sonetos, &c.* (Sev. 1582), *Tesoro de varias Poesias* (Madr. 1580 and 1587), and *Romancero* (Madr. 1583).

Pad'ishah (Pers. *pâd*, 'protector;' *cf.* Sansk. *pati*, 'master;' and *shah*, 'king'), one of the titles borne by the supreme ruler among the Persians and Turks in the diplomatic language of the Divan, was originally accorded only to the kings of France, but during the last century has been extended to the emperors of Austria and Russia, and even to the heads of secondary powers.

Pad'ua (Ital. *Padova*, Lat. *Patavium*), a town of N. Italy, capital of the province of the same name, 21 miles W. by S. of Venice, is situated in a fertile plain, on an arm of the Bacchiglione, and is a station on the Venice and Verona Railway. The town is widely built, surrounded with high walls, fortified also with ditches and bastions, and is about 6 miles in circumference. The streets are interspersed with gardens, but are mostly narrow, presenting an antique appearance, and containing fine buildings, chiefly of the period of the Renaissance. The largest square and promenade is the Piazza Vittorio Emanuele (formerly Prato della Valle), of elliptic form, with fountains and seventy-four statues of '*auditores Patavini*,' or distinguished men who have studied in P. These are arranged in a double row, and commemorate among others Stephen Bathori, Petrarch, Tasso, Ariosto, John Sobieski, and Galileo. In the S.E. is the church of San Giustina, a noble edifice with a fine interior, completed in 1549. It has eight cupolas 174 feet high; the nave is 364 feet long by 98 broad, and it contains several fine paintings, among which is the 'Martyrdom of St. Justina,' by Paolo Veronese. The church of San Antonio, commonly known as 'Il Santo' was begun in 1256, the principal part completed in 1307, the remainder with the seven domes in 1475, and the whole restored after a fire in 1749. It is larger than that of San Marco at Venice, being 300 feet long, 147 feet wide across the transepts, and 123 feet high in the centre. It contains many fine paintings. Adjoining is the Scuola del Santo, an oratory adorned with seventeen frescoes by Titian and his pupils. To the right of San Antonio is the Museo Civico, with a library and a collection of coins, bronzes, and terra-cottas, and having in front the bronze equestrian statue of Gattamelata by Donatello, 1443. Other buildings are the Eremitani, an Augustinian church of the 13th c., restored of late. It contains celebrated frescoes, the chief by Andrea Mantegna. On the N. side of the piazza in front of the church, is the chapel Madonna dell' Arena, erected in 1303, and adorned with frescoes by Giotto in 1304. In the vicinity is the church of I Carmini, before which stands a monument to Petrarch, erected by the town on the 18th June 1874, the 500th anniversary of his death. The Palazzo della Ragione, now the Municipio, erected in the 11th c., and remodelled in 1420, is celebrated for its great hall with vaulted wooden ceiling, 273 feet long by 90 feet broad, and 78 feet high. It is said to be the largest hall unsupported by pillars in the world. The University of P., founded by Pope Urban IV. in 1263, was celebrated in the Middle Ages. It possesses a library of 120,000 volumes, a botanic garden—the oldest in Europe—and an observatory, with a tower 138 feet high. In 1874–75 it had 52 professors and 1217 students. The manufactures of P. are unimportant, with the exception of silk cloth, leather, and catgut, but there is considerable trade in cattle, wine, oil, and corn. Pop. (1874) 44,607.

P. is one of the oldest cities of Italy. Roman legend ascribed its foundation to the Trojan chief Antenor, but it first becomes historical after the conquest of Cisalpine Gaul. Under the Roman Empire it was the most important city of N. Italy, and only yielded to Rome in the number of equites it returned to the census. It was the birthplace of the historian Livy. Destroyed by Attila in 452, rebuilt by Narses, and again destroyed by the Lombards, it was, during a part of the 13th c., a possession of the tyrant Ezzelino, but it afterwards remained a free state, until it became subject to the Carrara family in 1318. P. passed (1403) under the power of Venice, together with which it fell into the hands of Austria, was taken by Napoleon 1805, restored 1814, and became a part of the kingdom of Italy in 1866. In the history of art P. is of importance. It gave its name to the school founded by Squarcione in the first half of the 15th c. The greatest Paduan master was Andrea Mantegna (q. v.) See *Annali della Citta di P.*, by Gennari (3 vols. Bassano, 1804).

Padu'cah, a city of Kentucky, United States, on the Ohio River, near the mouth of the Tennessee, has a county court-house, fifteen churches, several mills, factories, and tobacco houses, two daily and four weekly newspapers. A large transit trade is carried on. Pop. (1870) 6866.

Pæ'an (from *iō Paian*, the burden of the chorus), the Greek choral song addressed to Apollo before a battle or after a victory.

Pædo-Baptism. See BAPTISM, INFANT.

Pæ'ony or **Peony** (*Pæonia*) is an extensive genus of showy plants belonging to the natural order *Ranunculaceæ*, among which they are distinguished by their introrse anthers, a calyx of five persistent sepals, five or more petals, stamens rising from a glandular disc, and fruit of from two to five many-seeded follicles bursting inwards. The species, with trifling exceptions, are strong-rooted

herbaceous perennials, and are natives of Europe, Asia, and N.-W. America. The common P. (*P. officinalis*), an old-fashioned garden favourite with large single or double blood-red flowers, is a familiar representative, as is also the white P. (*P. albifolia*), a native of northern Asia. The roots of this are sometimes boiled and used as an article of food by the natives of Siberia. *P. fragrans*, from China, has large scented double red flowers. *P. coralina*, with large crimson flowers, has been established on Steep Holmes Island, in the estuary of the Severn, for 150 years, but was originally introduced. The tree P. (*P. moutan*) is a shrub that in China attains a height of 10 feet, bearing handsome purple flowers, for which reason it is a garden favourite in that country and Japan. In 1789 it was imported into European culture, and horticulturists have obtained a range of various colours—white, pink, and purple. *Moutan* is its vernacular name, meaning 'king of flowers.' Formerly medicinal properties were ascribed to plants of this genus, the name *P.* being taken from Paiōn, in Greek mythology, the god of medicine.

Paer, Ferdinando, an Italian composer, was born at Parma, 1st June 1771. In his fifteenth year he produced the opera of *Circe* at Venice, where he completed his musical education. In 1801 he was appointed chapel-master to the Elector of Saxony at Dresden, where he composed several operas—*Leonora*, *Camilla*, *I Fuorusciti*, &c.—which were performed with brilliant success. After the battle of Jena he became conductor of the chamber music and composer to the Emperor Napoleon, and took up his residence for the remainder of his life at Paris. In 1810 he produced his *chef d'œuvre*, *Agnese*. For three years (1823-26) he was director of the Italian opera in the French capital. P. died 3d May 1839.

Pæs'tum (Gr. *Poseidonia*), an ancient seaport of Lucania, in southern Italy, on the Salso, 26 miles S.S.E. of Salerno, contains, with the exception of Athens, the finest specimens of Greek architecture in the world. Within its cyclopean walls, 3 miles in circumference, are a temple of Neptune (63 yards long by 28 wide, with thirty-six columns 7½ feet in diameter), a so-called basilica (59 yards by 26½, with fifty columns 6½ feet in diameter), and a temple of Ceres (35 yards by 15, with thirty-four columns 5 feet in diameter). Another temple, a theatre, and an amphitheatre are probably of Roman date. No traces now exist of the famous rose gardens. P. was founded, according to Strabo, by Greek colonists from Sybaris about 600 B.C. It came into the hands of the Lucanians in the 4th, and of the Romans in the 3rd c. B.C., and in 871 A.D. was sacked by the Saracens, and abandoned by its inhabitants. The temples, stripped of their marble by Robert Guiscard, have been described by Swinburne (1779), Wilkins (1807), and De la Gardette (1790; new ed. 1840).

Paganini, Nic'olo, the most wonderful of violinists, was born at Genoa in February 1784. At the age of nine he received lessons from Costa in his native city, and shortly afterwards was taken to Rolla, a celebrated master at Parma, who declared he could teach him nothing. He studied counterpoint, however, under Geratti, after which he gave concerts in the N. of Italy with immense applause. Till his forty-third year he performed only in his native country, but from 1827 to 1834 he made brilliant appearances in Germany, France, and Great Britain, not only dazzling and fascinating the public by his marvellous single string performances and similar feats, but striking such maestros as Rossini and Meyerbeer with positive wonder. P. acquired a vast fortune. He was author of a great number of ingenious instrumental pieces, including twenty-four violin caprices and twelve sonatas for the violin and guitar. He died May 27, 1840. See *P.'s Leben und Treiben*, by Professor Schottky (Prague, 1830). An elaborate analysis of his style of playing will be found in Fetis' *Biographie Universelle des Musiciens*.

Pa'ganism, or Heath'enism, is the name applied to the old polytheistic religions which were superseded by Christianity. The name arose at a comparatively late period, when the old religion was lingering among the *pagans* (Lat. *pagani*, Gr. *paganoi*, 'country-people') in the remote regions, after the towns had been Christianised. The first use of *pagani* in the religious sense occurs in Tertullian. The name 'heathens' had a similar origin. Literally it means 'the dwellers on the heaths'—*i.e.*, the rude, wild, and ignorant part of a nation, those who lived far away from towns, and who therefore clung most tenaciously to their ancient and hereditary beliefs.

Page (Fr. *page*; Ital. *paggio*; Low Lat. *pagius*; derivation uncertain, but supposed by some to come from Gr. *pais*, *paidos*, a 'boy'), a youth employed in the service of a prince or noble. In the first half of the Middle Ages he was little more than the slave of a great lord, and could be exchanged at the will of his master like a horse or a hound. But gradually his position improved. When the sons of the smaller nobility, for the sake of a knightly education, entered the households of the great barons, they were appointed to minor posts of honour which marked them off quite distinctly from low-born menials. But it was in Spain during the 16th and 17th centuries that the system of Court-attendance received its most elaborate development, and pages underwent the most minute instruction in their ceremonial duties. So long as the feudal system lasted, with its fixed distinctions of classes, the discipline that a page underwent, as a preparation for the higher grade of squire, which in turn led the way to knighthood, gave a reality to the office. Now, however, in the altered conditions of society, it is very nearly a sham, and it may be presumed that the race of pages who still feebly grace royal and ecclesiastical Courts will erelong become extinct.

Pa'ging Machine' is an ingenious contrivance for paging ledgers, or for numbering railway tickets, cheque-books, &c., with a consecutive series of numbers, hence also known by the name of numbering machine. There are several kinds of such machines, which are adopted for working either by hand or power. The construction in common use is that several wheels or rowel-formed circles have engraved on their circumferences the numerals from 0 to 9. The number of the wheels depends upon the range of the required notation, thus six discs may number from 1 to 999,999. The wheels usually revolve on one axle, and by the action of a lever the *units* wheel is advanced step by step till it reaches the figure 9, when a catch or a spring causes the *tens* wheel to move forward one step, at which it remains stationary till the units wheel, in completing another revolution, again sets it forward another stage. In like manner the tens wheel acts on the *hundreds* wheel, and so on through the others. Some machines print the first number with a series of non-expressive cyphers before it, but in improved machines the wheels bearing those cyphers are temporarily thrown out of gear. A P. M. is self-inking, and it may be designed to print alternate numbers or any other combination.

Pa'go, an island belonging to the Austrian crown-land of Dalmatia, lies 3 miles off the coast of Croatia, from which it is separated by the channel of Morlacca. Length, 37 miles; area, 110 sq. miles. The surface is rocky and elevated, rising as high as 886 feet. Vine-growing, fishing, and the manufacture of salt are the chief industries. Pop. (1870) 5152.

Pago'da, the name applied by European nations to the Hindu temples in S. India, and also to a gold coin of the value of 7s. 6d., which was formerly coined at the Madras mint, with the device of a temple on one face. The Hindu name for the coin was *varaha*, from the boar of Vishnu; the Mahommedan name was *hun*. The derivation of the word is quite uncertain, but it was apparently introduced by the Portuguese. In ordinary usage a P. is understood to have the shape of a square tower, highly ornamented, diminishing upwards by each successive storey. Some of these buildings are as much as 200 feet high, and form well-known landmarks to sailors. Among the most celebrated are those at Juggernath (q. v.) in Orissa, at Trichinopoly, and in the island of Rameswaram in Palk's Straits.

Pagu'rus, a well-known genus of Crustacea (q. v.), represented by the *P. Bernhardus* and by other species of the 'Hermit-Crab' (q. v.).

Pahar'ias, an aboriginal tribe in British India, inhabiting the hills of Rajmehal, overlooking the Ganges, in the Bengal district of the Sonthal Pergunnahs, number about 70,000. Ethnologically they are important, as their language proves them to be the most northerly colony of the Dravidian races, whose home is in S. India. See Colonel Dalton's *Descriptive Ethnology of Bengal* (Calcutta, 1872).

Pain is an uneasy sensation in animal bodies, varying in intensity, and generally proceeding from pressure, tension, spasm, or any derangement of function of the nerves of sensation. P. is an important, though not an invariable symptom of disease; for many disease processes are absolutely painless. P. of the

most intense description may be present apart from inflammation, and even the P. of inflammation varies very considerably, as inflammation of the largest and the most vital organs may be accompanied with little or no P., while in that of some of the smallest the P. may be intolerable. Much depends on the extensibility of the inflamed part, but much more on the peculiar sensibility of the organ; while, in some cases, it is often impossible to ascertain the physical cause of P., the most severe P. being experienced in conditions of the body which are compatible with perfect health. P., however, is an important symptom of disease in general, and of inflammation in particular; and the persistence of P. in any given part, in conjunction with disorder of the general system, indicates disease. P. in a part does not necessarily imply disease in that part—*e.g.*, P. in the right shoulder may indicate disease of the liver; or P. in the knee, disease in the hip-joint. There are great differences in individuals as regards sensitivity, depending upon idiosyncrasy, and such peculiarities mark individuals of every tribe and race. There are also times during which individuals are more susceptible to painful impressions than at other times.

Paine, Thomas, a political writer and agitator celebrated for the part he played in the American and French Revolutions, was born at Thetford, in Norfolk, England, 29th January 1737. His father was a quaker, to whose trade of stay-making P. was brought up. In 1759 he settled as a stay-maker at Sandwich, and married; but on the death of his wife two years later, he gave up his trade and obtained a situation in the Customs. In 1771 he married a second time and entered a tobacco warehouse, but having aroused the dislike of his employers he was dismissed, became bankrupt in 1774, separated from his wife by mutual consent, and after obtaining letters of recommendation from Franklin, at that time the commissioner in London from the American colonies, set sail for the New World. P. resided at first in Philadelphia, where he contributed articles to the *Philadelphia Magazine*. He took a lively part in the quarrel with England, and in 1776 published his famous pamphlet *Common Sense*, in which he urged the colonists to strike for their independence. The pamphlet had an enormous sale, and a powerful effect. During the rest of his career, P. adopted 'Common Sense' as his favourite *nom de plume*. In 1777 he was appointed by the Congress Secretary to the Committee of Foreign Affairs, an office which, however, he retained only two years. In 1781 he accompanied Colonel Laurens to France to negotiate a loan, and was rewarded for his success by a grant of $3000 from the Congress and the estate of New Rochelle from the State of New York. He revisited France in 1787, and in 1790 published in England his *Rights of Man*, an able reply to Burke's *Reflections on the French Revolution*. The work gained him great popularity in France, and led to his being created a French citizen and elected Member of Convention for Calais in 1792. Having in this capacity opposed the execution of the King, advocating his banishment to America, he was cast into prison by the Robespierre party, where he lay for ten months. Here he occupied himself with the composition of his *Age of Reason*, a coarsely deistical pamphlet, which estranged many of his friends. In 1802 P. returned to the United States, and spent the remaining years of his life in retirement. He died at New York, 8th June 1809, and was buried in his own grounds. In 1819 his bones were conveyed to England by William Cobbett, and in 1839 a monument was erected over his empty tomb at New Rochelle by some friends. Biographies of P. have been written by Chalmers, Cobbett, Cheatham, Rickman, Sherwin, and Vale. In 1856 a complete edition of his works was published by J. P. Mendum, Boston, and a complete collection of his political writings was issued in 1875 by Truelove, in one volume.

Pains and Pen'alties, Bill of, is a bill before Parliament to inflict punishment on any one beyond the power of the law then in force. See under BILL—*Bill of Attainder*, and *B. of P. and P.*

Paint'ed La'dy (*Cynthia Cardui*), a well-known species of *Lepidoptera* (q. v.), or Butterflies (q. v.), common in the S. parts of Britain in summer.

Paint'ing, the art of representing scenes, objects, figures, and incidents, real or imaginary, by the use of colours on flat or curved surfaces. As a vehicle of human expression, P. takes high rank among the Fine Arts, and it is known to have ministered greatly to the instruction of mankind from the earliest age of which we have any record. Of the origin of the art it is vain to speak, but it is probably as old as language itself, and it certainly is the oldest known form of written language, for before the invention of letters the historic records of the earliest civilised nations consisted of painted representations of scenes and animals, of heroes and heroic actions. (See also EGYPT, HIEROGLYPHICS, PYRAMIDS.) When it is remembered that Giotto (q. v.) began his artistic career by sketching with a piece of slate on the flat surface of a rock, there is no reason to doubt the extreme antiquity of the pictorial art on the ground of the scarcity or the necessarily rare and complicated character of the materials required for its practice. Yet though of such ancient origin, and cultivable, within limits at least, with materials of the simplest kind, the development of the art of P. has been subject at frequent intervals to periods of vicissitude and decline. The artistic genius has successively blazed and gone out in darkness in Egypt, Greece, and Italy, though in the last the wonderful revival of the 15th and 16th centuries, which culminated in Michael Angelo (see BUONAROTTI), Raphael, and Titian, has given a quickening impulse to European art which is felt to our own day. And P. is still strictly a European art, for although in America within our own time a school of art has sprung up, which, while it is vigorous and of ample promise, yet it is still 'provincial,' and to some extent without form and void. Of the arts of India, China, Persia, and Japan it is unnecessary here to speak, as they are sculptural, and architectural or decorative, rather than pictorial. But formative art is shared in by the most primitive nations; even the Eskimo carve with great skill and beauty, and even draw and paint with humour and expression, though their designs manifest a scorn for perspective, and for relative proportion. See Dr. Rinks' *Tales and Traditions of the Eskimo*, illustrated with native designs.

Before sketching the development of P. in the different countries and at the different epochs at which it flourished distinctively, it is desirable to refer briefly to the technique or mechanical processes of the art of P., and to glance at its principal subdivisions or styles. This part of the subject, it may here be noticed, is already partially treated under such headings as CHIAROSCURO, COLOUR, DISTEMPER, FORESHORTENING, FRESCO, GENRE, PERSPECTIVE, &c. All subjects which are either in themselves pleasing to the eye, or are dramatically effective in composition, whether in themselves pleasing or otherwise, come within the sphere of the arts. P. may be said to concern itself chiefly with portraits, historical or imagined incidents, landscapes, under which sea pieces may be classed, and still life. By the last term is meant the pictorial representation of game, fruit, flowers, plate, &c. An attempt to revive fresco P. in a modified form has recently been made, but without much success. This silica or water-glass P., the best English specimens of which are probably the 'Death of Nelson' and the 'Meeting of Wellington and Blucher after Waterloo' by Maclise, is carried on more successfully in Germany. It may be said that the two great kinds of P. at present are P. in oils and in water colours.

The invention of oil-P. is stated by Van Mander to have been made by Jan Van Eyck in 1410 (see EYCK, VAN). In the year named this painter was only fourteen years of age, and subsequent writers prefer to attribute the invention or rather the improvement in the process to Eyck's elder brother Hubert. The improvement substantially consisted in the adoption of a new colouring medium. 'It was,' says Wornum, 'literally varnish-P. Oil-P. in the strict sense of the term was neither a mystery nor a novelty in the time of Hubert Van Eyck.' Tutilo, a monk of the convent of Saint Gall in Switzerland, and himself one of the most celebrated painters and gold-workers of his time, published a treatise on P. 'giving directions for P. in oil,' about the close of the 9th c., or nearly 500 years prior to the supposed discovery by Van Eyck. Since the days of that famous painter many vehicles or mediums for laying on colour in oil-P. have been invented, the one most generally used being the well-known 'megilp,' a compound of mastic, varnish, and drying (*i.e.*, boiled) linseed oil. The oil painter's implements are his colours and brushes; he rests his canvas, which is stretched firmly over a frame, upon the easel, and he occasionally uses a maul-stick to steady the hand that wields the brush.

In oil-P., it is customary, after having conceived the subject and arranged the composition, to sketch in the design in pencil or charcoal, or to strike out the outline at once with a brush, using dark colour. The heads, draperies, and accessories are then put in, and the whole worked up to completion. The main processes are pretty well settled by the warrant of the practice of masters in all ages. In matters of detail, however, the painter follows his own inclination; and a bushel of hints or directions on such minor matters are worthless in comparison with an occasional visit to a studio, or an examination of unfinished works. Of such unfinished works in which we see the technique in actual operation, there are examples in the National Gallery, London, in the National Gallery of Scotland, and in most large collections. Of two examples on permanent exhibition in the National Gallery, Edinburgh, one is Wilkie's 'John Knox dispensing the Sacrament at Calder House,' in which only a few of the heads and indications of drapery are painted in, but the whole subject is carefully and delicately sketched in pencil, which seems to indicate that Wilkie refrained from using colour till his design was fairly completed. The other unfinished work, which is equally indicative of the painter's method of working, is John Phillip's 'Spanish Children Playing at a Bull Fight.' Here only one or two figures are at all complete, while the remaining figures, with the sweeping rows of seats of the amphitheatre forming the background, are merely outlined with the brush in dark brown, showing that it was this great artist's method to paint upon a rude sketch in dark colour.

P. in water-colour is now engaging the whole attention and talents of some of the greatest English artists. In this mode of P. paper takes the place of canvas in oil-P., and water the place of oil, while the mediums and vehicles used and the technical process of laying on the colours are different from those employed in oil-P. Gum-arabic is the vehicle best adapted for general use with water-colours, as it does not degrade the more delicate pigments; isinglass, which is thick, and looks like the 'megilp' of the oil-painter, is also much used, as well as a solution of borax in water and gum tragacanth, which dries sufficiently firm to allow tints to be repeatedly laid one over another without moving or 'washing up.' The white and the yolk of eggs are also employed, the former to make the colours blend more evenly on the paper, the latter for the opposite purpose of 'stopping out' the washes of colour from points where high lights are required, but which the wash would have destroyed. When so used the yolk is afterwards scraped, and the desired light reappears. The rules of Chiaroscuro (q. v.) and composition are the same for water-colour as for oil-colour work. The mode of working is as follows:—The paper damped with water having been very carefully stretched on a drawing-board, is allowed to become thoroughly dry. A clear outline of the subject is then drawn on it, without, however, any extra vigour of stroke to indicate light, shade, foliage, &c., as these effects are to be obtained by the use of the brush alone. A wash of warm colour is then applied over the whole surface. After being allowed to dry thoroughly, the paper is washed over with pure soft or distilled water. This process of tinting, drying, and washing (the tints varying in degrees of warmth) is several times repeated, and the result is an aerial tint of great purity, not to be otherwise attained. Having thus obtained a feeling of atmosphere, the sky, clouds, &c., are proceeded with, and finally the tones of the distance and the objects of the mid-distance and foreground are treated. In these later stages of working in water-colour the painter, as in the case of oils, will use the processes and the expedients which study and practice have proved to him are most effective. On the constantly varying methods of different artists it is impossible to dogmatise.

History of P.—Egypt—Pictures have been discovered on the walls of the tombs and temples of Abousambul (q. v.) which are considerably upwards of 3000 years old, and the colours of which still retain their original freshness. The earliest painted portrait on record is that of Amasis, King of Egypt, which was presented to the Greeks of Cyrene 600 years B.C. Belzoni analysed the Egyptian method of painting as displayed in the tomb of the kings at Thebes, and his examination, according to Wornum, 'leaves no doubt as to the method in which the Egyptian artists commenced their work. The outlines were first drawn in red upon the flattened wall and were afterwards corrected in black. The next process was to lay on a coat of lime-wash, which in these tombs is so clear and beautiful as to surpass the finest white paper. The colouring was then executed by the painter upon this white ground, and when the P. was completed the whole was covered with a coat of varnish.' The usual colours are red, yellow, green, and blue, of which there are two tints, and the mediums used in laying them on were glue and wax. Resinous varnishes and others made of glue were in use. There are many specimens of ancient Egyptian paintings in the British Museum. These show no evidence of perspective, nor indeed of any principle of art, except, in rare instances, light and shade.

Greece.—Few Greek paintings remain, but the works of the ancient writers are full of historical information on the pictorial art of the country. The art appears to have reached Greece through Egypt and Asia Minor. Its historic age commences after the defeat of Xerxes. Polygnotus of Thasos (q. v.), the first great painter of Greece, arrived in Athens about 463 B.C. He excelled in mechanical skill, in character and expression, and in the elegance and lightness of his draperies, and he opened to the Grecian mind the path that led to the highest possibilities of pictorial art. Among his contemporaries were Dionysius, a famous portrait painter, and Panænus, who painted the 'Battle of Marathon,' and decorated the 'Olympian Zeus' of Phidias. Apollodorus of Athens and Zeuxis (about 400 B.C.) added dramatic effect to the fidelity of their immediate predecessors—the former is regarded as the first great master of light and shade; the latter, the painter of Helen of Croton, exalted form in Greek art to an elevation undreamt of before his time. Parrhasius (q. v.) was believed to have surpassed Zeuxis, and Timanthes, his rival, excelled in ingenious invention. During the Alexandrian period P. reached perfection in form and refinement, and began to verge upon luxury and decay. The first masters of this age were Pamphilus (q. v.), Apelles (q. v.), Melanthius, Nicomachus, the most rapid painter of his time; Aristides, his brother, reputed the greatest of the Greeks in expression; Protogenes, a famous animal painter; and Euphranor, Pausias, Nicias, and Athenion, painters in encaustic, and the last of whom, but for an early death, 'would,' according to Pliny, 'have surpassed all men in painting.' The decline of Greek art set in about 300 B.C., and after a short downward course through caricature, *genre*, and still life, the artistic genius of Greece expired.

Revival of P. in Italy.—After the destruction of Corinth by the Romans (B.C. 146) Rome drained the ancient world of its works of art. Greek artists followed Greek art, and before the Christian era Rome was full of painters. The history of painting in Rome is divided into three periods—the first, or great period of Greco-Roman art extends from the Roman conquest of Greece to the time of Augustus; the second reaches on to the latter part of the 3d c.; the third comprehends the period of the Exarchate, when Rome, after the foundation of Constantinople, was in its turn drained of the artistic treasures of Greece, which were thenceforth to decorate the churches and the palaces of the New Rome. In Constantinople sprung up a fresh school of P., already noticed under the heading Byzantine Art (q. v.), and the new capital of the Roman Empire—in which the arts were cherished during the Middle Ages—was the source of the revival of painting in Italy during the 13th c. After the conquest of Constantinople by the Venetians in 1204, free intercourse sprang up between that city and the cities of Italy; and Greek or Byzantine artists, transferred westward to embellish the Italian palaces, carried with them the canons of ancient Greek art, which quickened the modern school of Italy into life. 'Schools' of P. were early formed in Florence, Venice, Pisa, and Siena. The first name that stands out on the revival of art in Italy is that of Guido of Siena, whose large 'Madonna,' bearing date 1221, is still preserved in his native city. Giunta of Pisa, a painter of frescoes and easel pictures, produced a 'Crucifixion' at Assisi in water-colours in 1236, still extant. Cimabue (q. v.), the first painter among the moderns of great fame, was born at Florence in 1240. He is still classed as belonging to the formal Byzantine school, though his drawing is more correct and his expression more animated than those of the Byzantines generally. Giotto (q. v.), Cimabue's pupil, vastly improved upon his master, and his works mark the first great epoch in modern P. He was the first to throw off the Byzantine trammels, and to seek his inspiration rather from nature than from tradition. Taddeo Gaddi (q. v.) excelled Giotto in colouring and light and shade. Andrea Orcagna (about 1340–75), one of the most eminent among the successors of Giotto,

did not go beyond the founder of the Italian school in P., but was greatly distinguished as a sculptor and architect. He painted a 'Hell' from Dante's *Inferno* at Florence, in which he placed his friends among the blessed and his enemies among the unblessed. Simone Memmi, one of Giotto's rivals, was the well-known painter of Petrarch's 'Laura.' He painted in all the great cities of Italy, and died at Avignon in 1344. About this time the school of Florence, to which all these followers of Cimabue and Giotto belonged, had become famous throughout the whole peninsula, and in 1349 they organised themselves into a society or guild under the name of the Company of St. Luke. A similar guild was established in 1355 at Siena. It is interesting to note that in this era, a good colourist, Cennino Cennini (born about 1360), won for himself the distinction of being the first Italian author on painting. His *Trattato della Pittura* discusses the rudiments of design, colouring, materials and their use, tools, fresco-P., distemper on walls, and perspective, oil-P. with oil thickened in the sun, gilding, distemper ('guazzo') for panels and canvases, the method of preparing grounds, gilding, varnishing, and illuminating parchments, taking casts from life, &c. (see the English translation of Cennino Cennini's *Trattato*, by Mrs. Merrifield, Lond. 1844).

While the Florentines were thus rapidly advancing in art, good progress was being made in the Roman, Umbrian, Venetian, and other schools. Among the Romans, Gentile da Fabriano (q. v.) went far beyond Giotto and his school, and his 'Adoration of the Kings' is now one of the most highly prized of the early pictures in the Academy at Florence. With the establishment of the rule of the Medici in Florence in the 15th c., the Florentine school greatly extended its influence, and the history of the school of Florence becomes the history of P. in Tuscany from this period. P. advanced to a distinctly new and higher stage of development in the beginning of the 15th c., when Pietro della Francesca and Paolo Uccello, by devoting their fine talents to perspective, reduced that principle to a system, and when Masolino brought the mystery of light and shade—formerly but very imperfectly understood—within the comprehension and practice of the period. Masaccio, Masolino's pupil, deserves more than any other individual painter to be called the father of modern P. His style was essentially modern, his composition dramatic, his forms and character individual, his general treatment natural. The twelve frescoes in the Brancacci Chapel (Church of the Carmelites, Florence), a few of which, however, were executed by Masolino and by Filippino Lippi, constituted, until the advent of Raphael, the models for all the great painters of Rome and Tuscany. Masaccio's style of composition and design, not in an altered, but only in an expanded form, was perpetuated in the works of Raphael and the great Romans, who recognised truth in the frescoes of the illustrious Florentine. Among his contemporaries were Fra Angelico (q. v.), Gozzoli (q. v.), Fra Filippo Lippi (q. v.), and his son Filippino. Fra Filippo Lippi excelled in chiaroscuro and colour, and, devoting his chief attention to external qualities, inaugurated the cultivation of the sensuous in art. In this respect he worked in a direction opposite to that of the artistic *religieux*, Fra Giovanni. His 'Martyrdom of St. Stephen' in the Cathedral of Prato, Florence, is considered his masterpiece. He occasionally painted *in oil*, and was one of the first Italian painters to adopt this method. 'This practice,' writes Wornum, 'was introduced into Italy by Antonello da Messina about 1450 or 1455, and was made known at Florence by Domenico Veneziano about 1455–60. Andrea del Castagno obtained the secret from Domenico, and is said afterwards to have killed him, apparently in the year 1463.' Other famous Florentines of this period, the close of the 15th c., are Sandro Botticelli, Raphaelino del Garbo, Domenico del Ghirlandajo (q. v.), Cosimo Roselli, Antonio del Pollaiuolo, Andrea Verocchio, and Luca Signorelli. Meantime the schools of Rome, Venice, Padua, and Bologna had already palpably felt the impulse that had been given at Florence to the revived Italian art. Perugino (q. v.), the master of Raphael, appeared at Rome toward the close of the 15th c.; Giovanni Bellini (q. v.), whose best works consist chiefly of Madonnas and portraits, had already founded a great school at Venice, where, however, he was excelled by Carpaccio. Squarcione led a phalanx of notable painters at Padua, the chief among whom was Andrea Mantegna (q. v.), the founder of the school of Mantua and the greatest painter that had appeared hitherto in the N. of Italy. At Bologna, Francesco Raibolini, commonly called Francia, and originally a goldsmith and niello engraver, had become greatly distinguished in 1490, and a vigorous school had also sprung up at Naples. Up to this point we have considered the development of the art of P. through all its earlier phases of development, and we now come to consider it as an art perfected in all essential principles by the splendid genius of Leonardo da Vinci, Michael Angelo, and Raphael. These men inaugurated a new era in P.—widened its bounds and enlarged its capabilities. Their immediate predecessors, the Quattrocentisti, had devoted their whole energies to the development of form exclusively; but the Cinquecento schools (16th c. men, or men who lived *after* 1500) opened up new ground, and while preserving the traditions of their predecessors added to the hitherto acknowledged canons of pictorial art the novel elements of *ideal selection* of form, dramatic composition, local colour, and light and shade—in other words, they rose to, and in their several ways perfected, the whole circle of qualities which constitute, and also limit, the art pictorial. Da Vinci's 'Last Supper,' painted at Milan in 1497, was the greatest work that had hitherto been produced in P. It was commenced, if not finished, nine years before Michael Angelo drew his famous 'Cartoon of Pisa,' eleven years before Raphael commenced the frescoes of the Vatican, and fifteen years before the completion of the ceiling of the Sistine Chapel by Michael Angelo. For a notice of the works and estimate of the genius of these great painters we refer to the separate articles BUONARROTTI, DA VINCI, RAPHAEL, merely remarking at this point in our historical survey that the last of the famous trio is by general consent regarded as the greatest painter of any age. The three achieved their greatest triumphs in Florence and in Rome; but in the meantime, the Renaissance of P. was evincing itself in the N., where Correggio (q.v.), the brilliant master of light and shade and of colour, and Parmegiano (q. v.), his most distinguished follower, gave birth to and conferred renown upon the schools of Lombardy. At the same period, the beginning of the 16th c., the great Venetian school rose into splendid fame; and in Giorgione (q. v.) and Titian (q. v.), the last great principle of the painter's art—local colouring—was brought to a perfection unsurpassed and unsurpassable. Other most distinguished members of the school of Titian were Pordenone, Paulo Veronese (q. v.), and Tintoretto (q. v.). But the 16th c., which saw the art of P. culminate in the schools of Florence, Rome, and Venice, saw also the commencement of its decline. Chief of the many imitators of Michael Angelo was Fra Sebastiano del Piombo, an excellent colourist, and one of the greatest portrait-painters of his own or any other age. 'There is probably no portrait in the world,' says Wornum, 'that can be compared for dignity and grandeur with the half-length figure by Sebastian of Andrea Doria, now in the Doria palace at Rome.' Other imitators of Michael Angelo were Daniele da Volterra, who died in 1567, and Vasari (q. v.), the historian of Italian art. Meantime successful artistic activity was being carried on in another part of the Italian peninsula, and a school was founded at Bologna by the Carracci (q.v.), the intention of which was, while rejecting the imperfections, to continue the merits of the various schools of Florence, Rome, Venice, &c. Before the Carracci rose into eminence, however, Bologna had had its famous schools. The first of these closed with Francia, whose works are the most perfect specimens extant of the quattrocento style of art, and who died in 1517. Bagnacarallo, who asserted that more was to be learned from Raphael than from nature herself, and who died in 1542, was the founder of the second Bolognese school. Primaticcio (q. v.) and Pellegrino Tibaldi (q. v.), the former the founder of the French school of art, and the latter, called the *Reformed Michael Angelo*, the decorator of the Escorial in Spain, were the immediate precursors of the Carracci, who on their advent in Rome proceeded to establish what is known as the Eclectic or Academic style, and whose greatest pupils were Domenichino (q. v.), Guido (q. v.), Albani (q. v.), one of the first painters of 'cabinet' pictures, and Lanfranco. Following the early example of Titian and Giorgione, Annibale Carracci, and more especially Domenichino, paid great attention to landscape. These Carracceschi, who devoted themselves chiefly to external qualities and accessories, were opposed by the *Naturalisti* and *Machinisti*, among whom technical execution was regarded as the one thing admirable. The more famous of the Naturalisti were Caravaggio (q. v.), Spagnoletto (q. v.), and Guercino (q. v.). Salvator Rosa (q. v.) belongs to

the same period, and in some respects to the naturalistic school, but his genius is too unique for classification. The school is of special interest on account of the influence it exerted on the great Spanish painters. Other masters in the Roman school about the middle of the 17th c. were Andrea Sacchi, his pupils Carlo Maratta and the Frenchmen, Nicholas Poussin (q. v.), Gaspar Poussin (q. v.), and Claude Lorraine (see CLAUDE). N. Poussin's mythological and scriptural pictures are remarkable for their extensive landscape backgrounds. Claude and Gaspar, with widely conflicting ideas of the picturesque, were the painters who first gave themselves up entirely to the worship of nature. Maratta, regarded by many as the last of the great Roman painters, was succeeded by Bentoni and Mengs (q. v.). As a great art capital, Rome has in recent times become the seat of a French Academy and of a Spanish institution, to which Spain sends some ten or fifteen young artists at the public expense. The greatest modern painter associated with Rome was the Spaniard Fortuny (q. v.), the Romanticist, who died in 1874. Considerable sensation was caused by the exhibition at Rome of an ambitious and really great picture by Siemiradzki, a Polish artist, in 1876.

Painting in the N. and W. of Europe.—Of the history of P. in the nations of the N. and W. of Europe, it is impossible within our limits to speak separately. In these countries, down to the period of the decay of feudalism, P., like the other fine arts, was practically unknown, and when at the close of the Dark Ages commerce and the arts arose together, it was from Italy that the painters of the N. and W. derived their instruction and their inspiration. In all these countries the illumination of MSS. and the painting of missals was practised ages before Italian art came to maturity. Art in the N.W. of Europe can only be properly said to have begun with Hubert and Jan van Eyck, the founders of the Flemish school, in the latter part of the 14th c. The greatest successor of Jan van Eyck was Jan Memling (see MEMLING). The earliest distinguished painter of Holland was Dierick Stuerbout, a pupil of the Eycks. His two pictures painted in 1468, and which are in illustration of the Golden Legend (q. v.), are now in the royal collection at the Hague. Lucas von Leyden, one of the best of the old Dutch painters, was also a famous engraver, and his print called the Eulenspiegel is the rarest extant. Other Dutch painters of the Eyck school were Van der Goes, Rogier van der Weyden, Gossaert, and Mabuse. In Flanders the greatest painter of this age was Quentin Matsys, the smith of Antwerp (see MATSYS). Among the earliest German painters were Schaffer, Schön, and Wohlgemuth. Albrecht Dürer (see DÜRER) greatly advanced the arts of P. and engraving in Germany in the beginning of the 16th c.; Cranach (q. v.) of Saxony, his contemporary, had a reputation almost equal to that of Dürer. The school founded by Dürer comprises Hans von Kulmbach, Schäufflein, Aldegraver, Beham, and the most original of all, Albert Altdorfer. Holbein (q. v.) is scarcely inferior in power to Dürer, while he was much more versatile, painting with equal readiness in oil, fresco, and distemper, subjects from history, portraits, miniatures, &c. In the 17th c. the chief German painters, mainly followers of the Dutch and Italian styles of the period, were Joachim von Sandart, Schönfeld, and Roos. Christian Rode, Raphael Mengs, and Tischbein, are the most respectable names in the dreary 18th c. Angelica Kaufmann (q. v.), although German by birth, practised her art in England, and was one of the original members of the Royal Academy. The present century has seen a great revival in German art, and the rise of the celebrated romantic schools of Münich and Düsseldorf. (See CORNELIUS, SCHADOW, VEIT, OVERBECK, &c.) Among the greater modern painters are Kaulbach, Moritz von Schwind, Feuerbach, Hübner, Rethel, and Piloty. In Spain the development of P. was perhaps due, in the first instance, to the immigration of Flemish artists into the country, but was carried on and matured under the influence of Italians of the schools of Venice and Naples. Titian spent several years in Spain, and the Spanish artists travelled and studied in Italy. The principal Spanish artists are Antonio del Rincon, Luis de Vargas (q. v.), Morales (q. v.), Joanes, Cespedes, Roelas, Ribalta, Pacheco, Alonzo Cano, Velasquez (q. v.), Zurbaran, and Murillo (q. v.). Murillo and Velasquez stand out conspicuously as the greatest artists to whom Spain has given birth. In the Netherlands during the 17th c. art was gloriously upheld by Rubens (q. v.), Vandyck (q. v.), Snyders, Jordaens, D. Teniers the elder, and Diepenbeck (q. v.); and by Rembrandt (q. v.), and his followers Gerard Dow, Eeckhout, Bol, and Hoogstraten. Throughout the 17th c. and later there appeared in the Netherlands a whole host of painters in *genre*, which has hence become almost synonymous with Dutch style. The chief of these were the Breughels, Jardin, Wouverman, Pieter de Hooghe, the Ostades, Paul Potter, Jan Steen, Teniers the younger, and Terburg. The principal landscape painters of this school were Bakhuizen, Vandevelde, Berchem, Jan Both, Albert Cuyp, Ruysdael, and Hobbema. The Flemish and Dutch schools produced only imitative and conventional work during the 18th c., but the former, greatly affected by French influence, has started to new and vigorous life within recent years. Besides Alfred Stevens, Knyt, and Florent Willems, settled in Paris, the more notable painters are Madou, Jean and Franz Verhaz, Winne, Van Severdonck, and the brothers Oyens. The modern 'Teruveren school' in landscape, founded by Hippolyte Boulenger (died 1876), comprises Coosemans, Dubois, Verwée, De Hass, and Montigny. Of living Dutch painters, perhaps the greatest are Josef Israels and Alma Tadema, the latter settled in England. In France the prevalent school of P. was derived from the Italian schools. N. Poussin gave a somewhat false character to the art of his country, which is perceptible almost to the present day. Eustache Lesueur (1617–55), called the French Raphael, approached the great Italian more nearly than any of his Italian imitators, in the character of his heads, his composition, draperies, &c. Charles Le Brun (1619–90) chiefly painted battle-pieces, and to this age belong Bourdon the landscape painter, and Bourguignon and Parrocel, famous for *genre* as well as battle-pieces; Hyacinth Pigand, and Watteau (q. v.), perhaps the most famous of all. Gaspar Poussin and Claude Lorraine are to be regarded as Frenchmen, although classed among the painters of Rome. Of the 18th c. the chief French painters were Lemoin, whose fine 'Apotheosis of Hercules' at Versailles contains one hundred and forty-two figures, and is the most magnificent monument of painting in France; Claude Vernet, a remarkable landscape painter; and Greuze (q. v.), famous in *genre*. Of the early part of the 19th c. the chief names are David (q. v.) and his followers Gros (q. v.), Girodet, Guérin (q. v.), Gérard (q. v.), and Géricault. Among the greatest ornaments in the modern Romantic school are Ary Scheffer, Paul Delaroche, Ingres, Delacroix, Vernet, unrivalled for battlefields, Rosa Bonheur for exquisite pictures of cattle and horses, and Troyon in landscape. Art in France has been more fertile in great names during the present century than ever before; and the country is famed for its treatment of landscape, and for the high technical skill of its painting. Among recent artists are Gerôme (q. v.), Meissonier, Doré (q. v.), Th. Roussean, Diaz, Duverger, Billet, Jules Breton, Cavàlier, and Pils.

Painting in England.—Of the early English painters little is known with certainty. What is known as the English school is little more than a century old, and arose partly by the assistance of the foreign artists attracted to the English court, and partly in protest against these intruders. Jan Mabuse, a contemporary of Durer, painted the portraits of Henry VII. and his children. Holbein (q. v.) established himself at the court of Henry VIII., and Elizabeth also liberally patronised foreigners. In the reign of the latter, miniature P., for which the earliest English painters were justly celebrated, was practised by Nicholas Hiliard and Isaac Oliver. Charles I. was a liberal patron of the arts. Among the foreigners that were attracted to his court were Diepenbeck, Rubens, and Vandyck; while among the native artists of the same reign were George Jameson (q. v.), 'the Scottish Vandyck;' Walker and Dobson, portrait painters of great merit; and Stone, an excellent colourist who had long studied in Italy. In the following reign the prominent names are Verrio, Sir Peter Lely (q. v.), Gerard Zoust, and the two Van de Veldes (famous marine painters), the only native artist of note being Samuel Cooper (born 1609, died 1672), who carried the art of miniature P. to its highest perfection. Of one of his miniatures Pepys says, it was 'done so admirably as I never saw anything.' The fact that Sir Godfrey Kneller (q. v.), Sir John Medina, and Jean Baptiste Monnoyer, flourished in the reign of William III. is sufficient proof that native art still lay in bondage. Of the age of George I. Walpole says, 'No reign, since the arts have been in any estimation, produced fewer works that will deserve the attention of posterity.' Jonathan Richardson, a good painter of a head, and, according to Wornum, the best art critic England has yet produced, and Sir John Thornhill, who decorated

the cupola of St. Paul's and the hall of Greenwich Hospital, were the chief native artists. Allan Ramsay (1709–84), painted portraits unaffectedly and with power. But the day of deliverance for British art had at last arrived, and William Hogarth (q. v.), the founder of the English school of P., rose into fame. He threw off the false traditions that had hitherto made British effort powerless; he laughed away the foreigners with the satire of his pen and pencil, he openly ridiculed the 'black masters,' as he called the manufactured, smoky counterfeits of ancient art with which the salerooms of London then abounded, and he took the liberty to think for himself. He himself says he 'grew so profane as to admire nature beyond the finest productions of art.' He revolted against the schools, and took his inspiration from nature at first hand. He was immediately followed by Sir Joshua Reynolds (q. v.), whose graceful composition, rich and mellow colour, and exquisite sense of beauty constitute him the English Titian. Then came in succession Gainsborough (q. v.), West (q. v.), Barry (q. v.), Copley (q. v.), and Romney (q. v.). Reynolds was worthily followed in portraiture by Gainsborough, who was equally great in portrait as in landscape art, and by Dance, Northcote, Opie (q. v.), and Sir Wm. Beechey (q. v.). Fuseli (q. v.), who found but a partial outlet for his genius in art, painted historical and imaginative subjects with wonderful power and suggestiveness, but with scant technical accomplishment. Stubbs, Gilpin, Morland (q. v.), Ward, and Landseer (q. v.), attained brilliant success as animal painters. Sir Thomas Lawrence (q. v.), Raeburn (q. v.), Hoppner, Owen, Martin Archer Shee (q. v.), Thomas Philips (q. v.), Sir John Watson Gordon (q. v.), and Sir Francis Grant (q. v.), are among the great names as portrait painters. J. W. M. Turner (q. v.) made himself acknowledged as 'the greatest landscape painter of his own or any other age;' while in historical and poetical subjects, Howard, Haydon (q. v.), Etty (q. v.), Smirke, Eastlake (q. v.), and the Stothards (q. v.), attained distinction. In *genre*, Wilkie (q. v.), Mulready (q. v.), Bird (q. v.), Maclise (q. v.), Leslie, and Newton, prove that in imagination, humour, and general artistic skill the English school abounds in resource. Constable (q. v.), Copley Fielding (q. v.), Calcott (q. v.), Collins (q. v.), Naysmith (q. v.), Creswick (q. v.), Stansfield, James Ward, Birket Foster (q. v.), Linnell (q. v.), and Lee (q. v.), are classic names in English landscape. David Roberts (born at Edinburgh 1796, died 1864), is undoubtedly the greatest architectural painter that Britain has produced. Scotland may be said to have won a special place for itself in the present day by the vigour and variety of its landscape painting. Thomson of Duddingston was perhaps the first that displayed great genius in this branch of art. Since his time, Sir George Harvey (q. v.), Horatio Macculloch (q. v.), Sam Bough, Macwhirter, Waller Paton, Peter Graham, Colin Hunter, &c., have, either at home or in London, maintained or extended the reputation of their country. The pre-Raphaelite movement, which began about 1849, and was in the heyday of its activity from 1850 to 1860, was perhaps the most unique, powerful, and original impulse that English art ever received. Though it has now almost ceased as a movement, its influence continues to be seen even in the works of those who repudiate its principles. As a protest against conventionalism in idea and execution, it did an immense good. Millais (q. v.) was long its brilliant and daring head; even yet he is its greatest ornament, though no longer identified with its exclusive methods. Holman Hunt (q. v.) is still faithful to its traditions, and it numbers among its disciples such distinguished painters as Dante Rossetti (q. v.), Ford Madox-Brown (q. v.), Whistler, and Burne-Jones. Remarkable for the treatment, in widely differing styles, of figure-subjects, historical and imaginary, are Redgrave, Hamilton, Cope, Dyce (q. v.), Webster, Frith (q. v.), Ford, Leighton (q. v.), Poynter, and Armitage. Alma Tadema is celebrated for beautifully-finished classical pictures; Fildes, for pathetic scenes in humble life; Miss Thompson, who acquired such a sudden fame by her 'Roll-Call' in 1874, for vigorous, tragic battle-pieces. A record of modern art, however brief, would be incomplete without some mention of the wonderful originality and fecundity of our book-illustrators, of whom perhaps the greatest are Millais, Leech (q. v.), Poynter, Du Maurier, Tenniel (q. v.), Frederick Walker, Doyle (q. v.), and Keene. Besides landscape painters, Scotland has many sons who stand high in the art-annals of the country. David Scott (q. v.), 'imperiously original,' grappled with the most daring subjects, and showed a skill only inferior to his ambition. His masterpiece, 'Vasco da Gama encountering the Spirit of the Cape,' is at once grandly pictorial and intensely dramatic. Sir Noel Paton (q. v.) excels in fantastic allegory and fairy tale; Thomas Faed (q. v.) in the delineation of the varying phases of rustic Scottish life. The historical pictures of James Drummond (died 1877) are equally remarkable for their dramatic power and fidelity to circumstance. The reputation of Scottish portrait-painting is at present well sustained by Sir Daniel Macnee, R. Herdman, and Norman Macbeth. Other eminent Scottish painters are Erskine Nicol (q. v.), the Burrs, Orchardson (q. v.), James Archer, Hugh Cameron, M'Taggart, Chalmers, &c.

Water-colour drawing had its origin in the humbler art of the topographer, and began with the tinted representations of antiquarian remains and ancient buildings, and was mainly the offspring of the antiquarianism of the latter part of the last century. The first specimens of the art were careful outline drawings, often finished with the pen, the light and shade being put in in black or grey. Afterwards tints of transparent washes were put in to indicate the local colour of the objects or scenery. The vital undying principle of water-colour drawing was that it necessitated constant reference to nature, and the progress of the art, which is a specially English one, has been carried to a perfection in England undreamt of abroad, and has for that reason been astonishingly rapid. Another reason for its progress here is that this form of art is peculiarly adapted for landscape—for the representation of verdure, foliage, air, distance, mists, and all atmospheric effects; and the climate of Britain, dewy, humid, haunted with cloud and mist-drift, while producing a freshness of verdure which is the wonder of foreigners, offers the best possible facilities for the exercise of this form of P. M. Rouquet, writing in 1755 says, 'Those who excel in landscape P. in England ought to excel all others, as nothing can be so charming as the verdure in that country.' John Cozens, toward the close of the last century, made a great advance in the art of water-colour P., by using a variety of positive, yet transparent colours. Thomas Girtin (born 1773), the first great water-colourist, made a great impression in his day by his bold and vigorous manner. But the full development of water-colour P. is due to Turner, who has raised this form of art to a level with oil P. David Cox (1783–1859), is famous for his shifting aerial effects and transient aspects of English scenery. Ruskin says his foliage is 'altogether exquisite in its impressions of coolness, shade, and mass.' Frederick Walker (died 1875), and G. J. Pinwell (died 1876), both possessed of rare imaginative power, are among the most distinguished of recent English painters in water-colour. See the works of Waagen (q. v.), R. N. Wornum, *The Epochs of P.* (Lond. 1847); Crowe and Cavalcaselle, *The History of P. in Italy* (Lond. 1864); Richard and Samuel Redgrave, *A Century of Painters of the English School;* Professor George Barnard, *Landscape P. in Water-Colours;* Kugler, *Handbook of P., Italian Schools of P.*, edited by Eastlake (1855); his *German, Flemish, and Dutch Schools*, edited by Sir Edmund Head (1846; new ed. by Crowe, 1875); *Spanish Schools and French Schools* (1848); Ruskin, *Modern Painters* (1843–60); W. B. Scott, *Half Hour Lectures on the History and Practice of the Fine and Ornamental Arts* (3d ed. 1874); and Mrs. Charles Heaton, *A Concise History of P.* (Lond. 1877).

Painting, House. This industrial art is concerned with the covering of wood, plaster, and iron-work in various parts of a building with liquid substances, which harden and resist atmospheric influences, mainly for protection from decay, but also for cleanliness and ornament. Besides plain painting, *graining* and *marbling*, by which imitations of fancy woods and marbles are produced, are branches of H. P., while *ornamental* H. P. deals with stencilling, and the painting of decorative designs on plain-painted walls, ceilings, &c., work which requires much artistic skill. The paints employed consist chiefly of white lead or zinc white, mixed up with linseed oil, and stained to the colour required. (See PAINTS and PIGMENTS.) In a few *fancy* colours, and sometimes in the finishing coats of ordinary work, the white base is left out. Turpentine is often mixed with the linseed oil, and when the work is to be finished without gloss the paint for the last or flatting coat, is wholly thinned with turpentine. To cause the paint to dry quickly, substances called *dryers* are added; these embrace litharge, sugar-of-lead, and occasionally Japan varnish. To new wood and plaster-work four or five coats of paint are applied, while for old work two coats are con-

sidered sufficient after dirt and grease are got rid of. Knots in wood are cut out, when bad, and replaced by new wood, or else covered with a composition of red lead; nail holes are stopped with putty, and in general all roughness is removed by the use of pumice stone. For *distemper*, the colours are mixed with size and diluted with water. It is chiefly used for ceilings. In graining, thick oil colour is applied over a prepared surface, and by means of brushes of different kinds, metal combs (for wainscot alone), sponges, and pieces of soft leather, the veins, knots, &c., peculiar to the various fancy woods are closely imitated. Grained work is subsequently varnished. Imitation marbles have the ground prepared of the colour predominant in the natural stone, and the veins are represented by other colours, blended and softened with brushes, the whole being varnished when dry.

Paints or **Pigments** are the insoluble, generally coloured, substances used to form a preservative coating on wood, stone, and metal work, &c., for decorating surfaces, and for producing pictorial effects. The term paint is generally restricted to colours mixed with oil, and prepared for the use of artisan painters; pigments, on the other hand, embrace these and the colours used by artists, those applied in the decoration of pottery and porcelain, and a certain proportion of the substances used in calico printing. P. and P. are most largely derived from the mineral kingdom, but some are of vegetable origin, and a few are produced by the animal kingdom. Many of these, of mineral origin, are highly poisonous, and require to be treated with care in their preparation and use, and especially the arsenical lead and copper colours, which are all of great importance, require to be ground and prepared with great caution. P. and P., for the most part, must undergo a process of grinding to prepare them for use, and that operation, on a large scale, is performed in a colour-mill, which consists essentially of a pair of millstones of cast-iron, grooved and channeled like the stones of an ordinary flour-mill. In the colour-mill the paint is ground up with a sufficient amount of oil to form a stiff uniform paste as it is delivered, and in the case of colours, which are required in a state of very fine division, the pasty mass is afterwards passed between steel rollers set very close to each other. The basis of most of the artisans' paints consists of white lead, to which colouring matters are added, and in the following list are enumerated or indicated the principal painters' colours either used to colour white lead, or by themselves as substantive paints. (1.) *Native mineral colours.*—Italian and other ochres, Terra de Sienna, raw and burnt; Vandyke brown, Sardinian earth, Turkey umber, raw and burnt; oxide of iron, various shades; Indian red, Turkey red, Venetian red, English umber, and siliceous deposits. (2.) *Lakes* (q. v.), crimson, scarlet, purple, light and deep; Hungarian, Victoria maroon; green, dark and light; vermilion, pale and deep. (3.) *Miscellaneous colours*, chiefly artificially prepared from mineral substances, including numerous pigments, which will be found specified according to their colours under the various headings—black, blue, green, red, &c.

Paisiell'o, Giovann'i, a prolific Italian composer, was born at Taranto, May 9, 1741. While a pupil of Durante at the Conservatorio di S. Onofrio, Naples, he distinguished himself by the composition of Church music. His first opera, *La Pupilla*, was produced at the Marsigli Theatre, Bologna, in 1763, and during the next fourteen years he produced no fewer than fifty-one similar works. On the invitation of Catherine II. he went to St. Petersburg in 1777, where he remained for eight years, and where he composed several operas, including *Il Barbiere di Siviglia*, many sonatas, cantatas, &c. He produced the opera *Il Passione* at Warsaw, and twelve orchestral symphonies at Vienna in 1785. He next resided for a number of years at Naples, where he brought out three of his best operas, *La Molinara*, *I Zingari*, and *La Nina*. A funeral march he composed on the death of General Hoche attracted the notice of Napoleon, who summoned him to Paris, appointed him director of music in his chapel, and loaded him with honours. In 1805 he returned in receipt of a pension to Naples, where he died in 1816. P.'s works include ninety-four operas, many minor stage pieces and ballets, thirty-nine masses, a multitude of sacred pieces, and much instrumental music. He excelled in comic opera, and had a fresh and buoyant style.

Paisley, an important industrial town in the county of Renfrew, Scotland, on both sides of the Cart, 3 miles above its entrance into the Clyde, and 7 miles W.S.W. of Glasgow by rail. It is the junction of the Glasgow and South-Western and Glasgow and Greenock railways, and is also connected with the royal burgh of Renfrew and the river Clyde by a branch line from the Glasgow and Paisley joint railway. The river Cart is navigable to the town for vessels drawing 8 feet of water, and along its banks shipbuilding to a considerable extent is carried on. P. consists of an old and a new town, the former situated on and around a hilly ridge on the W. bank of the Cart, and commanding extensive views, the latter is built on a regular plan and on a level site. The Cart is crossed by the railway viaduct and three stone bridges. Adjoining both old and new town are extensive suburbs. The principal modern buildings are the castellated county buildings and prison, erected in 1818 at a cost of £40,000, and extended since at a cost of £15,000, comprising a court-house, council chamber, county hall, jail, and various public offices; the John Neilson educational institution, surmounted by a dome visible from all parts of the town; a grammar school in Gothic style, erected in 1864; and numerous banking offices. A recreation ground, called the Fountain Gardens, gifted to the town by Mr. Thomas Coats of Ferguslee, was opened in 1868, and his brother, Sir Peter Coats, erected a very chaste and elegant structure for a library and museum and presented it to the inhabitants in 1870. The library is supported by a rate under the Free Libraries' Act, and is extensively used. The late George A. Clark bequeathed a sum of £20,000 for erecting a town hall, which sum his brothers have supplemented by an additional £30,000, and an imposing edifice in the Classic style is now (1878) commenced. The late Robert Brodie of Carraigehill left his property, consisting of about 24 acres, for a public park, which has been laid out and planted by the corporation at a cost of £3000, and was opened to the public in the summer of 1877. Mr. Duncan Wright of Alticry, a native of the town, conveyed his estates of Upper and Nether Carswell to trustees to form the 'Duncan Wright educational endowment,' which yields about £450 annually, one-fourth of which is devoted to school bursaries varying from £5 to £10 each, and the remaining three-fourths to college bursaries of £25 each, tenable in both cases for four years. The staple manufactures of P. have varied greatly. In the beginning of the 18th c. they were coarse and chequered linen cloths, and these were supplanted by chequered linen handkerchiefs and striped muslins, called 'Bengals.' Subsequently lighter articles were introduced, such as plain and richly figured lawns, sewing-thread, &c. The manufacture of lawns had increased at the end of last century to the yearly value of £165,000, that of thread to £60,000. The former is now extinct, while the latter has been exchanged for cotton thread, the production of which has become the largest industry in the town. About 350,000 spindles are (1878) engaged in it by two large and five smaller firms. From 6500 to 7000 workers are employed in the thread factories, 90 per cent. of whom are females, and the estimated annual value of the manufacture is very nearly £1,500,000. About the middle of the 18th c. the silk gauze industry was begun, and was prosecuted with such energy that P. soon surpassed Spittalfields in the richness and variety of its silk goods, which supplied various Continental cities, including Paris, and amounted in value to £350,000 yearly. This industry, although it has declined, is still of importance. The manufacture of muslin, formerly extensive, has been transferred to Glasgow. At present (1878) the staple textile manufactures are shawls of silk and cotton, and silk and cotton mixed, and 'Cachmere' shawls of fine wool, the wool being expressly imported from Germany and Australia; woollen scarfs, ladies' dresses, and woollen piece-goods, and tartans for mantles and dresses. The shawl trade culminated about a quarter of a century ago, when its annual value was estimated at £1,000,000 sterling. The manufacture of tapestry has been lately introduced, and employs from 150 to 200 looms. Carpets are also extensively manufactured in the town and suburbs. Other industrial products are soap, starch, corn flour, and chemicals. There are also large dye and print works, power-loom factories, tanneries, bleachfields, and engineering works. Horse races have been held here since 1608, and take place on St. James's Day. P. sends one member to Parliament. Pop. (1871) 48,257; estimated (1878) at 51,000. Wilson the ornithologist, Tannahill, and John Wilson (Christopher North) were born in P. A bronze statue of the ornithologist and a monument to Tannahill have been erected within the past few years.

The *Abbey of P.* was founded in 1169 by Walter, son of Alan, the first Stewart of Scotland. He established at P. a colony of monks of the order of Clugny, whom he brought from the priory of Wenlock in Shropshire. The abbey was largely endowed by Walter and his descendants with lands and churches, chiefly in the counties of Renfrew and Dumbarton. It was dedicated to the Virgin, St. James, St. Mirin, and St. Milburgha. St. Mirin was a missionary from Banchor in Ireland, who first preached Christianity in the neighbourhood of P. St. Milburgha was the patron saint of Wenlock. The abbey was the burying-place of the Stewarts until their accession to the throne of Scotland. King Robert III. was also buried there before the high altar. Many of the abbots—who were mitred—were eminent as statesmen. The last Abbot of P. was John Hamilton, Archbishop of St. Andrews. In 1553 his nephew, Claud Hamilton, a boy of ten, was made abbot *in commendam*. After the Reformation his commendatorship was ratified by the crown, and the temporalities of the abbey were erected into a barony in his favour, and his son was created Earl of Abercorn. The abbey was burnt by the English in 1307, during the war of independence. It suffered greatly in the commotions connected with the Reformation, and was burnt a second time by Lord Glencairn and his followers in 1561. The nave of the church is still in good preservation, and is used as a place of worship. A chapel, dedicated to St. Mirin, and forming part of the transept, is also entire. The remainder of the transept and the choir are unroofed, and used as a burying ground. The nave is as fine a specimen of Pre-reformation architecture as any in Scotland. Its style in general is Early English. It has both triforium and clerestory. There are several sculptures and monuments of interest in different parts of the building. In the centre of St. Mirin's chapel there is an altar tomb of very beautiful workmanship, popularly supposed to have been erected to Marjory, daughter of Robert the Bruce. A series of sculptures representing incidents in the life of St. Mirin are in the same chapel, and are of a very remarkable character. This part of the building is called the 'sounding aisle,' owing to a wonderful echo in it. None of the monastic buildings remain. See the Rev. Dr. Lees' *History of the Abbey of P.* (Gardner, Paisley, 1878).

Pal'ace. See PALATINE HILL.

Palack'y, Frantisek, the founder of the historical school in Bohemia, was born at Hodslavice in Moravia, June 14, 1798. Educated at Trentshin and Pressburg, he commenced his literary career by translations from Ossian (1817), which were followed by *Anfangsgründe der Böhmischen Dichtkunst* (Pres. 1818), *Theorie des Schönen* (1821), and *Allgemeine Geschichte der Aesthetik* (1823). His appointment as tutor to the family of Graf Chotek in Prague (1823) gave him entrance to the circles of the nobility, where he strove thenceforth to rekindle the spirit of Czech nationality. In 1824 P. founded the Matice Czeská, a society for the publication of a native literature; from 1827 to 1838 he edited the Magazine of the Bohemian Museum, in Czech instead of German as heretofore; and during this period commenced his *Geschichte Böhmens* (6 vols. Prague, 1836–73; Czech edit. 3 vols. 1848–57), which gained for him the title of Historiographer to the Estates of Bohemia (1839). He appeared as head of the Bohemian Opposition in 1848, and again in 1860, but in 1872 withdrew from public though not from literary life, his *Politische Testament* (1874) upholding Panslavism with Bohemia as its centre, and denouncing the falseness of the German race. P. died at Prague, May 26, 1876. Amongst his other writings are *Die ältesten Denkmäler der Böhmischen Sprache* (1840), *Der Mongolen Einfall im Jahre 1241* (1842), and *Urkundlichen Beiträge zur Geschichte der Hussitenkriegs* (2 vols. 1873).

Pal'adin (Ital. *paladino*), originally a *Comes Palatii* or Count (q. v.) of the Palace, then one of Charlemagne's peers, as Roland or Oliver; and lastly, in the Italian romances of the later Middle Ages, a knight-errant generally.

Palæog'raphy (Gr. *palaios*, 'old,' and *graphē*, 'writing') is the science of at once deciphering ancient documents and determining their date, origin, and the circumstances under which they were written, by such external and internal evidence as materials (paper, parchment, &c.), handwriting (initials, abbreviations, &c.), orthography, vocabulary, and subject-matter. The importance of such a science has been shown in the case of the Ireland and Chatterton forgeries, and more recently in that of the *Oera Linda Book* (Amst. 1872; Eng. edit. and trans. Lond. 1876). This work, purporting to be a 13th c. transcript of an old Frisian MS. of far higher antiquity, imposed for a time on some of the ablest living scholars, but has now been conclusively proved to have been written by one Gerrit Over de Linde, who died in 1873. The cotton paper of this MS., to which the editor, Dr. Ottema, drew especial attention as being clearly of a date prior to 1256, was declared by Frederik Müller, an eminent antiquarian bookseller, to be of modern Maastricht manufacture, whereas in reality it was brought from China by the seafaring author of the *Oera Linda*. Here we see the caution that must be exercised by palæographists. Of works upon the subject may be noticed the writings of Mabillon, the founder of the science; of Montfaucon, Muratori, Champollion-Figeac, and Tischendorf, Bast's *Commentatio Palæographia* (Leips. 1811), Natalis de Wailly's *Éléments de Paléographie* (2 vols. Par. 1838), Silvestre's *Paléographie Universelle* (5 vols. Par. 1839–45), Westwood's *Palæographia Sacra Pictoria* (1845), W. Forsyth's *History of Ancient Manuscripts*, and Wattenbuch's *Anleitung zur Griech. Paläographie* (Berl. 1867), and *Anleitung zur Lat. Palæographie* (Leipz. 1869). See MANUSCRIPTS, CONTRACTIONS, and PALIMPSEST.

Palæolith'ic (Gr. *palaios*, 'old,' and *lithos*, 'a stone'), the name applied to the races of men that existed in the Post-pliocene age. The absence of metals and the presence of stone implements in deposits of this age indicate a very primitive state. P. man was a contemporary of the Mammoth (q. v.) and other species of extinct mammals.

Palaeol'ogus Constanti'nus XIII., surnamed **Dragases**, the 7th emperor of the dynasty of P., and last of the Byzantine Empire, the 4th son of Manuel II., was born in 1394, and called to the throne by the voice of the people on the death of his brother, Joannes VII., in 1448. He hesitated long to accept a crown which he feared he could not maintain against the Turks, by whose ravages the empire had been reduced to the city of Constantinople and a few places among the islands of Greece. His reign was tranquil until the death of the Sultan, Amurath II., and the accession of his ambitious son Mohammed II., who, however, concealed his intentions until he had completed his preparations. He appeared before the walls of Constantinople, 6th April 1453, at the head of 258,000 men, against whom P. could only oppose an army of irresolute Greeks, aided by Genoese and Venetian mercenaries. The city was taken by storm on the 29th May, and P. fell fighting bravely in the breach amidst a crowd of Janissaries. His body was afterwards discovered, and his head cut off and nailed on the porphyry column in the Augusteum, but was afterwards sent round as a trophy to the principal cities of Asia Minor. See Gibbon's *Decline and Fall of the Roman Empire*.

Palæonis'cus (Gr. *palaios*, 'old,' and *oniskos*, a 'sea-fish'), a genus of extinct ganoid fishes, the remains of which are common in Carboniferous and Permian rocks. The tail is markedly heterocercal, and the teeth are minute and numerous. P. died out in the Triassic period. The genus is included in the family *Lepidosteidæ*, or that represented by the existing *Lepidosteus osseus*, or bony pike of N. America. Its members have well-developed scales of rhomboidal shape, but not overlapping each other.

Palæontol'ogy (Gr. *palaios*, 'old,' *ont-*, 'being,' and *logos*, 'discourse,' 'science'), the division of geological science that deals with the determination of the nature and affinities of *fossil* organisms, with the manner of their preservation, and with the general range and development of animal and plant life in past periods of the earth's history. P. is in fact the botany and zoology of the past. It deals with the *distribution in time* of living organisms, and seeks to construct a record of the ancient life-history of the globe. P. is usually ranked as a branch of geology. That this latter idea is correct is evident from the consideration that not only are the objects which the palæontologist studies derived from the domain of the geologist, but the results of palæontological study serve to elucidate points of material interest in geology, and also aid in the determination of many problems connected with the age, &c., of rocks. The term 'fossil' may be first defined, as it lies at the foundation of the study of P. A *fossil* is the trace of the existence of any living being preserved in the earth. It does not matter whether the fossil is only a fragment of the organism, or has been

much altered by preservation in the earth, or is but little changed from its original state. All such terms as 'sub-fossil,' 'semi-fossil,' and the like, are inexpedient and useless. The merest fragment of a living organism may sometimes suffice for the determination of its characters. Thus a fragment of a tooth may give the palæontologist a definite knowledge of the creature from which it was derived; since from his acquaintance with living animals he is enabled to relate the fossil organism to its nearest living representatives. A fragment of the occipital bone of a mammal, bearing the condyles or articular processes for articulation with the spine, would enable the palæontologist to express a definite opinion regarding the nature of the animal, and to postulate certain characters which he knows invariably accompany the presence of a well-ossified occipital bone with two condyles.

Fossils present themselves under three or four leading forms. The most perfect fossils are those in which the actual organism has been preserved. Fossil skeletons exemplify this first group—the palæontologist dealing with the actual structures which have been petrified and preserved through the infiltration of mineral matter. Trunks of trees and other parts of plants, fishes, shells, &c., may be similarly preserved in this way. A second group of fossils is that in which external or internal casts or moulds of the organisms are found. A shell originally falling into a soft deposit—which, through consolidation, ultimately becomes a solid rock—will be filled up by the soft material of the deposit. This matter becoming hardened, will form a solid cast of the inside of the shell; and if we suppose that the shell itself becomes dissolved by chemical action, the internal cast will remain, and will give an accurate idea of the form of the shell, whilst an *external* cast would also be formed through the pressure of the shell against the clay or other matter which immediately surrounded it. In reference to the complete and perfect preservation of such organisms as bones, teeth, trees, &c., it may be remarked that in many cases the most delicate portions and most minute structure of the preserved organisms may be made apparent by microscopical examination. The fact that microscopic sections may be made of fossil structures has had a most important bearing on the determination of the nature of many fossil structures. Thus the affinities of many fossil plants have been determined from microscopic structure alone; and tooth-like structures (such as those found in the jaws of certain bird-fossils—*e.g.*, *Odontopteryx*), have been ascertained to be bony or osseous in their nature, and to exhibit no structural affinities with true teeth.

Certain broad generalisations are deducible from the casual study of P. (1) It may readily be imagined that it is the *hard parts* of animals and plants which alone possess any definite chance of being preserved in a fossil state. On this account, or rather from the converse reason of their softness, many groups of animals are utterly unknown in a fossil state. Such are the sea-squirts or *Tunicata*, the jelly-fishes, &c.; although, strange to say, there have been found in the Lithographic Slates of Solenhofen in Bavaria impressions of jelly-fishes which had fallen upon the mud of that deposit when in a soft and plastic condition. (2) It is evident that the only rocks in which fossils can occur are the *Aqueous* or Sedimentary formations. These rocks, being formed in water, of necessity receive, along with the materials derived from the land, the bodies of land-organisms; while those of water-living species will similarly fall into the deposits when such species die. No fossils are found in *Igneous* or fire-formed rocks, the circumstances of formation of such rocks precluding the possibility of organisms being preserved in such formations. And in the so-called *Metamorphic* rocks traces of fossils are not common; the changes to which these rocks have been subjected having in all probability destroyed the fossils they may originally have contained. (3) The nature of the fossils included in a rock or rock-system affords a clue to the exact nature of the formation. Thus, if shells of marine species be found as fossils in any particular formation, such a deposit may be regarded as having been of marine origin, and as having been formed from sediment deposited in the sea-bed. If, on the contrary, shells found only in fresh waters are discovered as characteristic fossils of any particular formations, its origin as a lake-deposit may be postulated; and the presence of shells known to inhabit brackish waters would similarly indicate the estuarine nature of the formation. (4) A test of the relative ages and order of formation of the various rock-systems may be found in the history of their fossil contents. When a series of fossils can be shown to be characteristic of any particular formation, and to be limited in its range to such formations, we may deduce the conclusion that widely separated rocks which present a similar assemblage of fossils may be *contemporaneous* with the first beds or strata, although the subject of contemporaneity of strata is a very difficult and undetermined one at present. Certain groups of fossils, moreover, are found to be specially limited to certain rocks. Thus the *Graptolites* (q. v.) are found only in Silurian rocks. The discovery of a single graptolite would therefore at once indicate that the rock from which it was obtained was of Silurian age. And it could even be shown that certain *genera* or kinds of these organisms are limited exclusively to certain beds of Silurian age. These conclusions are founded on data discovered through investigation. They are, as far as they go, tolerably certain, but like every other fact of observation, they are liable to be modified by the progress of research.

The age and order of the rock-systems, as defined by the test of *superposition* and by the combined organic remains, may be stated as follows, beginning with the oldest series:—

Laurentian, Huronian, Cambrian, Silurian, Devonian or Old Red Sandstone, Carboniferous, Permian,	Palæozoic, or 'Ancient Life' Epoch.
Triassic, Oolitic or Jurassic, Cretaceous,	Mesozoic, or 'Middle Life' Epoch.
Eocene, Miocene, Pliocene, Post-Tertiary or Recent,	Kainozoic, or 'Recent Life' Epoch.

The stratified or aqueous rocks are thus arranged, as will be seen from the table, in three well-marked 'epochs.' Of these, the oldest or Palæozoic (beginning with the Laurentian and ending with the Permian rocks) is characterised by the general dissimilarity existing between its fossils and existing animals and plants. Most of the Palæozoic fossils belong to extinct species. In the Mesozoic rocks, which include the Trias, Oolite, and Chalk, the fossils include many extinct types, but evince as a whole a much nearer approach to living species than those of the Palæozoic Epoch; while in the Kainozoic Epoch the fossils mostly belong to living species, or to species that have only 'recently' become extinct.

It may be noted, by way of conclusion to these general observations on P., that the record of life in the past is by no means of perfect or continuous nature. On the contrary, very many serious gaps occur in our knowledge of the succession of life on the globe, and 'the imperfection of the geological record,' as Darwin terms it, is likely to remain a permanent stumbling-block in the way of settling certain aspects of the evolution theory. There can be little doubt, however, that life has been developed upon the earth's surface in a gradual fashion and in an ascending scale. Thus, in the oldest series of rocks, the remains of the lowest organisms only are found; while higher forms of life make their appearance as we advance to more recent deposits. In the Laurentian and Cambrian rocks the chief fossils consist of the famous *Eozoön* (q. v.) or 'Dawn of Life' animalcule; a giant *Foraminifer* (q. v.). In the Lower Cambrian, burrows and tracks of marine worms occur; traces of a supposed Trilobite (*Palæopyge*) (q. v.) are found, and various organisms (*Oldhamia*) (q. v.), &c., which may either be plants or zoophytes, also occur. The Upper Cambrian rocks teem with the remains of Trilobites (q. v.), of marine plants, of Brachiopods (q. v.), &c. The Silurian formations have fossil brachiopods in plenty, sponges, marine plants, graptolites, echinoderms, worm-burrows, trilobites; mollusca (gasteropods, cephalopods, &c.), and fish remains. In the Devonian rocks ganoid fish-remains occur. Corals, echinoderms, sponges, crustaceans, and insects are also found, and the plants indicate the beginning of the luxuriant vegetation of the Coal Epoch which followed. In the Carboniferous series, the characteristic 'Coal Plants' occur, together with sponges, corals, echinoderms, annelids, crustacea, polyzoa in abundance, fishes, amphibians, and probably a few reptiles; the Permian rocks in addition containing true reptilian remains. The Triassic has many characteristic plant-fossils and abundant molluscs; while reptilian remains are common, and birds have

a doubtful place. In the Triassic, however, the first remains of mammals are found. The Jurassic or Oolitic rocks resemble the Triassic closely, but contain an enormous development of reptilian life. One bird (Archæopteryx) occurs as a fossil in these rocks, and the mammals are more numerous than in the Triassic. The Chalk is celebrated for its *Foraminiferous* remains and for its sponges, echinoderms, polyzoa, and cephalopods—the latter being very numerous. Bird-fossils occur in rocks of Cretaceous age in America. The Eocene is rich in vertebrate fossils. Its birds are numerous and its mammals plentiful; and through the succeeding strata the number of species allied to living groups increase in numbers; traces of man's handiwork first appearing during the Post-Pliocene Period, when the mammoth, woolly rhinoceros, cave bears, lions, tigers, &c., also existed.

Palæ'ophis (Gr. *palaios*, 'old,' and *ophis*, 'a serpent'), a genus of serpents, the fossil remains of which are found in rocks of Tertiary age in the United States, and in rocks of a similar age in Britain. *P. typhæus* occurs in the Eocene beds of Bracklesham. Another species (*P. toliapicus*) has been found in the London clay of Sheppey, and is the oldest known example of a fossil snake.

Palæop'teris (Gr. *palaios*, 'old,' and *pteris*, 'a fern'), a genus of fossil ferns, highly characteristic of the Carboniferous period. P. was one of the so-called tree-like or arborescent ferns, and presents, along with such genera as *Caulopteris* and *Psaronius*, a striking resemblance to the tree-ferns found in New Zealand at the present day.

Palæopy'ge (Gr. *palaios*, 'old,' and *pūgē*, 'the rump'), a genus of extinct Crustaceans, the fossil remains of which occur in the Lower Cambrian formations. P. is usually regarded as a *Trilobite* (q. v.), or as nearly related to one. *P. Ramsayi* is the representative species. From the fragmentary and incomplete nature of the fossil, its exact nature is difficult to determine.

Palæosau'rus (Gr. *palaios*, 'old,' and *sauros*, 'a lizard'), a genus of fossil reptiles, allied in some respects to the *Crocodilia*, but regarded as sufficiently distinct from that group to warrant its being classified with the so-called *Thecodont* reptilia of Owen, or with the *Deinosauria* of other writers. The remains of P. occur in 'dolomitic conglomerate' formations near Bristol, the age of these formations being either Permian or Triassic. The vertebræ in P. are *amphicœlous*, that is, are concave at either end; this disposition indicating a mobility of the spine such as is seen in fishes. The ribs were long and bent, and the femur or thigh had a third trochanter. The P. had also well-developed teeth, springing from distinct sockets.

Palæothe'rium (Gr. *palaios*, 'old,' and *thērion*, 'a wild beast'), a fossil genus of quadrupeds, allied to the living tapirs. The remains of species of P. occur in the Eocene and Miocene rocks of the Tertiary period. All the feet had three toes. The teeth comprised six incisors, two canines, eight premolars, and six molars in each jaw. The canine teeth were longer than the others. *P. magnum* is a familiar species. The P. varied in size from a sheep to a horse or cow. In all probability it had a short trunk or proboscis, was herbivorous in its food, and inhabited marshy lands and swamps.

Palæozo'ic. See PALÆONTOLOGY.

Palafox y Melzi, José de, Duke of Saragossa, a famous Spanish General, was born at the Castle of Palafox, Aragon, in 1780. He accompanied Ferdinand VII. to Bayonne, but, on the latter being taken prisoner, fled to Saragossa, by his gallant defence of which town against the French he has gained for himself a historic reputation. Forced at length to capitulate, P. was taken to France and imprisoned for four years in Vincennes. On the conclusion of the Treaty of Valençay, in 1813, he returned to Spain, where from 1814–20 he rendered valuable service as Commander-General of Aragon in suppressing various rebellions. After the death of Ferdinand he attached himself to the party of the Christinos, and was created in 1836 Duke of Saragossa and grandee of Spain of the first order by the Queen-Regent Marie Christine. After this he avoided mixing in politics, and died at Madrid, 16th February 1847.

Palais Royal, a pile of buildings in Paris, now comprising a palace, a theatre, and many brilliant shops and *cafés*. The old palace, originally called the Palais Cardinal, was built (1624–36) by Richelieu, who bequeathed it to Louis XIII., on account of whose occupancy it received its present name. It was given by Louis XIV. to his nephew Philippe, Duc d'Orléans, and became the town residence of the Orléans family. A centre of the gaiety and vice of the pre-Revolution period, it was converted by Philippe Egalité into the chief rendezvous of the revolutionary schemers and demagogues. Confiscated by the Republic in 1793, it was used for the sittings of the tribunes during the Reign of Terror. After serving as the residence of Louis-Philippe from 1814 to 1831, it was greatly damaged during the Revolution of 1848. Under the Second Empire it became the residence of Jerome Bonaparte and his son Prince Napoleon. The buildings were set fire to by the Communists in May 1871, and received much injury, but have been restored since 1873. The garden in the second court, or Cour Royale, measures 700 by 300 feet, and is beautifully laid out in avenues and parterres, and adorned with fountains. On one side is the Théâtre Français, and facing it is the famous Galerie Vitrée ('glass gallery') chiefly occupied by the *cafés*.

Palamcott'ah, a town in the district of Tinnevelly, Madras Presidency, British India, 49 miles N. of Cape Comorin. Pop. (1871) 17,945. It contains the cantonments of a native infantry regiment, and lies a mile S.E. of the civil station of Tinnevelly.

Pálampóre, a town in the district of Kangra, Punjaub, British India, among the lower slopes in the Himalayas, 317 miles S. by mountain passes from the commercial centre of Leh in Cashmere. A fair was established here in 1867, to develop local trade and promote intercourse with Central Asia. In November 1871 it was attended by Lord Mayo. 30,000 people are sometimes present, and goods sold to the value of £30,000. English cloth, metal ware and ornaments are exchanged for shawl wool, ponies, borax, musk, and gold. P. is also a centre of tea-planting industry under European supervision.

Palanqueen (Port.; Javanese, *pálangki*; Hindust. *pálki*), the well-known Indian conveyance, consisting of an oblong box, in which the traveller reclines on a mattress, &c., attached in its framework to a pole, borne on the necks of at least no less than four bearers, whose monotonous chaunt can never be forgotten by those who have once heard it. The natives use similar conveyances, more or less ornamented, especially for marriage processions; but the P. proper was essentially for European use, and the introduction of railways and the adaptation of roads for wheeled traffic have considerably promoted its discontinuance.

Palap'teryx (Gr. *palaios*, 'old,' and *apteryx*, 'the wingless'), a genus of fossil New Zealand birds belonging to the struthious family *Dinornithidae*, and distinguished from the typical Moas (see DINORNIS) by the presence of a back toe. Three species are known.

Palate (Lat. *palatum*, probably allied to *pascere*, 'to feed'), the term used to denote the roof of the mouth. Anatomically, the P. is divided into the *hard* and the *soft*. The former is situated in the front, and the latter in the hinder part of the mouth. The hard P. is bounded in front and at the sides by the sockets of the teeth, while behind it becomes continuous with the soft P. It is covered by the mucous membrane of the mouth, which is closely united to the *periosteum*, or membrane investing the bone. The mucous membrane of the P. is provided with numerous mucous glands, and is covered with *squamous* or *pavement epithelium*. The soft P. is anatomically known as the *velum pendulum palati*. It is a movable fold of mucous membrane, forming a kind of curtain or partition between the mouth and the *pharynx*. Its anterior surface is concave in its undisturbed state; its hinder surface convex, and continuous with the mucous membrane lining the *posterior nares* or hinder nostrils. It is attached by its upper border to the hard P. The *uvula* depends from the middle of the lower border, and two curved folds of mucous membrane, which arch outwards on each side of the uvula, are named the *arches* or *pillars* of the soft P. The mucous membrane of this latter part is thin, and, like that of the hard P., is covered with squamous epithelium. Around the orifice of the Eustachian tube the epithelium is of the *ciliated* and *columnar* description. The soft P. has five muscles on each side, and also close anatomical relations with the *Tonsils* (q. v.), which are situated between the anterior and posterior pillars of the soft P. The tonsils or *amygdalæ* are two glands of a

rounded form, their exact function being undetermined. They, however, secrete a glutinous fluid, which may possibly serve to lubricate the throat.

Deformities of the P.—There are various degrees of congenital deformity in the P. and uvula. The soft P. and uvula are most frequently cleft without the hard P. being divided; occasionally the lip and the hard P. are fissured without the soft one being cleft, and the separation may extend through all the parts to the integuments of the face, giving rise to the complication of hare-lip. The operation for the cure of a cleft in the soft P. is called *staphyloraphy*, and Roux was the first to introduce it as a distinct operation. Roux's operation was modified by Graefe, Warren, and others; but Fergusson introduced a new principle of treatment by dividing the levator palati and the palato-pharyngeus muscles, thus paralysing the movements of the muscles of the P. Since that time, Mr. Smith, by the invention of the gag and the use of anaesthetics, has been enabled to operate in early infancy. Sir W. Fergusson introduced also a modification of the operation of staphyloraphy by osteoplasty. See MOUTH, DISEASES OF.

Palat'inate (Ger. *Pfalz*), a name formerly applied to two German states distinguished as the Upper P. (Ober-Pfalz) and Lower P. (Unter-Pfalz), which were united until 1620. (1) The Upper or Bavarian P. was bounded by Baireuth, Bohemia, Neuberg, Bavaria, and the Nürnberg district, and was a duchy with Amberg as its capital. Its area was 2764 sq. miles. (2) The Lower or P. of the Rhine, belonging to the Rhine electoral circle, lay on both sides of that river, surrounded by Mainz, Würtemberg, Baden, Elsass and Trier, embracing the P. proper or electoral P., one of the most fertile districts of Germany, lying chiefly right of the Rhine, the principality of Simmern, the duchy of Zweibrücken, the half of Sponheim, and the principalities of Beldenz and Lautern. Its area was 3190 sq. miles. Its chief town was Heidelberg. The Counts-Palatine were in possession of the P. and the surrounding country as early as the 11th c. They were among the most important princes of the Empire. In 1156 the Emperor Friedrich I. gave the P. to his half-brother, Konrad of Swabia, who made Heidelberg his seat. In 1215 Duke Otto III. of Bavaria received it on the outlawry of Duke Heinrich of Brunswick, and was succeeded by Ludwig II., 'the Strong,' in 1253, and by Rudolf I. in 1294, who, however, was banished by the Emperor Ludwig. Ruprecht III., who died in 1410, left four sons, of whom Ludwig III. received the Rhenish P.; Johann, the Upper P.; Stephen, Zweibrücken; and Otto, Mosbach. The provinces again united fell in 1559 to Friedrich of the Simmern line, but in 1619 Friedrich V. was deprived of his electorate and possessions by the Emperor. The lower P. was given, at the Peace of Westphalia, in 1648, to his son Karl Ludwig, with whose son Karl ended in 1685 the Simmern line. The P. now passed to Philipp Wilhelm, Count Palatine of Neuburg, who died in 1690, and was succeeded by Johann Wilhelm and his brother Karl Philipp, who died childless in 1742, when the electorate passed to Karl Theodor of Sulzbach, who united the P. to Bavaria. He was succeeded in 1799 by Maximilian Joseph, who was obliged at the Peace of Lunéville, in 1801, to cede to France the part of the P. left of the Rhine, and to Baden, Hessen-Darmstadt, Leiningen-Dachsburg, and Nassau, the part right of the Rhine. By the Treaties of Paris of 1814 and 1815, the P. was once more divided, the largest part being given to Bavaria, and the remainder to Hessen-Darmstadt and Prussia. See Häusser's *Geschichte der Rheinischen Pfalz* (2 vols., Heidelb. 1845).

Palatine, Counties, where the Earl (q. v.) exercised *jura regalia* or independent jurisdiction, corresponding to that of a *Comes Palatii*, were in England formerly three in number—Chester, Durham, and Lancaster, all of them frontier counties. Of these Lancaster alone, forfeited to the crown in the reign of Edward IV., retains its court, the palatine jurisdiction of Chester having been abolished in 1830, and of Durham in 1836. We also find mention of the C. P. of Pembroke and Hexham, dissolved in the reigns of Henry VIII. and Elizabeth respectively, but whether they enjoyed the same privileges as the preceding counties does not appear. In Scotland there were the Earls Palatine of Strathearn.

Pal'atine Hill (*Mons Palatinus*), the highest of the seven hills upon which Rome is built, and the original site and centre of the ancient city, is in the shape of an irregular quadrangle, 1900 yards in circumference and 168 feet above the sea-level. On the north-western slope, according to legend, grew the fig-tree beneath which Romulus and Remus were suckled by a she-wolf. In the times of the republic the P. H. was one of the most aristocratic quarters of the city, and it was chosen by the first Emperors as their place of residence. Augustus and Tiberius dwelt on the western slope, and the eastern side was afterwards covered by Nero's *Golden House*. The name *Palatinus*, derived from *Pales*, a pastoral deity, has passed into almost all modern languages as *palace*, in the signification of imperial residence.

Palay' is an Indian name for *Cryptostegia grandiflora*, a twining shrub, belonging to natural order *Asclepiadaceæ*, and a native of Hindustan. It abounds in a milky juice, which, when exposed for a short time to the sun, is converted into caoutchouc. The stem yields a very fine strong white fibre.

Pale, in Heraldry, one of the greater ordinaries, is a broad stripe placed perpendicularly upon and equidistant from the sides of the shield, of whose surface it occupies one-third.

Pale, English, that portion of Ireland which was held by the English since Strongbow's invasion in 1169, and which John divided into the twelve counties palatine of Dublin, Meath, Kildare, Louth, Carlow, Kilkenny, Wexford, Waterford, Cork, Kerry, Tipperary, and Limerick (1210). On the territory thus divided was imposed the observance of English law, and by the Statute of Kilkenny (1367) the use of the Brehon or native law was made an act of treason, as also was the intermarriage of the English with persons of Irish blood, or the adoption of English children by Irish foster-parents. The term pale is one of considerable vagueness, shifting with the growth or decrease of English supremacy. From the time of Edward III., however, it seldom extended beyond the province of Leinster. In Edward VI.'s reign, in the struggle for a common faith, the population within and without the pale became one, 'not as the Irish nation, but as Catholics.' The term was, however, still employed by Spenser and other writers in a non-political sense, and lives to-day in the phrase 'without the pale of civilisation.' See Goldwin Smith's *Irish History and Character* (1861).

Palea, or **Pale**, the name given to an inner bract or scale in *Compositæ*, *Gramineæ*, and some other plants, when of a thin yet stiff consistence, usually narrow, and of a pale colour. The term *paleaceous*, in botanical descriptions, means of a chaffy consistence.

Palembang', the capital of a Dutch residency of the same name in Sumatra, is situated in the S.E. of the island, on the N. bank of the estuary of the Musi, which is here 100 feet broad, and which enters the sea opposite the large island of Banca. The river, from 40 to 50 feet deep, forms an excellent harbour for the largest vessels, and there is an extensive export trade in rice, benzoin, gum-elastic, raw cotton, rattans, &c. (value 1870, £106,159). The inland river trade is also considerable. The native houses are constructed of bamboos, and raised on posts, but there are various large buildings, including a fort, a mosque, a blind asylum, &c. The inhabitants, mostly Malays, but also comprising many Europeans, Chinese, and Arabs, are skilful workers, and produce carved ivory, embroidered silk, coloured cotton fabrics, gold and silver wares, japanned goods, and cutlery. Pop. 40,000.—The *Residency* lies between those of Djambi on the N., Lampong on the S., and Benculen on the W., and on the E. is washed by the Sunda Sea and Strait of Banca. Area, 61,911 sq. miles; pop. (1874) 508,668. The western boundary is formed by the volcanic mountain range that traverses the island, but great part of the area is low-lying morass thickly clad with jungle, and drained by the Musi and its tributaries, chief of which is the Komering. There are several lakes, the largest being Itam in the S. The higher districts inland are covered with vast forests of cocoa-nut and gum trees, and yield much rice, cotton, sugar, pepper, and tobacco. There are extensive coal-fields, in which occur oil-springs, and among the mineral products are gold-dust, iron-ore, sulphur, and arsenic. The rivers and lakes abound with fish, and the forests are the haunt of the tiger, leopard, panther, elephant, and rhinoceros. The climate is only unhealthy near the swamps, and the temperature in the dry season ranges from 80° to 92° F., and in the wet season from 76° to 80°. The Kubus, a primitive tribe in the N.W., are supposed to be descendants of the aborigines.

Palen'cia, a Spanish town, capital of the province of the same name, lies on the left bank of the Carrion, and is surrounded by ancient walls of immense thickness. The most interesting building is the Cathedral of San Antolia (1321–1504). The first Spanish university was founded here in 1209, but was removed thirty years later to Salamanca. The inhabitants are chiefly engaged in the cultivation of the vine, and in the manufacture of woollen stuffs and leather. Pop. 14,000.

Palen'que, 'the Pompeii of the New World,' a ruined town of Mexico, near the modern village of St. Domingo de P., in the State of Chiapas, and on the river Chacamas. It was discovered in 1750, buried in dense tropical forest, and is of the *pueblo* or village type. There are four or five pyramidal stone terraces similar in form and relative situation to those at Uxmal. One is much larger than the others, and on it are the remarkable structures called the 'palace,' altogether 228 feet long in front, and 180 deep. Most of the buildings, which are solid structures of one storey, are adorned with figures carved in relief, or with stucco figures and hieroglyphics, bearing traces of brilliant colours. The statuary is more akin in freedom and natural grace to that of Greece than to that of Egypt or India. See the works of Stephens, Catherwood, and Morelet.

Palermo, the capital of Sicily, and the fifth largest city of Italy, is beautifully situated on the N. coast of the island, on the W. side of the spacious Bay of P., 135 miles W. of Messina by water, and 60 N.N.W. of Girgenti by rail. Appropriately called 'la Felice,' on account of its magnificent position and delightful climate, it lies in the fertile plain of Conca d'Oro ('golden shell') and is sheltered in the N. by the romantic Monte Pellegrino, a limestone mass 1958 feet high, and inland by an amphitheatre of mountains. The city is 4½ miles in circuit, is girt with walls and entered by sixteen gates. Two fine main streets—the Corso Vittoria Emanuele, stretching S.W. from the sea at Porta Felice to the fortified gates at Porta Nuova, and the Via Macqueda, intersecting it at right angles—divide the city into four nearly equal parts. The houses, most of them externally shabby, are flat-roofed, and have balconies. There are many beautiful squares and promenades adorned with almost tropical vegetation, and with marble statues and fountains. A lack of ancient architectural remains is compensated by the treasures of the famous Museo, and the many interesting medieval monuments. P. is the ecclesiastical, judicial, and military headquarters of the island. Among the churches are the cathedral or church of S. Rosalia, erected (1169–85) on the site of an older structure disfigured by the addition of a dome (1781–1801), but containing royal tombs and valuable sculptures; S. Domenico (1646), the largest church in the city, with accommodation for 12,000 persons; S. Giovanni degli Eremiti, one of the oldest existing Norman churches, and almost Oriental in style, with a bell which was the first to sound alarm at the Sicilian Vespers; and the disused Martorana, dating from the 12th c., rich in mosaics and Arabic inscriptions. On a slight eminence to the S.W. is the Palazzo Reale, a vast building erected originally by the Arabs as a castle, but transformed by the Normans. Its Cappella Palatina, a gem of medieval architecture, is richly encrusted with curious old mosaics and adorned with columns of Egyptian marble. Other notable buildings are the archiepiscopal palace, dating in its present form from the 16th c., with its fine façade; the Palazzo del Municipio, containing Roman antiquities; and the palaces of Chiaramonte, Sclafani, and Patella, all admirable specimens of later medieval architecture. The Museo Nazionale is famous for its splendid collection of ancient sculptures and its gallery of Sicilian pictures. The university, founded in 1394, and restored in 1804, had 340 students in 1875. P. has various literary and scientific institutions, three theatres, and a Flora or public garden, perhaps the most beautiful in Italy, adjoining which are the botanical gardens. The Porto, to the N.E. of the town, is sheltered by a mole 1300 feet long. In front of the town is the recently deepened harbour of La Cala, with the Porto Felice on the right, and on the left the extensive fort of Castellamare, almost entirely destroyed in 1860. In 1874 there entered the port 6171 vessels of 814,226 tons (382 British of 250,901 tons), and the exports were chiefly oranges and lemons, wines, oil, sulphur from the mines of Larca (14,000 tons), and shumac (100,000 bags). The manufactures are silks, cottons, jewellery, iron wares, coral ornaments, &c., while there is considerable shipbuilding, stone-dressing, and tunny
dine fishing. The environs of P. abound in o
interest, among which are the great cathedral of
(q. v.), the old Arabic châteaux of La Cuba and La
the cave of S. Rosalia, the patron saint of the city,
Pellegrino. The festival of S. Rosalia (11th to 1
accompanied by horse-races, processions to the chap
saint, and illuminations, &c., attracts a vast concourse
people. That it may be celebrated with becoming spl
municipality usually contributes some 5000 francs
penses. The climate is usually mild and humid, the
ture averaging 52° F. in January; but in summer,
when the sirocco prevails, the heat is intolerable. P
186,145. P., the ancient *Panormus* (Gr. 'entirely har
probably of Phœnician origin (the Phœnician name,
found on coins, means 'a camp'), but is first known
as one of the most important strongholds of the C
invaders. It was taken by the Romans in the first
(254 B.C.), and became one of their chief naval statio
the island formed part of the Eastern Roman Empire,
by the Arabs in 831, and subsequently fell to the N
1072. The French held it from 1266 to 1280 (see
VESPERS). In 1269 Charles of Anjou removed h
Naples, and later P. was the residence of the Aragon
The Bourbon Ferdinand IV. took up his quarters h
expulsion from Naples in 1799. After various abort
the inhabitants, on the landing of Garibaldi at Marsa
finally threw off the Bourbon yoke, and by an
plébiscite joined the city to the kingdom of Italy. T
are still sadly infested by brigands. See Oppermann
(Bresl. 1860).

Pal'estine, or **Phil'istia**, originally the name of t
of the Philistines (q. v., *cf.* Ex. xv. 14; Is. xiv. 29, 31
4), was latterly applied to the whole country so lon
by the Israelites or Jews, other names for which wer
of Canaan (Num. xxxii. 30), Land of Promise (Heb.
Gen. xiii. 15), Land of Israel (1 Sam. xiii. 19; M
Judea, and the Holy Land. This last name, which
used by Zechariah (ii. 12), has been a favourite one
tians from its being the birthplace of our Saviour.
graphical position of P. is peculiar. The Jews reg
the centre of the earth, and it is exactly in the po
which there is the nearest access to Europe, Asia, a
hence, from the time of Chedorlaomer (Gen. xiv. 1
Napoleon Bonaparte, it has enjoyed the unenviable
being one of the great battlefields of the world.

Physical Geography.—P. proper is the narrow str
lying between the Jordan and the Dead Sea on the
Mediterranean on the W., to which there has al
attached a narrow strip with indefinite boundaries on
of the Jordan; forming altogether a country about
Wales, less than 140 miles in length, and 40 in averag
The most characteristic of all the features of the cou
Jordan valley, by which it is cut off from the mainla
and which is in reality part of a ravine which
Lebanon to the head of the Gulf of Akaba. T
is filled up at both the extremities of the country, a
dan, rising at the northern end, is dammed back at th
into the Dead Sea, so that it belongs with its three lak
to P. Through the whole length of the country,
mountains of Lebanon to the southern end of the D
runs an irregular mass of hills of no great height, which
where intersected by ravines, in some cases widened int
formed by mountain torrents. This range, being n
Jordan, leaves room for a plain which runs along the
whole way, except where, opposite the Sea of Galilee,
rupted by the range of Carmel (q. v.), stretching out
central highlands to the sea as if to make room for th
Esdraelon (q. v.), which here extends from the Mediter
the Jordan. The average height of the central region i
1800 feet above the Mediterranean. A few of the high
are Jebel Jermuk, about 4000 feet; Safed, 2775;
Gerizim, both about 2700; Singil, near Shiloh, 3108
of Olives, 2724; Hebron, 3029. The portion of P.
of the Jordan consists of a plateau about 2000 to 3
height, cut by many ravines formed by mountain
descending to the Jordan.

The general aspect of the country has changed very materially from what it was in the early days of the Jewish State. When invaded by the Israelites under Joshua it was a well-wooded, well-watered country, producing grain and fruit in abundance—'a land flowing with milk and honey.' There are traces even yet of the former fertility of the country, *e.g.*, in the rich pastures of Sharon, Moab, and Gilead, the evergreen shrubberies of Carmel, the oak forests of Bashan, and the great profusion of flowers everywhere. The cutting down of the timber has doubtless changed the climate, and rendered the country less productive, and the insecurity of life and property under an unsettled government, which has prevailed so long, has discouraged the inhabitants from making the most of its capabilities. The rounded hills, which used to be clothed with vineyards to their summits, now show nothing but gray limestone rocks or gray shrubs, the soil being all washed off the neglected terraces. Even the plains are little cultivated, and are bleak and desolate looking. As a natural consequence of its unproductiveness the country is now very thinly populated. This also is in strong contrast with the dense population of former times, of which there are abundant traces in the ruins of towns and villages which everywhere abound.

The climate of P. is remarkable for the great variety of temperature that prevails within such narrow limits. Between the perpetual snows of Hermon and the tropical heat of the shores of the Dead Sea, there are to be found, among the hills of Bashan, of Galilee, Ephraim, and Judah, and on the coast plain, or even almost in passing from the source to the mouth of the Jordan, all the kinds of climate to be found in passing from the frigid to the torrid zone. Consequently the summer heat varies greatly in different localities. No rain falls from June to September. A small quantity falls in October, and the next four months form the rainy season. Seed-time for the different grains, and in different localities, extends from October to January, and harvest from March to June.

The variety of climate which has been mentioned produces a corresponding variety of animal and vegetable life. The animals, both wild and domesticated, and the plants, both wild and cultivated, include most of those to be found in Europe, besides the local Asiatic fauna and flora.

Geology.—The prevalent rock of P. is a limestone, the numerous caverns in which have always formed a striking characteristic of the country, being used by the inhabitants as tombs (*cf.* Gen. xxiii. 19; John xi. 38), granaries, and temporary dwellings (*cf.* Gen. xix. 30; Judg. vi. 2; 1 Sam. xiii. 6, xxii. 1, xxiv. 3). This limestone is in several places—*e.g.*, in Bashan, on the W. side of the Jordan, and S.W. of the Sea of Galilee—overlaid by basalt, which has been erupted from numerous volcanoes, which, however, have been extinct for ages. That earthquakes were a familiar phenomenon is proved by many allusions to them in Hebrew literature (*cf.* Ps. xlvi. 2, cxiv. 4–6; Isa. xxiv. 20; Hab. iii. 6–8), as well as by those that are actually recorded (*cf.* Amos i. 1; Zech. xiv. 5; Jos. *Ants.* xv. 5, 2, &c.). The numerous hot, sulphurous, and salt springs which are found in the Jordan valley are an indication that the same agency is still in some degree active.

Political and Historical Geography.—When the Israelites arrived at P. from Egypt, the country was in the possession of a number of tribes, the boundaries of whose territories cannot be exactly defined. (See HITTITES, HIVITES, AMORITES.) The two Hebrew tribes of Reuben and Gad and the half tribe of Manasseh settled on the E. of the Jordan, in the territories of Sihon and Og. In P. proper, the region lying due W. of the Dead Sea was allotted to the tribe of Judah, with which were amalgamated the tribes of Dan and Simeon. N. of this lay the narrow strip of Benjamin. Between Benjamin and the plain of Esdraelon lay the portions of Ephraim and the other half tribe of Manasseh. The region between Carmel and the Sea of Galilee fell to the two tribes of Issachar and Zebulon; and that to the N., as far as the mountains of Lebanon, to Naphtali and Asher—the former next the Jordan, and the latter next the sea. On the death of Solomon (B.C. 976) the country was divided into two kingdoms, the boundary between which was the northern border of Benjamin—Judah in the S., with Jerusalem (q. v.) for its capital, and Israel in the N., with Shechem (q. v.), and afterwards Samaria (q. v.), for its capital. The northern kingdom was obliterated by the Assyrian conquest of Shalmaneser (B.C. 721), the southern, by Nebuchadnezzar (B.C. 606); after which, notwithstanding the return of a number of Jews (q. v.) to Jerusalem (B.C. 536), the country continued to form a part of a Persian satrapy till the conquest of Alexander the Great (B.C. 332). During this period the Moabites (q. v.) and the tribe of Bashan took possession of their old territory E. of the Jordan; the Edomites (q. v.), pressed by the Nabatheans (q. v.) from the E., encroached on the south of P., which was thus included in the territory of Idumea (q. v.); while the neighbouring tribes did the same in the N., so that there always remained a large Gentile element in that part. On the death of Alexander, P. formed first a part of the empire of Egypt and then (from B.C. 198) of Syria. The independence of the country was again established by the Maccabees (B.C. 165), but in B.C. 63 it was conquered by the Romans, to whom it remained subject till the Mohammedan conquest (A.D. 637). As described in the New Testament, under the Herodian princes, the country W. of the Jordan was divided into the three provinces of Judea in the S., Galilee N. of Carmel, and Samaria in the middle. The trans-Jordanic part as far N. as the Sea of Galilee formed the province of Perea; and N. of that were the regions of Gaulonitis, Iturea, Auranitis, Trachonitis, and Batanea. After 637 P. formed a province of the Saracen Empire. From 1099 to 1291 it was nominally a Christian kingdom under the Crusaders; and since 1517 it has formed part of the Ottoman Empire. The modern population has been estimated at about 824,000, of whom about 80,000 are Christians, 12,000 Jews, and the rest Mohammedans. Jerusalem has about 20,000; and the only other towns of any importance are Gaza, Joppa, Acre, and Nabulus. A very great amount of light has been shed on many points of Jewish topography and history by the labours of the 'Palestine Exploration Fund' (organised 1865) and the 'American Palestine Exploration Society' (organised in 1870). The triangulation of Western P. was begun in 1871, and is now (1878) completed. See Kitto's *Cyclo. of Bib. Lit.* (new ed. Edinb. 1876); Smith's *Dict. of the Bible* (Lond. 1863); Robinson's *Biblical Researches*, &c. (2d. ed. 1856); Porter's *Handbook of Syria and P.* (Lond. 1858; new ed. 1875); Thomson's *Land and the Book* (Edinb. 1866); *Our Work in P.* (1873), by the 'English Exploration Fund;' Stanley's *Sinai and P.* (Lond. 1864); Karl Ritter's 'P.' from his *Erdkunde*, translated by W. L. Gage (4 vols. T. & T. Clark, Edinb.); Baedeker's *Palestina und Syrien* (Leips. 1875; Eng. trans. 1876); which contains the freshest and most accurate information regarding the present condition of the country.

Palestri'na, a town of Italy, 22 miles E.S.E. of Rome, is built on the S.W. slope of an offset of the Apennines (2546 feet), which is crowned by the medieval Castel St. Pietro. It contains a cathedral, the remains of cyclopean walls, and the Palazzo Barberini, with statues, paintings, and mosaics. Pop. (1874) 6015. P. occupies the site of the ancient *Præneste*, the most ancient and important of all the Latin cities, which seceded from the Latin League and allied itself to Rome (499 B.C.), was destroyed by Sulla (82 B.C.), but under the emperors became a favourite summer resort, being the occasional residence of Augustus, Horace, and Hadrian. The ruins of its famous Temple of Fortune were demolished by Pope Boniface VIII. in the 13th c., but those of Hadrian's villa may still be seen. In the Middle Ages P. belonged to the Colonnas, whose conflicts with the popes led to its second destruction (1436), and who sold it to the Barberini (1630). Excavations here have yielded the 'Antinous Braschi,' now in the Vatican, and numerous other treasures of antiquity.

Palestri'na, Giovanni Pierluigi da, the greatest composer of the 16th c., was born at Palestrina (q. v.) in 1524. He was sent to Rome to study under Claude Goudimel in 1540, and in 1551 became chapel-master in the Julian Chapel. He resigned this appointment in 1555, and was afterwards attached to the churches of St. Giovanni di Laterano and Ste. Maria Maggiore. For the latter he composed in 1560 the *Improperia*, which has ever since been performed every year on Good Friday. About 1565 he produced three masses—the *Missæ Papæ Marcelli*—which created quite a revolution in sacred composition, and were regarded as prodigies of musical art. These and a second book of eight masses in 1570 he dedicated to Philip II. of Spain. The authorities of the Church, struck with the vulgarity and impiety of the compositions then in vogue, had determined on a return to the simple Gregorian chant, when the devout style and pure harmonies of P. recalled them to a sense of the majestic power

of noble music. P. was one of the founders of the celebrated musical school at Rome established about 1571. He died 2d February 1594, and was buried in the Church of the Vatican. He left thirteen books of masses, two volumes of motets (including the famous *Popule Meus*), two volumes of litanies, a Stabat Mater, a volume of sixty-eight offertories, and a great variety of other music. See the Abbé Baini's *Memorie storico-critiche della Vita e delle Opere di Giov. P.* (Rome, 1828; Leips. 1834).

Pales'tro, a village of Piedmont, Italy, 18 miles S.E. of Vercelli, was the scene of a double victory won by the Franco-Sardinian troops over the Austrians, 30th and 31st May 1859.

Pal'ette, a thin oval board of hard wood, or a similar shaped porcelain slab with a thumb-hole in it near one extremity, used by artists for mixing and preparing their colours in painting. A thin steel blade with a wooden handle, used for mixing paints with oil, is called a *P. knife.*

Pa'ley, William, D.D., an English theologian and ethical writer, was born at Peterborough in July 1743. After having been carefully educated by his father, who was a Yorkshire schoolmaster, he entered Christ's College, Cambridge, as a sizar in 1759, and took his degree of B.A. with highest honours in 1763. After having spent three years as an assistant-teacher in Greenwich Academy, he was elected fellow of his college in 1766, took the degree of M.A., and removed his residence to the University, where he remained for the next ten years. P. now married, and having in consequence to give up his fellowship, was appointed vicar of Dalston in Cumberland, and Appleby in Westmoreland. In 1780 he became Canon of Carlisle, in 1782 Archdeacon, and in 1784 Chancellor. In 1793 he obtained the vicarage of Stanwix, near Carlisle, and vacated that of Dalston. The year following he was appointed prebend of St. Pancras, London, and was soon after promoted to the sub-deanery of Lincoln. The degree of D.D. was conferred on him by the University of Cambridge in 1795, on his being presented by the Bishop of Durham to the rectory of Bishop Wearmouth. He died 25th May 1805. P. was a man of genial temperament and original character, who knew how to use life without abusing it, and who placed more stress, both in his works and by his own example, upon the useful practice of virtue than upon a profession of exalted religious enthusiasm. His writings, original in form rather than in matter, are distinguished by rare clearness of thought, vigour of style, and an unsurpassed felicity of illustration. He is one of the ablest expositors of that popular philosophy which relies upon the principle of final causes to establish the existence and attributes of God. As a Christian apologist, P. exercised the greatest influence upon the mind of his age, though many of his arguments, then considered irrefutable, have failed to meet the demands of modern scepticism. His chief works are *Elements of Moral and Political Philosophy* (1785); *Horæ Paulinæ, or the Truth of the Scripture History of St. Paul, evinced by a Comparison of the Epistles which bear his Name with the Acts of the Apostles, and with one another* (1790); *A View of the Evidences of Christianity* (1794); *Natural Theology, or Evidences of the Existence and Attributes of the Deity* (1802); a work largely founded on the Dutch mathematician Nieuwentyt's *Het regt Gebruik der Weltbeshouwingen,* which appeared in English under the title of *The Religious Philosopher* (1718). A collected edition of P.'s works was published in 1838 by his son, in 4 vols. 8vo. See Meadley's *Life of W. P.* (1809). His grandson, **Frederick Apthorp P.,** became a convert to Roman Catholicism in 1846, and has since 1874 occupied the chair of classical literature in the Catholic University College at Kensington. He has gained for himself a high reputation as a translator and editor of the classics, and has also written with success upon architecture and botany.

Palghaut', a town in the district of Malabar, Madras Presidency, British India, 332 miles S.W. of Madras by rail, and 74 miles from the W. terminus of the railway at Beypore. Pop. (1871) 30,752. It occupies an important position, commanding the only pass across the steep range of the W. Ghauts, and contains a strong fort built by Hyder Ali; but is now best known for the export of timber, chiefly teak, and its transit trade.

Pal'grave, Sir Francis, the son of a Jewish stockbroker, Mr. Meyer Cohen, was born in London, July 1788. He was a solicitor's clerk (1803–22), embraced Christianity and assumed the name of P. (1823), was called to the bar (1827), and knighted (1832), in recognition of the services rendered to antiquarian and constitutional knowledge by his *Parliamentary Writs* (2 vols. 1827–34), *History of England* (1831), and *Rise and Progress of the English Commonwealth* (1832). He served on the Municipal Corporation Commission (1833–35), and was Deputy Keeper of the Public Records from 1838 till his death at Hampstead, July 6, 1861. Among P.'s other works were *Rotuli Curiæ Regis* (2 vols. 1835), *Calendars and Inventories of the Exchequer* (3 vols. 1836), *The Merchant and the Friar* (1837), *The History of Normandy and of England* (4 vols. 1851–64), and numerous articles in the *Edinburgh* and *Quarterly,* a list of which is given in the *Gentleman's Magazine* (October 1861).—**Francis Turner P.,** a son of the preceding, was born in London, September 28, 1824, and educated at the Charterhouse. He became a scholar of Balliol College, Oxford, and a fellow of Exeter, was for five years vice-principal of the Schoolmasters' Training College at Kneller Hall, and has since been private secretary to Earl Granville, and has filled a post in the Educational Department of the Privy Council. He is author of *Essays on Art* (1866), a capital fairy story—*Five Days' Entertainments at Wentworth Grange* (1868), and *Lyrical Poems* (1871), but is best known by his exquisite collections, *The Golden Treasury* (1861), and *The Children's Treasury of Lyrical Poetry* (2 vols. 1875), and by his editions of *The Sonnets and Songs of Shakespeare* and *Selected Lyrical Poems of Herrick* (1877).—Another son, **William Gifford P.,** born in Westminster, January 24, 1826, passed from the Charterhouse to Trinity College, Oxford, where he graduated with first-class honours (1846). He served in the Bombay Native Infantry from 1847 to 1853, when, having become a Catholic, he resigned his commission, entered the Order of Jesus, and after studying theology at Laval in France was ordained priest, and sent as a missionary to Damascus. Here he acquired that thorough mastery of Arabic and Mohammedan theology which enabled him to undertake, at the expense of Napoleon III., a daring expedition through the Wahabite kingdom of Central Arabia. This he successfully achieved (1862–63), disguised as a physician, and returning to Europe, quitted the Order of Jesus (1864), and was sent out to Egypt by the English Government (1865), to treat for the release of the Abyssinian captives. He was appointed British consul at Soukhoum-Kalé (1866), at Trebizond (1867), and at St. Thomas in the West Indies (1873). Besides his great work, *Personal Narrative of a Year's Journey through Central and Eastern Arabia* (2 vols. 1865), P. has published *Essays on Eastern Questions* (1872), *Hermann Agha: an Eastern Narrative* (2 vols. 1872), *Alkamah's Cave: a Story of Nejd* (1875), and *Dutch Guiana* (1876).

Pa'li, the classical language of Buddhist literature, in which are written the sacred, metaphysical, and historical works. The earliest P. alphabet is that found in the inscriptions of Asoka (3d c. B.C.), first deciphered by James Prinsep; but European scholars have agreed to write the language in Roman characters. It is manifestly derived from a vernacular corruption of the ancient Sanskrit, carried to Ceylon, Burmah, and Siam, when the Buddhists were expelled from India; but it nowhere now survives as a spoken tongue. It is still studied by the native Cingalese scholars, and the knowledge of it was introduced into Europe by Lassen and Burnouf. But the great store-house of information is the *P. Dictionary* (2 vols) of the late Mr. R. C. Childers, published in 1875. This learned gentleman, who had been in the Ceylon Civil Service, was sub-librarian at the Indian office, and Professor of P. and Buddhist Literature in University College, London. His *P. Grammar* was not completed before his premature death in July 1876. Other eminent students of P. are Keru, Koeppen, Gogerly, Fausböll, Rhys Davids, and Sir Coomara Swamy.

Palikao, Cousin Montauban, Comte de, was born in Paris, 24th June 1796, and acquired the rank of a general of division in Algeria, where he served with distinction for twenty years. He commanded along with Sir Hope Grant and Sir Robert Napier in the Anglo-French invasion of China in 1860, and subsequently received his title from the great victory of Pa-li-kao (21st September). His 'looting' of the imperial summer palace was the subject of unfavourable criticism at the time. During the Franco-Prussian war he succeeded Ollivier as Prime Minister, 10th August 1870, but had to make way for the Republic on the 4th September following. The charges brought

against him by the radical press he successfully repelled in *Un Ministère de Guerre de Vingt-quatre Jours* (1871.)

Palimp'sest (Gr. from *palimpsēstos*, 'scraped again'), is a parchment from which one writing has been erased to make room for another. The most ancient MSS. now existing are written on vellum, the prepared skins of very young calves, parchment, the prepared integuments of sheep, goats, and paper made from the reed papyrus, which was in common use long before the time of Herodotus (440 B.C.). Cotton and linen paper were manufactured as early as the 10th and 12th centuries A.D. respectively. But as none of these seem ever to have been plentiful, and vellum especially was always scarce and dear, the practice arose of erasing ancient writings from vellum and parchment to make room for others. This became especially common when the supply of papyrus from Egypt was cut off by the Mohammedan conquest in the 7th c. The process of erasure, however, was seldom so complete that the old writing did not appear more or less distinctly under the new. Now as MSS., as a rule, are of greater value the older they are, it is the partially-erased writing on a P. that is of most importance and value, and it is this which is always understood to be referred to in speaking of one. Some of the most valuable MSS. of the Scriptures are of this kind. Scholars, both Biblical and classical, have accordingly bestowed great pains in deciphering P. MSS., and by chemical and other treatment of them have generally succeeded in restoring the erased writing so far as to be legible.

The first P. published was a fragment of the 91st book of Livy's *History*, which was discovered in the Vatican by a German scholar, Dr. Paul Bruns, and published at Hamburg 1773. Fragments of the Gospel of St. Matthew were next published (1801) by Dr. Barret from a P. in the Library of Trinity College, Dublin, which is assigned to the 6th c. Perhaps the greatest name in the discovery and deciphering of palimpsests is that of Angelo Mai (q. v.). Among his important 'finds' in Greek were fragments of most of the Greek writers on Roman history, which are contained in the fifth volume of his *Scriptorum Veterum, nova Collectio* (Rome, 1831–38); in Latin, parts of the writings of Cicero, the comedies of Plautus, the works of Cornelius Fronto, &c. Niebuhr discovered part of the Institutions of Gaius, and Dr. Cureton nearly 4000 lines of the *Iliad* hidden under Syriac MSS. The most important P. in existence, as it is one of the most valuable MSS. of the New Testament, is the *Codex Ephræmi* in the National Library, Paris. The original writing, which consists of fragments of the LXX. and of every part of the New Testament, is assigned to the first half of the 5th c. In the 12th c. this was effaced and written over with the Greek works of Ephræm Syrus (q. v.). The MS. was brought from the E. to Florence in the beginning of the 16th c., and from thence to Paris by Catherine de' Médici. The New Testament part was published by Tischendorf in 1843, and the Old Testament in 1845. Another very valuable P. was brought to England in 1847 from a convent in the Nitrian desert, deposited in the British Museum, and deciphered by Tregelles (1854) and Tischendorf (1855). The original writing (of the 6th c.) contains the Gospel of Luke, but this was covered in the 9th c. or 10th c. by Syrian writing. A P. in possession of the Bible Society of London also contains important fragments of Luke, probably written in the 8th c., but written over with a Greek Lectionary of the 13th c. A multitude of less important P. MSS., both in Greek and Latin, are to be found in the libraries throughout Europe, as well as in this country. See Scrivener's *Introd. to the Crit. of the New Test.* (Camb. and Lond. 1861); Tischendorf's *Cod. Ephræmi, Prolegomena* (1843); *Monumenta Sacra inedita* (1860); and Dr. F. Mone's *De Libris Palimpsestis tam Latinis quam Græcis* (Karlsruhe, 1855).

Pal'indrome (Gr. *palin*, 'backwards,' and *dramein*, 'to run;' Low Lat. *versus cancrinus*, 'crab's verse'), a species of verse the origin of which is ascribed to Sotades, a Greek poet of the 3d c. B.C., in which the letters read the same backwards as forwards, *e.g.*, the line quoted by Sidonius Apollinaris, *Roma tibi subito motibus ibit amor;* or Taylor the Water Poet's 'Lewd did I live, & evil I did dwel.' In the chanson of Baudoin de Condé, a French poet of the 13th c., only the words can be read backwards:—

'Amours est vie glorieuse
Tenir fait ordre gracieuse
Maintenir veult courtoises mours.'

Palingene'sia (Gr. *palin*, 'again,' and *genesis*, 'birth'), in the New Testament denotes (1) regeneration, or the new birth—that is, the change from a carnal nature to the Christian life (Tit. iii. 5); (2) renovation, restoration—that is, in the Messiah's kingdom, or perhaps simply the resurrection (Matt. xix. 28). In the early Church it was sometimes used as a name for Baptism, in reference to Tit. iii. 5. In the Stoic philosophy (*cf.* M. A. Antoninus) P. meant the periodical renovation of all things by which they are first dissolved into the principal elements of which they are composed, and then rebuilt or revivified into new forms.

Pal'inode (Gr. *palinōdia*) originally denoted the recantation of an ode or poem by another. The use of the term was strictly literary; but it has been adopted into Scotch law. In an action for damage on account of defamation before the Commissary Court (q. v.), it was the practice in Scotland to demand not only damage and expenses, but a judicial recantation or P., and the practice is held to be still competent by the law of Scotland.

Palinu'rus, a genus of *Decapodous* crustacea, including the *P. vulgaris* or Spiny Lobster, frequently exposed for sale in the markets under the name of 'sea cray-fish.' It has a spiny carapace or shell, with three prominent spines in front. The members of the family *Palinuridæ*, of which P. is the type, are distinguished by their long and cylindrical body. The outer antennæ is very long and thick, and its basal joint is large. The walking feet are terminated by a single claw, and the sternal plate is wider than in the common lobster. The claws are not large. The spiny lobster occurs most frequently on the S. and W. coasts of Britain. Its flesh is palatable, but is reckoned somewhat coarser than that of the lobster. An average specimen will weigh 4 or 5 lbs. and attain a length of from 16 to 18 inches. Its colour is a purple brown beautifully variegated with lighter spots and markings. *P. ornatus* is a species which may attain the enormous length of from 3 to 4 feet.

Palisan'der Wood is a name used in France for Rosewood (q. v.), and is sometimes also applied to striped ebony and violet-wood or Kingwood (q. v.).

Palissy, Bernard, a famous French ceramic artist, was born at Saintonge, near Agen, about 1510. Of humble parentage, he was early apprenticed to a potter, but acquiring a knowledge of geometry, became a land-surveyor, and travelled much in France and Germany. The chance sight of an enamelled cup turned his attention seriously to pottery, and for sixteen years he inflexibly pursued the art amid the utmost discouragements of poverty and ridicule. At last fame dawned on him, bringing wealth and court favour, and he is now recognised as one of the greatest artists of the French Renaissance. As a Huguenot he was imprisoned in 1562, but liberated on the intercession of Montmorency, and subsequently, by express order of Catharine de' Médici, exempted from the massacres of St. Bartholomew. He did much to bring about a truly scientific study of physics and natural history, and anticipated many recent discoveries. In 1588 he was again arrested as a heretic and thrown into the Bastille, where he lingered till his death in 1590. P. is equally notable for his artistic genius and for his incorruptible nobility of character. Several of the Paris museums contain collections of his pottery (mostly small vases, ewers, jugs, &c.), valued now almost beyond price, and distinguished by fineness of material, richness of ornament, and elegance of outline. The chief of his glass-paintings is a Psyche, after Raphael. His writings on the formation of springs, the fertilising power of marl, the means of purifying water, &c., were published by Faujas de St. Fond and Gobet in 1777, and by A. Cap in 1844. See Lives, by A. Dumesnil (Par. 1851), H. Morley (2 vols. Lond. 1852), and J. Salles (Nîmes, 1855).

Paliu'rus, a genus of *Rhamnaceæ*, with a dry hemispherical fruit, having an orbicular membranous wing an inch in diameter, making it resemble 'a head with a broad-brimmed hat on.' The stipules are converted into prickles. In *P. aculeatus*, commonly called Christ's thorn, the lithe branches are beset with one hooked and one straight prickle at the base of each leaf. It is a bush or small tree, native of countries bordering the Mediterranean, and of W. Asia, and being common in Palestine, has been selected as the likeliest plant to have formed the crown of thorns referred to in St. Matt. xxxvii. 29, although the allied *Zizyphus spina-Christi* is supposed by some to have a higher claim. From its thorny character and entangling growth, it makes

a useful hedge plant, and its seeds are employed in Turkish medicine; they also furnish a dye. *P. Aubletii*, a thorny tree, native of China and Japan, has also been recommended for hedge-making.

Palk Strait, the channel which separates the island of Ceylon from the mainland of the Indian peninsula on the N., about 100 miles in length, and 40 miles wide at the narrowest. The water is shallow throughout, and at the narrowest point a chain of sandbanks called Adam's Bridge (q. v.) runs across. The project has been revived of cutting a navigable channel for large ships through this strait, and the plan supported by Mr. Robertson, a government engineer, would cut across the island of Rameswaram for 1 mile and 1 furlong, traversing a sandy plain only 7 feet above high water mark, but requiring much dredging at either end. The depth would have to be 28 feet, and the total cost is put at £440,000. Another project, for crossing the promontory of Ramnad, would utilise the newly opened railway to the port of Tuticorin.

Pall (Lat. *pallium*), (1) originally a Greek cloak specially worn by philosophers or ascetics, was adopted as an article of dress by those of the early Christians who specially affected asceticism. Afterwards, when the clergy were chiefly chosen from among the monks, it became (in the 5th or 6th c.) the usual habit of the clergy. At a later period the P. was a white linen garment received by all bishops in the East at their consecration, which the Popes of Rome began to bestow on their special representatives among the bishops. Boniface III. decreed (1215) that it should be conferred by the Pope on every metropolitan or archbishop, who can perform none of his archiepiscopal functions without it, and has to pay a certain sum for it. The P. now consists of a band of white woollen cloth passing round the neck, from which two pieces of the same hang down, the one on the breast, the other on the back; the whole ornamented with crosses. The cloth is made by the nuns of St. Agnes from the wool of two lambs, which are solemnly blessed in the church, and on the festival of that saint. See Pertsch, *De Origine, &c., Palii archiepiscopalis* (Helmst. 1754). (2) The name of P. given to the black or white cloth thrown over a coffin when being carried to the grave may have derived its name from the clerical garment. At any rate, the bier used to be carried to the grave by the clergy on their shoulders (Brand's *Pop. Antiq.*). Or the name may have been applied to the cloth in the sense of a coverlet. (3) P. was the name given in the ancient Church to the white cloth with which the communion-table or altar was covered. It is now applied to the covering of cloth variously ornamented for the chalice used in the mass.

Pall, in Heraldry, the upper part of a saltire joined to the lower part of a Pale (q. v.), having thus the form of a Y. Imitating, as it does, the form of the ecclesiastical P., it is a common charge on the arms of bishops.

Palladio, Andrea, a famous Italian architect and writer on art, was born of poor parents at Vicenza, 30th November 1518. He was early taken to Rome by Trissino, and cultivated his extraordinary natural talents by studying the classic buildings of ant quity there and in other Italian cities, together with the writings of Vitruvius. On his return to his native town he was entrusted with the restoration of the Basilica, a work which at once spread his reputation throughout Italy. From this time till his death he was continuously engaged, chiefly at Vicenza and Venice, in designing and executing buildings which, for careful arrangement, elegant proportion, and richness of execution, are regarded as masterpieces of the Renaissance style, and which have exercised a great influence on subsequent Italian architecture. The principal of these, besides the Basilica, are the Palazzo Chiericato in Vicenza, and the Church of San Giorgio Maggiore at Venice. P. wrote a treatise on architecture which has been translated into most European languages, *Quattro Libri sull' Architettura* (best edition, Vicenza, 4 vols. 1570–83). He died at Vicenza 19th Aug. 1580. See Temanza's *Vita di A. P.* Venice, 1763, and Magrini's *Di Vita e di Opere di A. P.* (Padua, 1845).

Palladium, a wooden image of Pallas Athene, five feet high, fabled to have been cast down from heaven by Zeus as a pledge of the safety of Troy, where it remained enshrined till stolen away by Odysseus and Diomedes; it was transferred to Argos or Athens. Another legend ran that the P. was borne away by Æneas in his flight to Italy, and thenceforth preserved in the Temple of Vesta at Rome, though here again its possession was contested by Siris, Lavinium, and other Italian cities. In modern European languages the word P. is applied to such guarantees of the well-being of a State as trial by jury, liberty of the press, &c.

Palladium (Pd = 106.5) occurs associated with platinum in its ores, and in small quantity with native gold and platinum. It resembles platinum, but is harder, much lighter, and oxidises more easily. At ordinary temperatures it remains unchanged, but when heated it becomes coated with a blue film of oxide, which decomposes, however, and therefore disappears at a higher temperature. It is separated from the platinum with which it is associated by mixing a prepared solution of the ore with cyanide of mercury, when a yellow precipitate of cyanide of P. is obtained, which yields the spongy form of the metal when heated. Unlike platinum, it forms a nitrate by direct union with nitric acid. It forms two oxides—the protoxide and binoxide. The former is basic, and has been obtained by gently heating the binoxide. It forms also corresponding chlorides, of which the tetrachloride is very unstable. The rarity of the metal prevents its being much used in philosophical instruments, for which it is peculiarly suitable because of its hardness, lightness, and difficulty of oxidation. An ingot of pure P., valued at £1900, and extracted from native P. and gold of the value of £1,000,000, was shown at the Vienna Exhibition of 1873.

Palladius, Rutilius Taurus Æmilianus, a Latin author of the 4th c. A.D., who wrote a treatise, *De Re Rustica*, in fourteen books. Of these the first is introductory, twelve are devoted to the twelve months of the year, and the last is a poem on the art of grafting. It is an ingenious compilation from Columella, Gargilius Martialis, the *Geponica*, and Vitruvius; was published by Jenson (Ven. 1472) and Schneider (Leips. 1794), and has been translated into English by Thomas Owen (Lond. 1803), as also into French, German, and Italian.—**P.**, a Greek ecclesiastical writer, born in Galatia about 367 A.D., at the age of twenty became a hermit in the Thebais, and was chosen bishop of Helenopolis in Bithynia (400). Accused of Origenism, he fled to Rome (405), returned to his see (417), and shortly after was translated to that of Aspona in Galatia, where he died about 430. He wrote the *Historia Lausiaca* (so called because dedicated to the Prefect Lausus), a series of lives of ascetics, of which the original Greek text was published by Ducæus (Par. 1624), and the Latin version in the *Vitæ Patrum* (Ant. 1615).

Pallas. See MINERVA.

Pallas, Peter Simon, a German naturalist, was born at Berlin September 22, 1741. After a scientific education at Berlin, Göttingen, and Leyden, he was employed in classifying certain collections in Holland and England. P. first won a reputation by his *Elenchus Zoophytorum* and *Miscellanea Zoologica* (Hague, 1766), and two years afterwards was invited to St. Petersburg, whence he accompanied as naturalist a scientific expedition sent to Siberia in 1765 to observe the transit of Venus. During a six years' absence, P. explored the Ural Mountains, the district on the river Jaik, and the Kirghiz Steppe, the Altai range, and all the country as far as Kiachta. The results of his researches were published in his *Reise in Mehrere Provinzen des Russischen Reichs* 3 vols. St. Petersb. 1771–76). P. now turned his attention to botany, and employed himself for several years with the greatest ardour in exploring the different parts of the empire. In 1706 he was presented by the Empress with an estate in the Crimea, on which he lived till shortly before his death, which took place during a visit to Berlin, September 8, 1811. The other chief works of P. were *Spicilegia Zoologica* (14 parts, 1767–80); *Flora Rossica* (2 vols. 1784–88); *Sammlungen historischer Nachrichten über die Mongolischen Völkerschaften* (2 vols. 1776–1802); *Bemerkungen auf einer Reise durch die Südlichen Statthalterschaften des Russischen Reichs* (2 vols. 1799; Eng. trans. 1812); and *Linguarum totius Orbis Vocabularia Comparativa* (1787–89).

Pallavicini, Pietro Sforza, an Italian historian, eldest son of the Marquis Alessandro P. of Parma, was born at Rome 20th Nov. 1607. In opposition to the wishes of his parents he entered the Church, and filled some important offices under Pope Urban VIII. In 1637 he joined the Society of the Jesuits, and in 1657 he was created cardinal by Pope Alexander II., to whose elevation he had contributed. He died at Rome 5th June 1667. P.'s

two most important writings are his *Istoria del Concilio de Trento* (2 vols. fol. Rome,' 1656–57), and his *Vindicationes Soc. Jesu* (4to, Rome, 1649). P. was a fine scholar, and an able historian, but opposed to the liberal tendencies in the Church.

Palliobranchia'ta, a name formerly applied to the class *Brachiopoda* (q. v.), belonging to the lower *Mollusca* (q. v.), under the idea that the *mantle* or *pallium* which forms the shell constituted the breathing organs of the class. This notion is only true in a modified degree, if indeed at all. The *cirriferous arms* so characteristic of the brachiopods are the chief organs of respiration.

Pall'iser, Lieut.-Colonel Sir. Wm., fifth son of Colonel Wray Palliser of Comragh, Waterford, Ireland, was born at Dublin, June 18, 1830. After leaving the Staff College, Sandhurst, he obtained a commission as ensign in the Rifle Brigade in 1855, and was transferred to the 18th Hussars in 1858. He retired from the army in 1871. He was knighted June 21, 1873, and received the Cross of the Commander of the Crown of Italy in March 1875. He is the author of many improvements in fortifications, the arming of ironclads, &c., but is best known as the inventor of the projectiles and guns which bear his name. The Palliser projectiles now used in the British navy and fortifications were a vast improvement in economy and efficiency on anything previously designed for piercing armour-plated ships. An immense quantity of old smooth-bore cast-iron guns were converted by a simple process invented by Sir. W. P. into rifled compound guns, and are known as 'P. guns.'—**John P.**, eldest brother of the preceding, born in 1817, has earned a name as an active and enterprising explorer. He published the *Solitary Hunter, or Sporting Adventures in the Prairies*, an account of travels in North America in 1853. He had command of a British expedition to the Indian country in 1856–57, and was a boundary commissioner in fixing the line of division between British North America and the United States from Lake Superior to the Pacific in 1857–60. His report on the topography and resources of the region was published in 1861.

Pall'ium. See PALL.

Palm, an ancient measure of length taken from the length or breadth of the hand. There were thus two distinct palms, one of which was regarded as three times the other. The Romans called these respectively *palmus major*, or simply *palma*, and *palmus minor*. The former was 8·74 English inches, the latter 2·91. The English P. is reckoned as equivalent to 3 inches, but it is rarely if ever used.

Palm, Johann Philipp, was born at Schorndorf in 1766. After serving an apprenticeship as a bookseller in Erlangen, and subsequently prosecuting his trade in Frankfurt and Göttingen, he married the daughter of the bookseller Stein in Nürnberg, and succeeded to the business. In the spring of 1806, there issued from his house the pamphlet *Deutschland in seiner tiefsten Erniedrigung*, which, though superficial on the whole, contained some bitter reflections on Napoleon and the conduct of the French troops in Bavaria, but of the contents of which P. to the last hour of his life declared himself quite ignorant. Its author is believed to have been Johann Konrad von Yelin, who died in 1826 at Edinburgh, and who was then a professor in a gymnasium at Ansbach. P. was arrested at Munich, and again on his return to Nürnberg, and examined before Marshal Bernadotte. Transferred to Braunau, it is said, by express orders from Napoleon, he was tried by an extraordinary court-martial and condemned to death. The sentence was executed on the same day, 26th August 1806. Subscriptions for his family were raised in London, St. Petersburg, Berlin, Hamburg, Dresden, and Leipzig. In 1866 a monument was erected to P. on the place where he suffered, and his tragic fate has been dramatised by L. Eckardt and A. Rungler. See *Biographie Johann Philipp Palm's* (Munich, 1842).

Pal'ma, one of the Canary Islands (q. v.), is 67 miles W.N.W. of Teneriffe. It measures 26 by 16 miles, and has an area of 718 sq. miles, with a pop. of 33,000. It is traversed by a lofty mountain range, which culminates in the Pico de los Muchachos (7900 feet). P. is volcanic, and contains a huge crater 9 miles in diameter, from which flows the only permanent stream on the island. The sugar cane is extensively grown and the exports also include honey, wax, and silk manufactures. The chief town is Santa Cruz, with a pop. of 4400.

Pal'ma, the capital of Majorca, and of the Spanish province of Baleares, on the S.W. coast of the island, and on a fine bay between Capes Blanco and Figuer. A railway connecting P. with Inca was extended to Sineu in 1877. The town, which is walled, is the seat of a bishop, and has a Gothic cathedral with a beautiful spire called the Angel's Tower, a handsome exchange, a governor's palace, a medical school, and three *colegios*. The harbour is formed by a mole, which was being prolonged in 1877. One of the great marts of Europe in the 13th c., P. has now little foreign trade. From Algeria it imports cattle and contraband tobacco; from Great Britain, coal and railway materials; from Sweden and Norway, deals, planks, and timber. In 1876 there entered and cleared 48 vessels of 16,412 tons, and the imports amounted to £31,618, of which £22,795 were British. There is considerable shipbuilding, besides some manufactures of silk, soap, glass, and brandy. Pop. 40,418.—**P.**, a port on the S. coast of Sicily, 16 miles S.E. of Girgenti, exports fine almonds and other fruits, and has a pop. (1874) of 13,458.

Pal'ma Christ'i is a name given to *Ricinus communis*, the Castor Oil Plant (q. v.).

Pal'mas, Cape, a low headland on the coast of Northern Guinea, in 4° 21′ N. lat., 7° 44′ W. long. The anchorage on its E. side is the best on the Guinea coast.

Palm'blad, Vilhelm Fredrik, a Swedish writer, born 16th December 1788, at Liljestad in Oestergotland, entered Upsala University in 1806, where he became a friend of Atterbom, and in 1807 a member of the 'Auroraförbund.' To further the literary objects of this society he bought in 1810 the University printing press, and under his guidance there issued from it the important periodicals, *Phosphoros*, *Poetisk Kalendar*, and *Svensk Literatur-Tidning*. The novels and critical essays contributed to them by P. contain some of the best prose in the writings of the 'Phosphorists.' Taking his doctor's degree in 1815, he became 'Docent' (1822) and afterwards 'Adjunct' (1827) in history at the University, and published a *Handbok i äldre och nyare Geographien* (1826–27). In 1835 P. was appointed Professor of Greek. The fruit of his classical studies was translations of Æschylus and Sophocles, and his valuable *Grekisk Formkunskap* (1843–45). His humorous story *Familjen Falkensvärd* (1844–45) and the historical novel *Aurora Königsmark och hennes Slägt* (1846–49) take a high place in the national literature. P. was a constant writer in various political journals, of which he himself edited one, *Läsning för bildning och nöje* (1847–48). He was also editor of the *Biographisk Lexicon öfver namnkyndig Svenska Män*. His last years (1847–51) were spent as editor of the Conservative paper *Tiden*, noted for fulness and accuracy of statistics. P. died 2d September 1852.

Palmella'ceæ, or **Palmell'eæ**, is a family of green-spored unicellular *Algæ*, characterised by the plants being composed of free or merely conglomerated cells propagated by the division of their contents (endochrome). Fertilisation has not been observed. The endochrome is not always green, indeed blue, yellow, and red are assumed by some of the species. They propagate with great rapidity, and the young plants exhibit remarkable powers of motion for a brief period, afterwards settling down and devoting all their energy to reproduction. Berkeley says that many organisms assigned to this order are doubtless mere transitional states of higher plants. The Red-Snow Plant (q. v.), *Protococcus nivalis*, is one of the most generally known examples, though *P. cruentus*, which appears like blood-stains at the base of walls, is one of the commonest. See GORY DEW.

Palm'er was a general name loosely applied, *e.g.*, in Chaucer, to Pilgrims (q. v.).

> 'Thanne longen folk to gon on pilgrimages,
> And palmers for to seeken straunge strondes,
> To ferne halwes kouthe in sondry londes;
> And specially from everie schires ende
> Of Engeloud, to Caunterbury thei wende.'

Properly the name only belonged to one who had made a pilgrimage to the Holy Land, on his return journey, or as he journeyed hither and thither to the shrines of divers saints in fulfilment of his vow or discharge of his penance. The ordinary attire of a P. was a cloak of coarse black cloth, which enveloped the whole body, called a Slavonian, coarse sandals, a broad hat with cockle shells sewed on its brim, with a long staff in his hand, to the upper end of which was fastened a branch of palm.

Palmer, Edward Henry, an Oriental scholar, born at Cambridge, August 7, 1840, entered St John's College and ... [illegible] ... In the Sinai Expedition ... [illegible] ... was appointed Lord ... [illegible] ... [illegible] ... [illegible]

equivalent of a metal. Excepting potassium and sodium palmitates, all are insoluble in water or alcohol, and are obtained by precipitation from the double decomposition of a metallic salt and an alcoholic solution of the sodium or potassium palmitate. The alkali-metal compound may be obtained by the action of caustic potash upon palmitin, which is a natural fat, obtained by cautiously pressing palm oil and crystallising from hot ether. Its formula is $C_3H_5(C_{16}H_{31}O_2)_3$, so that it is a palmitate of the compound radical glyceryl (C_3H_5). See GLYCERINE. It melts at from 46° to 63° C., according to the allotropic modification in which it exists. Prepared artificially it is known as tripalmitine, to distinguish it from monopalmitine and dipalmitine, whose formulæ are respectively $C_3H_5(C_{16}H_{31}O_2)(OH)_2$ and $C_3H_5(C_{16}H_{31}O_2)_2(OH)$, both of which are obtained by heating P. A. with glycerine in sealed tubes. The tripalmitine is prepared by mixing 1 part of monopalmitine with 10 parts of P. A., and keeping the mixture at a temperature of 250° C. for two days.

Palm Oil. See OIL PALM.

Palms (*Palmaceæ* or *Palmæ*) constitute a large and most important order of monocotyledonous plants, estimated to number upwards of 700 species, abounding in the tropical regions of the world, and having outliers in the warm temperate zone; *e.g.*, *Chamærops humilis* in the N. hemisphere reaches the Riviera near Nice in 43°, and grows well in Cornwall; *Cocos Australis* extends south from Brazil to Uruguay and the La Plata States; and *Areca sapida* in New Zealand reaches 38° 22″ S. lat. There is much diversity in the order. The stem is either under ground or above ground: in the former case it is a perennial rhizome producing flower-stalks and tufts of leaves; in the latter, it is either erect, scandent, or supported by other trees or bushes. Its structure (explained under ENDOGENS) renders the outer portion the hardest, and the cellular tissue of the centre frequently decaying, the stem often becomes hollow. As regards surface, in one group of P. it is smooth and shining, marked with raised rings where the leaves have fallen; in another it is rough with the persistent base of the petioles. The leaves of seedlings are always undivided; those that are formed later are generally either pinnately or palmately divided, the pinnæ or segments being linear or lanceolate, and mostly folded longitudinally, with numerous parallel veins. The petiole is always broad-based, and generally sheathing. The inflorescence is generally a panicle, enclosed in its young state by a large sheathing brac (*spathe*), the common peduncle (*spadix*) being often branching, thick, and sometimes woody. The flowers, by abortion of stamens or pistils, are generally dicœcious, monœcious, or polygamous—rarely hermaphrodite. Calyx and corolla, as a rule, each consist of three segments; the stamens are generally six; the ovary three-celled; the fruit a one or three-seeded drupe or berry; the seed albuminous; the albumen cartilaginous, horny, or oily; the embryo minute, and cylindric. The properties of P. are very various. In the countries in which they grow they are used for supplying food, clothing, and for forming habitations. The fruit of some is edible, while that of others is extremely hard. Many yield oil, wax, starchy matter, and sugar, which is fermented so as to produce an intoxicating beverage. The fibres are employed for ropes, and the 'reticulum' surrounding their leaves is sometimes manufactured into brushes. See ASSAI, ARRACK, TODDY, JAGGERY, COIR, PIASSABA.

The order is commonly divided into six tribes, of which it will be only possible to notice here a few of the most important species, and such as are not described in separate articles. (1) *Borassineæ*, with fan-shaped leaves and unisexual flowers. Besides the Palmyra P. (q. v.) and the Doom P. (q. v.), the Coco de Mer or Double Cocoa-nut (*Lodoica Sechellarum*) belongs to this tribe. It is found only on two or three small rocky islands of the Seychelle group. The tree is one of the tallest and most remarkable of the Palm family, attaining 100 feet in height, though scarcely a foot in diameter. The nut—formed, as it were, of two firmly united together—weighs as much as 40 lbs., and takes nearly ten years to come to maturity. It is made into various domestic utensils, the wood also is valuable, and the leaves are manufactured into hats, baskets, &c. (2) *Coryphineæ*, with fan-shaped leaves, bisexual or polygamous flowers, and compound panicles. See CHAMÆROPS, CARNAHUBA, MAURITIA, TALIPAT P. The *Chamærops excelsa* of Japan and N. China is a most useful plant; the leaves are made into hats and waterproof cloaks, and rope is manufactured from the inner fibrous layer of the sheath. The delicate young leaves of a species of N. W. India (*C. Ritchieana*) are eaten as a vegetable, and when developed, rope is made from them, also fans, baskets, sandals, pouches, brushes: the seeds are pierced and strung into rosaries. (3) *Phœnicineæ* is represented by the well-known Date P. (q. v.), and in addition to the various species enumerated in that article, the African *P. spinosa* merits mention. It is common over the central regions of the continent, and on the coast, both as a bush and a tree with a flexuous stem 20 feet high. The green bunches of fruit, if immersed for twelve hours in water, suddenly assume a rich scarlet hue, and the astringent pulp becomes sweet. The split leaf is made into fine mats and caps, which take colour easily, and are worked into many patterns. (4) *Arecineæ*, with pinnate leaves, having the leaflets entire or irregularly lobed, sheathing petioles, and monœcious flowers; contains genera referred to under BETEL, CABBAGE P., WAX P., CARYOTA, ARECA, GOMUTO. (5) *Cocoineæ*. In this tribe the leaves are pinnate, the leaflets entire, the petioles amplexicaul with a fibrous base, and the flowers monœcious. The most important are *Cocos* and *Elæis*—already noticed under Cocoa P. and Oil P. (6) *Lepidocaryineæ* has leaves pinnate, leaflets entire, petioles on long sheaths, both they and the sheaths beset with prickles; a flower monœcious or dicœcious in compound panicles. In this tribe are included the rattans, and other useful plants of the genus *Calamus* (q. v.). Sago (q. v.) is chiefly the produce of several species of *Metroxylon* (*Sagus*).

Two remarkable genera, which resemble P. in general habit and in their large pinnate leaves, but differ essentially in the structure of their flowers, and are not included in the above synopsis, are *Nipa* (q. v.) and *Phytelephas*, or the Ivory P. (q. v.). The different aspect of P. to other trees led to their being early sought after as objects of horticultural curiosity, and now palm-houses are especially erected for their reception and culture. Such may be seen at the Botanic Gardens of Kew, Edinburgh, Dublin, and many continental and colonial cities. See *The Geographical Distribution of P.* by Oscar Drude in the *Mittheilungen* of January 1878, and *Les Palmiers* by Oswald de Kerchove de Denterghem (Par. 1878).

Palm Sunday is the Sunday before Easter, which received its name from the practice of carrying palm (or, in northern latitudes, box, yew, or willow) branches in procession, in commemoration of our Saviour's triumphal entry into Jerusalem, on which occasion, according to John (xii.), many of the Jews took branches of palm-trees and went out to meet him. At the same time there can be little doubt that in the rites of the day the Church adopted part of the pagan ceremonies connected with the rejoicings of Easter (q. v.)—a part which was long kept up in connection with May-day (q. v.), when the young people went out to the woods during the previous night and returned in the morning laden with branches of trees decorated with flowers.

Palmy'ra is the Greek name (perhaps compounded of *palma*, 'a palm-tree,' and Arab. *mur*, Gr. *myron*, *myrra*, 'an aromatic gum') of the city Tadmor (Heb. 'city of palms'), which was situated in a well-watered oasis in the Syrian desert, about 150 miles N.E. of Damascus, serving as a depôt for the merchandise of India, Persia, and Arabia, in its transmission to the West, and a safe halting-place for the caravans. That P. was built by Solomon, as stated in 2 Chron. viii. 4, is doubtful. The city mentioned in the parallel passage in 1 Kings (ix. 18) is Tamar (Heb. 'a palm'), which is probably the city to the S. of Palestine mentioned in Ezek. xlvii. 19 (*cf.* the other towns mentioned in the passage), Tadmor being introduced on the margin from Chronicles. The first mention of P. in profane history is when it attracted the attention of Marc Antony (about B.C. 40), who expected rich spoil from it; but the inhabitants transported their wealth beyond the Euphrates. In the time of Pliny (about A.D. 70), P., with a certain territory, formed an independent state between the Roman and the Parthian Empires, and the great emporium of the Eastern trade; but it was soon after united to the Roman Empire as a free city. Under Adrian (from whom it received the name of Adrianopolis) and the Antonines it rose to the height of its splendour, but was laid waste by Aurelian after the rebellion of Odenathus and Zenobia (q. v.; 3d c.). It was again fortified by Justinian in the 6th c., it was one of the first conquests of the Saracens in Syria (632), and was plundered by Tamarlane (1400). All that remains of it at the present day

are vast masses of ruins, amid which several families of Arabs have their huts, and retain possession of the place. See St. Mart's *Histoire de Palmyre* (Par. 1823), Porter's *Handbook of Syria and Palestine* (Lond. 1858), Vogüe's *Syrie Centrale* (1869), and Baedeker's *Handbook of Syria and Palestine* (Lond. 1877).

Palmy'ra Palm is the name of *Borassus flabelliformis*, a plant widely distributed throughout the tropical parts of Asia either in a wild or cultivated state. It belongs to the section of palms with fan-shaped leaves and unisexual flowers in paniculate spikes. The young stems are covered with dry leaves, or the lower part of the petiole, and the old stems bear the scars of the fallen petioles. The leaf consists of from 60 to 80 parchment-like, smooth, shining segments. The sub-globose fruit, which is about 6 inches in diameter, contains a yellow pulp mixed with tough fibres surrounding the seeds. Sometimes the tree attains 100 feet in height, but it is generally about 50 feet, and has a diameter of 18 to 24 inches. The stems are hollowed out in India and employed as water-pipes; cut half-way through lengthwise, they serve as gutters and open channels. The outer wood is used for posts, rafters, and building generally, also for furniture. The leaves are employed for writing upon (with pointed iron style), the documents lasting for several centuries; they are also used for thatch, mats, and basket work. The pulp of the fruit is eaten raw or roasted, and in Ceylon a preserve is made from it. The unripe seed and the seedling plants are an important article of food. But the most valuable product of the tree is the sweet sap which runs from the peduncles cut before flowering, and is collected in bamboo tubes or earthen pots tied below the wound. Nearly all the sugar made in Burmah and a large portion of that made in S. India and the Konkan is the produce of this palm. The sap is also fermented into toddy and distilled. An African species (*B. Æthiopum*, the 'Deleb' of Nubia) is widely diffused over the tropical part of that continent, forming a marked feature in the landscape whether it occurs singly in a forest or forms a monotonous plantation covering miles of flat land. It is the largest of the E. African palms, growing on the Zambesi to a height of 80 feet, and at about half its height the stem is generally much swollen, a prototype perhaps of the bulged shaft of the old Egyptian column. The wood if kept dry is durable, resisting well the attacks of termites. See DELEB PALM.

Palmyra Wood is a name given to the timber of the hard outer parts of the trunks of the cocoa-nut palm and the Palmyra palm. The peculiar arrangement of the vascular bundles in their connection between the interior of the stem and the base of the leaf, and the varied structure of these bundles, give a remarkable appearance to the wood. Veneers cut in the horizontal direction are known in the trade as 'speckled wood,' and those made vertically as 'porcupine wood.' It is used in the manufacture of numerous fancy articles, such as ladies' work-boxes.

Palo'lo (*P. viridis*), also named 'Balolo,' the name applied to a species of *Annelida* (q. v.) or worms, belonging to the order *Errantia*, or that including the most typical marine worms. It inhabits tropical seas, and is common around the Samoan and Fijian coasts. The average length of the P. is about 3 inches. It is of a greenish colour and has a cylindrical body which tapers at both ends. The gills are represented by tufts borne on the sides of the segments of the body. The natives of the islands first mentioned regard the P. as a delicacy, and capture it in large numbers at certain periods of the year.

Pal'pi (from Lat. *palpo*, 'I touch'), the name given to certain appendages developed in connection with the mouth-parts of *Articulate* or Annulose animals. Thus in insects P. are borne by the second pair of jaws or *maxillæ* and by the *labium* or lower lip, but the larger jaws or *mandibles* are never provided with these organs. In Crustaceans (*e.g.*, lobster) P. are attached to the *mandibles*, to the *maxillæ*, and also to the *maxillipedes* or foot jaws. The P. in *Arachnida* or spiders and scorpions are large and important. They belong in the latter class to the *maxillæ*, and are used by the males to convey the seminal fluid to the female generative organs. In the scorpions the maxillary P. are developed to form the *chelæ* or nipping-claws.

Palpita'tion is the term used to express frequency of cardiac action, irregularity, and suddenness of impulse. P. may be either functional or a symptom of organic disease of the heart, and, as a rule, the symptoms which accompany the P. without organic disease are flushings or pallor of the face, ringing in the ears, or some coldness of the extremities. P. may be persistent, but it is more generally paroxysmal, and the causes are most frequently traceable to excessive mental exertion and sedentary occupation, great anxiety, strong mental emotions, nervous exhaustion, the influence of poisons on the heart's action, and derangement of the stomach and liver. The causes being removed the P. is removed, but the heart may become hypertrophied or dilated through the chronicity of the P. P. due to organic disease of the heart is a much more serious affection, and repeated examinations of the patient are often necessary to arrive at a correct conclusion regarding the nature of the disease. See HEART, DISEASES OF.

Pal'sy. See PARALYSIS.

Palu'dal Diseases. See MIASMATIC DISEASES.

Paludan-Müller, Frederik, was born at Kjerteminde in Zealand, and educated at the Cathedral-school of Odense and at Copenhagen University. His first works, *Fire Romancer* (1832), and *Kjærlighed ved Hoffet*, had already considerable success, when the beautiful poem *Danserinden* (1833) gave him the high place he afterwards maintained by *Amor and Psyche* in 1834, and from 1835 to 1838, when he travelled to Italy, by *Zuleimas Flugt*, *Eventyr i Skoven*, *Alf og Rose*, *Trochæer og Iamber*, *Fyrste og page*, *Beatrice*, *Vestalinden*, and *Slaven*. The latter year closed his first or 'æsthetic period,' while the drama *Venus* (1841), and the first part of his greatest poem, *Adam Homo* (1841–48), appearing after his return, are the expression of his second or 'ethical period.' Two mythological poems, *Tithon* and *Dryadens Bryllup*, lead on to the third, or 'religious-speculative' period, whose chief works were *Luftskipperen og Atheisten* (1852), *Kalanus*, *Paradiset*, *Abels Död*, *Kain eller Vredens Barn*, *Ahasverus*, and *Benedict og Hans Amme*. *Ivar Lykkes Historie*, the comedy *Tiderne Skifte* (1874), and the poem *Adonis* (1874) were his last works. He died 28th Dec. 1876. P.-M. is one of the greatest of Danish poets. His characteristics are a high moral earnestness, a richly developed power of reflection, and transparent clearness of style.

Paludi'na, a genus of *Gasteropodous* Mollusca (q. v.), forming the type of the family *Paludinidæ*, in which a conical or globular shell exists with a rounded and entire or unbroken aperture. The *Operculum* (q. v.) is horny or shelly. These gasteropods are inhabitants of fresh or brackish waters. P. is represented by living species, of which *P. vivipara* is a good example. The fossil representatives of the genus begin in the Jurassic or Chalk formations.

Palunpur', the capital of a native State of the same name in W. India, in political connection with the Bombay Government, 80 miles N. of Ahmedabad. It has a special manufacture of chintz counterpanes. Pop. (1872) 17,189.—The *State* of P., which lies between Gujerat and Rajputana, has an area of 2384 sq. miles, a pop. (1872) of 215,972, and a revenue of £40,000, of which £4550 is paid as tribute to the Gaekwar. The crops are rice, wheat, and sugar-cane. The ruling family are Afghans, who received the title of Dewan from the Emperor Akbar. The higher title of Nawaub, offered by the British for services during the Mutiny, was refused.

Pam'lico, or Pamp'lico Sound, the largest sound on the coast of N. Carolina, 80 miles long by 10 to 30 broad, is fenced by long low islands from the open sea, to which it opens by Ocracoke, Hatteras, Loggerhead, and other inlets. It receives the Neuse and P. rivers, communicates with Albemarle Sound in the N., and has an average depth of 20 feet, with great areas of shoal water. Its fisheries are valuable.

Pam'pas (in the Quichua tongue, 'plains'), the name given to the wide plains forming almost the whole of the Argentine Republic and part of Paraguay. They are composed of an estuary deposit, and are largely impregnated with salt, while large lagoons, more or less saline, are of frequent occurrence. Bones and other animal remains are so abundant, that Mr. Darwin says 'We may conclude that the whole area of the P. is one wide sepulchre of extinct gigantic quadrupeds.' Strips of barren land, of different geological character, and called *travesias*, cross the P. in some places. The P. themselves are covered with long grass, and in some districts for two-thirds of the year with thistles eight feet high, which afford shelter to robbers, and also serve as fuel in a country destitute of trees and coal. Large flocks of sheep are now reared on the P., over which also roam immense herds of wild cattle and horses. The latter have largely supplanted the

native fauna, which consisted chiefly of the guanaco, vizcacha, a rabbit-like creature, and the rhea, or S. American ostrich. The principal inhabitants of the P. are Indians, and the mixed race called Guachos (q. v.). The P. are liable to fierce blasts of westerly wind, known as *pamperos*, whose influence extends some distance out to sea.

Pampas Grass is the name applied to a genus of grasses botanically called *Gynerium*, brought into European notice by the introduction into gardens of the handsome species named *G. argenteum*. All the genus, with one New Zealand exception, is S. American, and the species above alluded to covers large areas of the Pampas district. Few ornamental plants produce a finer effect than good tufts of this grass, grown either singly on lawns, or arranged against a background of evergreens, which serve as a contrast to its large, elegant, silvery-white panicles and graceful leaf-disposition. In favourable conditions the stems rise to 12 feet high, with as many as 200 springing from a single plant.

Pam'philus, one of the most famous artists of ancient Greece, the founder of its most celebrated school of painting, and the instructor of Apelles, was born at Amphipolis, and flourished in the middle of the 4th c. B.C. In the school of P. the course of study, which embraced drawing, arithmetic, geometry, anatomy, and painting, extended to ten years.

Pam'phlet (said to be from the Sp. *papaleta*, 'an inscribed slip of paper' or Lat. *pagina filata*, 'a threaded page;' but the derivation is uncertain), a short treatise or essay—technically, a book in octavo, of not more than five sheets, merely stitched together. The word occurs in Chaucer, and the P. was first wielded in England as a powerful weapon of attack by Wyclif. In the reign of Edward VI. a crowd of Protestant pamphleteers flooded the country with vehement invectives against the Mass and its accompanying superstitions. The attacks, directed by Nash and his rivals among the Elizabethan pamphleteers against the Puritans, were the first English works which shook utterly off the sickly extravagances of euphuism, and laid the foundation of popular literature. Milton's pamphlets are splendid specimens of wrathful protest and impassioned pleading. In later times, till the rise of the newspaper press in some measure superseded this form of publication, every controversy brought its budget of pamphlets. There are valuable collections of them in the libraries of the British Museum, and the Royal and London Institutions.

Pamphyl'ia, anciently a province on the S. coast of Asia Minor, consisting of a narrow strip of land skirting in a semicircle the coast of the Bay of P. It was traversed by ramifications of Mount Taurus, and watered by the rivers Catarrhactes (*Dudensu*), Cestrus (*Ak-su*), Eurymedon (*Capri-su*), and Melas (*Menavgat-su*), all of which are navigable and discharge into the Bay of P. The inhabitants were a mixed race of aborigines, Cilicians, and Greeks, hence their name 'Pamphyli' (Gr. *pas*, 'all,' and *phylē*, 'tribe;' *cf.* Ger. *Alemanni*). They were chiefly devoted to maritime pursuits, and, like the Cilicians, were much addicted to piracy. The chief towns, all on the sea-coast or on the rivers, were Side and Aspendus, originally Greek colonies, Attalia, founded by Attalus, king of Pergamos, and Perga.

Pamplo'na, the chief town of the province of Navarre, in N. Spain, 40 miles S.S.W. of San Sebastian, with which it is connected by rail, and 19 from the French frontier. Situated in a fertile plain 30 miles in circumference, on the left bank of the Arga, a tributary of the Ebro, on an eminence 1378 feet above the sea, it is strongly fortified, and has a citadel founded by Philip II. Though very uneven, the town is finely built, has three squares, of which Plaza del Castillo is the finest, an Episcopal palace and a Gothic cathedral, founded in 1397 by Carlos III. of Navarre, and containing the graves of the kings of Navarre. P. has a medical school, a college with a library and botanic garden, a *casa de espositos* ('foundling hospital'), a theatre, and a *plaza de toros* ('bull arena'), the largest in Spain, capable of holding 10,000 people. There is some trade in wine, leather, linen, wax, and guitar-strings. Pop. 22,896. P., the ancient *Pompeiopolis*, was taken by the Goths in 466, and by Karl the Great in 778. Its Moorish conquerors corrupted the Roman name to Bamblona, whence the modern P. It was taken by the French in 1808, but surrendered to the Duke of Wellington after the Battle of Vittoria, in 1813.

Pan (akin to Lat. *pasco*, 'I feed'), in Greek mythology a rural divinity, the son of Hermes by a daughter of Dryops, was originally worshipped in Arcadia, whence his fame extended to other parts of Greece. He was regarded as the guardian of flocks, pastures, and bees, as a mighty hunter, and as the inventor of the syrinx or *pandean* pipes; and in art was usually represented with goat's horns, beard, tail, and feet—attributes that struck the beholder with *panic* alarm (Gr. *to panikon*). By the Romans he was identified with Faunus (q. v.), and the Alexandrian philosophers saw in him a personification of nature, connecting his name with the Gr. *to pan* ('the universe'). The story related by Plutarch (*De Defectione Oraculorum*), how, on the night of the Nativity, a voyager off the promontory of Tænarum heard a strange cry, 'The great Pan is dead,' suggested to Milton the most beautiful stanzas in the *Hymn on the Nativity;* and the Lycean god has been sung by Beaumont and Fletcher, by Shelley, Keats, and Mrs. Browning.

Panache (Fr., Old Fr. *pennache*, Ital. *pennachio*, from Lat. *penna*, 'a feather'), in Heraldry, a plume of feathers placed upright in front of the helmet, and so arranged as to form a crest.

Panama', Isthmus of, connects Central and S. America, extending from 77° to 83° W. long. It forms the State of P., belonging to the Colombian confederation, and has an area of 29,756 sq. miles, with a pop. in 1871 of 220,542. The isthmus is traversed by a mountain range forming a continuation of the S. American Cordillera, and culminating in the peak of Picacho (7200 feet). In its eastern part and on the Atlantic shore there is a belt of low wet land with a very unhealthy climate; but the western portion rises into dry and comparatively healthy savannahs. The central range is rugged and precipitous, and is clothed with a rank tropical vegetation. Gold, iron, copper, and salt mines are partially worked, while the chief crops are rice, maize, cotton, and bananas. The isthmus is crossed by a railway 36 miles in length, connecting Aspinwall on the Atlantic, and the town of P. on the Pacific. It was constructed by United States enterprise, opened in 1855, and enjoys a transit trade of £11,000,000 yearly. The construction of a ship canal across the isthmus has been long discussed, and more than one survey for the purpose has been made.—**P.**, the capital of the State of the same name, on the Pacific side of the Isthmus of P., and on the Bay of P., an inlet of the Atlantic. The sea at P. is so shallow that vessels are obliged to anchor from 2 to 8 miles from the shore, under the lee of several small islands. The town is well-built, but has frequently been devastated by fire, the last disaster of the kind occurring in 1874. P. is a free port, but derives its chief importance from being the Pacific terminus of the P. Railway, and consequently enjoying a large transit traffic. The chief exports are indiarubber, hides, skins, and ivory nuts. In 1873 the value of the exports from P. amounted to £400,000, but fell to about half that figure in 1874, in consequence of Indian troubles. The old Spanish city of P., built in 1518 and destroyed in 1670 by the buccaneers, stood 6 miles N.E. of the present town, whose pop. in 1871 was 18,378.

Panathenæ'a, the greatest and probably the most ancient festival of the Athenian State, was celebrated in the month of July at Athens in honour of Athene Polias. Strictly speaking the P. consisted of two festivals, the one held annually under the name of the Lesser P., the other every four years under the name of the Greater P. The P. seems to have been a development of the feast Athenæa, instituted, according to tradition, by King Erichthonius about 1500 B.C., and originally confined to the city of Athens, but on the formation of the Attic confederacy by Theseus opened to all the Atticans, and receiving on that account the name P. The celebration included rich sacrifices of oxen, to which every town in Attica had to contribute one bull, besides various contests of skill, horse and foot races, and the *lampadephoria*, or torch-race. The Greater P. was distinguished by the more magnificent character of its sacrifices, by the recitation of the Homeric and other poems, and especially by the solemn procession of all Atticans on the last day of the festival to the temple of Athene Polias, for the purpose of presenting the goddess with the *peplus*, a crocus-coloured garment wrought by the maidens of the city. This procession, and other solemnities of the P., are represented on the frieze sculptures of the Parthenon now in the British Museum.

Pan'ax. See GINSENG.

Pan'cakes are cakes fried from a thin batter of flour, eggs, and milk, seasoned with salt and sugar. The following is M. Soyer's recipe for P.: 'Break two to four eggs into a basin, add four small tablespoonfuls of flour, two teaspoonfuls of sugar, and a little salt; beat the whole well together, adding by degrees half a pint of milk, or a little more or less, depending on the size of the eggs and the quality of the flour, so as to form a rather thick batter; next add a little ginger, cinnamon, or other flavour at will; lastly, put them into the pan, and when set and brownish, lay hold of the frying pan at the extremity of the handle, give it a sudden but slight jerk upwards, and the cake will turn over on the other side; when this is brown, dish up with sifted sugar and serve with lemon.' The use of P. is peculiarly associated with Shrove Tuesday, and this observance is supposed to be a relic of an ancient heathen festival continued in connection with the calendar of the early Christian Church.

Panchatan'tra. See BIDPAI.

Pan'creas (Gr. *pan*, 'all,' and *kreas*, 'flesh'), or **Sweetbread,** an organ of the higher vertebrata, situated in the abdominal region as an appendage to the digestive system. The P. in man lies somewhat transversely in the abdomen, or across the hinder wall of the belly, in the *epigastric* and *hypochondriac* (*right and left*) regions. It is a gland of oblong and flattened form, and has been compared in shape to a dog's tongue. It is broadened at its right extremity, is from 6 to 8 inches long, 1½ inches broad, and half an inch to an inch thick. It weighs usually from 2 to 3½ ounces, but 5 or 6 ounces is not an uncommon weight. The right extremity of the P. is covered by the bend of the *duodenum*, or first portion of the small intestine. Its body is covered in part by the posterior surface of the stomach; and the left extremity or 'tail' of the organ extends to the spleen, and overlies the left kidney.

The *structure* of the P. is strikingly similar to that of the *salivary glands* of the mouth. There is a loose and irregular division into lobules, which are in turn composed of ramified tubes. The secretion of the P. is conveyed from the organ by the *pancreatic duct*, which runs through the organ from left to right, and which opens into the *duodenum* in close relationship with the bile-duct from the liver. This duct is of the size of a quill at its intestinal end. The P. derives its *nerves* from the splenic plexus. The *arteries* of the P. arise from the splenic, &c., and the *veins* open into the splenic and superior mesenteric veins.

The *pancreatic juice*, or secretion of the P., like *saliva*, is a colourless, transparent, and alkaline fluid. Its specific constituent is *pancreatin*. In 100 parts of pancreatic juice there are of water 980·45 parts, and of solids, 19·55 parts. The solids consist of pancreatin, 12·71 parts; and of inorganic bases and salts, 6·84 parts. The functions of the pancreatic juice in digestion comprehend (*a*) the conversion of *starch* into *dextrin* and *grape sugar*, an action which the bile is powerless to effect; (*b*) to aid in the assimilation of *fatty matters*, by transforming them into an emulsion and thus rendering them fit for absorption by the lacteal vessels. In *Disease of the P.*, fatty and oily matters appear to be but imperfectly digested—(*c*) the dissolution of *albuminous matters*, and the production of a peptone, similar to that formed by the action of the *gastric juice*.

Panc'sova, a fortified town of Austria on the Servian frontier and on the Temes, near where it enters the Danube, 12 miles N.E. of Belgrad. It has an important trade in grain and cattle, and considerable industries in silk, brandy, &c. Pop. (1869) 13,408.

Pan'da or **Wah** (*Ailurus fulgens*), a species of *Carnivorous* quadruped found in Nepal, and allied to the raccoon, potto, &c. It attains a length of about two feet; its colour is a rich chestnut brown, deepest in hue on the outside of the body and legs; the head is greyish, and there is a whitish spot below each eye. The tail is ringed, the head short and broad, and the muzzle pointed. The soles of the feet are hairy. The P. appears to feed on birds and smaller mammalia. It is also fond of eggs, and robs nests to procure these dainties. The names 'Wah' and 'Chit-wa' are given to the animal from its cry.

Pandana'ceæ, or the **Screw-Pine Family,** is a singular natural order of monocotyledonous plants, numbering about 100 species, chiefly contained in the genera *Pandanus* and *Freycinetia*. The stem is arborescent, usually sending down aerial roots, sometimes weak and decumbent; the leaves imbricated in three rows, long, amplexicaul, and almost always spiny on the margins; the flowers diœcious or polygamous, and arranged on a covered spadix; the perianth wanting; and the fruit either fibrous drupes or many-celled berries. They are abundant in the Mascaree Islands, common in the Indian Archipelago and most tropical islands of the Old World, but are rare in America. Their strong aerial roots, which protrude from the stem, descend towards the earth, and reaching it, quickly bury themselves in the soil, are not only a source of nourishment but act as stays to prevent the stems being blown about in the sandy situations where the plant is usually met with. The fruit and seeds of many species are eatable, and their leaves furnish cordage and thatching material. From the unexpanded leaves of *Carludovica palmata*, the Panama hats are manufactured. Jipagapa in Ecuador is the principal seat of the trade—not Panama, which is a misnomer in the same way that 'Mocha' is for coffee. See SCREW-PINE.

Pánda'vas are the five sons of Pandu, whose life and war with the rival Kaurava princes form the subject of the celebrated Hindu epic the *Mahabharata* (q. v.). It is supposed that this war has some historic basis, but it is now impossible to discriminate it.

Pande'an Pipes, an ancient wind instrument formed by a number of reeds of graduated lengths. The Greek *Syrinx* and Roman *fistula* were of this nature.

Pan'dects (Gr. *pan de kai*, 'all-receiving'), the name given to a digest of the Roman law, made by the order of the Emperor Justinian. It consists of fifty books containing the opinions and writings of eminent lawyers. The books are divided into seven parts, which are as follows:—1-4, 5-11, 12-19, 20-27, 28-35, 36-44, and 45-50. The first contains the elements of law, defining justice, right, &c.; the second part treats of judges and judgments; the third of personal actions; the fourth of contracts, pledges, &c.; the fifth of wills and testaments; the sixth of the possession of goods; and the seventh of obligations, crimes, punishments, &c. The P. were compiled by Tribonian during the years 530–33. See ROMAN LAW.

Pandem'ic Waves of Disease. In 1858, Dr. Lawson, Inspector-General of Hospitals, while in charge of the Medical Department of the Army in Jamaica, investigated the records of mortality to ascertain whether they indicated the operation of local causes which might be removed. He says:—'After much consideration, I was led to the conclusion that epidemics proceeded regularly from south to north, and that they might be traced from the Cape of Good Hope to Iceland. They succeeded each other at the interval of a few years, and often affected places far distant in longitude; and their resemblance to a succession of waves led to their causes being designated P. W. As the course of these waves seemed uninfluenced by atmospheric currents, it was clear they must be owing to some terrestrial force; and their appearance at Mauritius and the Cape in the same year, and their subsequently manifesting themselves at more northerly latitudes on the eastern side of the Atlantic than on its western shore at the same time, taken in connection with the position of one of the magnetic poles to the N. of Canada and the S. of Australia, rendered it probable that the force was magnetic.' In regard to the progress of P. W. in the production of fevers and cholera, Dr. Lawson states that 'they take five years to go from the Cape of Good Hope to England. A febrific wave is supposed to start from the isoclinal, 70° S., on the 1st of January of a year with an odd number, and to overspread the zone between that and 53° in the course of the year. It will start from 53° on the first of January of the even year, and so on. As the waves are assumed to occur every second year, another will leave the isoclinal, 70°, in the next year, and will pursue the same course as that which preceded it. From this peculiarity, it follows that the first part of a wave is experienced in any given zone either always in an odd year or always in an even one. And the force of the epidemics is accordingly felt in each zone in the year peculiar to it, following that of the zone to the south of it, and preceding that of the zone to the north.' The theory of P. W. is not generally received by epidemiologists, and requires confirmation. See *Trans. Epidem. Soc.* (vol. iii. p. 216, Lond.).

Pando'ra (Gr. 'all-gifted'), according to Greek myth, was the name of the first woman on earth. After the theft of fire from heaven by Prometheus, the wrathful gods in revenge caused Hephaestus to mould a woman of surpassing beauty, whom they endowed with every seductive gift, and sent as a present to Epimetheus, brother of Prometheus. Epimetheus, despite the warning of his brother, received P., whose curiosity prompted her to open a box or cask which stood on the threshold of the house, whereupon there issued from it all the varied evils that afflict mankind, Hope alone remaining behind. The details of this myth are variously given and interpreted.

Pan'dours (from Pandur, a village near Kolocza), the name formerly given in the Austrian army to corps of light-armed foot, levied from among the Slavs on the Turkish frontier, and acting under their own leaders, called Harumbashas. Since 1755 the P. have been incorporated with the other frontier forces of the Austro-Hungarian Empire.

Pan'el, in English law, is the slip or 'pane' of paper or parchment containing the names of the jurors returned by the sheriff, or other ministerial officer, to serve on trials of issue in courts of law. The enrolment of the names upon the schedule is called *impanelling a jury;* and the returning officer is said to *array* the names on the P. In Scotch criminal law the accused, who is called the defender till his appearance to answer to the charge, is, after appearance, termed the P.

Pan'el (Old Fr., a diminutive of *pan*, 'a piece or pane,' Lat. *pannus*), in architecture, denotes a compartment with raised margins, as in wainscotings, ceilings, and the like. Panels are a common feature in the ornamental stone-work of Gothic buildings. They appear to a certain extent in the Norman style, have greater variety in the Early English, while in the Perpendicular style walls and ceilings are sometimes entirely covered with them in every variety of form. In modern buildings, panelling is chiefly employed in plaster-work and wainscoting.

Pan'fish, a name applied to a species of king crabs (*Limulus cyclops*) found in the E. Indies, where it is also known as the 'saucepan crab.' When limbs and tail have been removed, the buckler-shaped body or shell presents some slight resemblance to a saucepan.

Pan'ge Lin'gua (Lat. 'proclaim, O tongue'), a Latin hymn in honour of the Eucharist, written by Thomas Aquinas (q.v.), forms part of the service in the Roman breviary for the festival of Corpus Christi; and two verses, commencing *Tantum ergo Sacramentum*, are sung at the Benediction with the Blessed Sacrament.

Pan'golin, or **Ma'nis**, a name given to a genus of *Edentate* mammals allied to the Armadillos, and included in a special family, that of the *Manidæ*. They are almost the only members of Edentate order found outside S. America; being natives also of Africa and India. Two well-marked species are the Phatagin long-tailed manis (*Manis tetradactyla*), and the short-tailed manis (*M. pentadactyla*). The latter is sometimes distinctively named the 'Pangolin.' It occurs in India and Ceylon. Its length is 5 feet, inclusive of the tail. The P. is covered with horny scales, which invest both tail and body. The toes are provided with strong claws, enabling the animal to burrow with ease.

Pan'icle. See INFLORESCENCE.

Pan'icum. See MILLET.

Pánini, the great Sanskrit grammarian, who is said to have flourished in the 6th c. B.C., and whose work is still the standard authority among Hindus. It is divided into eight books, and is composed of nearly 4000 *sutras* or aphoristic verses. The system of grammar is entirely different to that with which we are familiar in Europe, being arranged not according to the parts of speech, but on the principle of classifying all cognate philological phenomena, such as the change of long vowels for short. The original, with commentaries, was published at Calcutta (1809) and at Bonn (1840). See *P., hi: Place in Sanskrit Literature*, by Prof. Goldstücker (Lond. 1861).

Paniput', a town in the district of Kurnaul, Punjaub, British India, 78 miles N. of Delhi. It lies on the direct route from Western Asia into the heart of Hindustan, and has been the scene of two decisive battles. In 1526, the Timurian Baber (q. v.) defeated the Afghan Ibrahim, and founded the Mogul dynasty at Delhi; and again in 1761 the supremacy of the Mahrattas in N.W. India was broken by the Durani or Afghan emperor, Shah Ahmed. In the neighbourhood are many ruins and tombs. P. was at one time the headquarters of a British district of the same name. There is a special manufacture of glass ware. Pop. (1868) 25,276.

Panizzi, Sir Antonio, K.C.B., some time principal librarian of the British Museum, was born at Brescello, Modena, September 16, 1797, and was educated at Reggio and at the University of Parma, obtaining the degree of Doctor of Laws in 1818. An ardent Liberal in politics, he was implicated in the Piedmontese revolution in 1821, and although condemned to death he managed to escape, and after wandering in Switzerland and Germany fled to England. Obtaining an introduction to the historian Roscoe, who gave him warm encouragement and cordial assistance, he settled first in Liverpool, where he remained an Italian teacher of repute till 1828, when he became Professor of Italian in University College. In 1831, through Lord Brougham's instrumentality, he received an assistant librarianship in the British Museum, and succeeded in 1837 to the Keepership of Printed Books. Among his earliest important duties were the transference of the printed books from Montagu House to Great Russell Street, and the compilation of a new catalogue, his designs for the work having been approved by the trustees. To his painstaking efforts are due in a very great degree the obtaining of a large increase in the Parliamentary grants to the Museum, the trebling of the number of volumes in the library, and the formation of the unequalled Reading-Room (1855–57). P. was appointed Principal Librarian in 1856, and retired on full pay in 1866. He was created a K.C.B. in 1869. His literary labours include the editing of the *Orlando Innamorata* of Boiardo and the *Orlando Furioso* of Ariosto (9 vols. 1830–34), prefaced by an able essay; an edition of the *Sonetti e Canzoni* of Boiardo in 1835; and a splendid reprint at the expense of Lord Vernon of the first four editions of Dante's *Divina Commedia* (1858). He has also written a number of pamphlets and critical papers.

Panjim'. See GOA.

Panno'nia, a province of the Roman Empire, bounded N. and E. by the Danube, S. by Illyricum and Mœsia, and W. by Noricum and Italy. It comprised the territory now known as Lower Austria, Carinthia, Carniola, the S.W. of Hungary, Slavonia, and parts of Croatia and Bosnia. Its inhabitants were of Illyrian descent. First conquered by Octavianus, B.C. 35, they were completely subdued by Tiberius in A.D. 8, and by Drusus on their revolt after the death of Augustus, when he divided the country into P. Superior and P. Inferior, the boundary being a line drawn from Arrabona in the W. to Servitium in the S.; P. Superior lying W. of the line. In the 4th c. Galerius took from P. Inferior the part N. of the Dravus, but Constantine the Great equalised the provinces by adding to Inferior the S. part of Superior. The chief towns were, in P. Superior—Vindobona (*Vienna*), Carnuntum, Petovio (*Pettau*), Æmona (*Laybach*), Siscia or Segesta (*Sissek;* in P. Inferior—Sirmium (*Mitrovits*), Mursa (*Essek*), Aquincum or Acincum (*Alt-Buda*), and Bregetium (*Komorn*).

Pann'us, or **Vas'culo-Neb'ulous Cor'nea**, is a vascular state of the cornea, with thickening of its epithelium, the result of chronic inflammation. Idiopathic P. is the result of corneitis, and the vascularisation of P. differs from other forms of vascularity in that the vessels proceed to the cornea from the conjunctiva and ramify upon the cornea in an irregular manner, with considerable intervals between them, the internal surface of the eyelid being smooth and natural. The blood-vessels of P. are also derived from those of the sclerotica, and they may pervade the whole of the lamellated tissue of the cornea to such a degree as to render it almost impervious to light. See OPHTHALMIA.

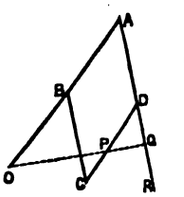
Panora'ma (Gr. *pan*, 'all,' and *orama*, 'a view') is, properly speaking, a painting which represents an extensive sweep of a landscape as viewed from one point, and is therefore disposed upon the concave side of a whole or half cylinder. The perspective of such a design is peculiar, and its execution difficult; but if well done the effect is splendid, and the optical illusion almost perfect. The inventor of the P. was Robert Barker (1739–1806), who first exhibited a panoramic view of Edinburgh in that city in 1788. The most successful in this department of

pictorial art, which has been almost wholly confined to the United Kingdom, was Robert Burford, who died in 1861. The term P. is often incorrectly applied to a *diorama*, which is simply an exhibition of a series of large landscape paintings viewed through an aperture. The diorama was invented by Daguerre and Bouton, and has been widely introduced as a public exhibition.

Panslav'ism, the movement towards Slavonic unity, is a modern growth, undreamt of by Catherine II. when she signed away to Prussia and Austria their shares of Poland. At the downfall of Napoleon's empire all Europe was seized with a passionate enthusiasm for nationality, which in Bohemia assumed the form of P. The philologues Kopitar and Shaffarick, the poet Kollar, and the historian Palacky, told each their tale of a mighty past, and literary and sentimental aspirations were quickened and extended by the misjudged attempts of the Prussian and Austro-Hungarian Governments to Germanise Poles and Czechs, and Magyarise Serbs, Slovaks, and Croats. The movement of the Western Slavs found a ready response among the down-trodden Slavonian subjects of the Porte, who with less to lose had everything to win. The first Panslavic Congress met with high hopes at Prague in 1848, the year of Kossuth's insurrection, and met to find that the sons of the 'Great Mother Slaveeya' could only make themselves mutually intelligible by means of detested German. But that and the succeeding year, by bringing Russian arms to quell a Magyar revolt, linked Russia with P., and raised the Czar to boundless popularity beyond his own domains. In Russia itself the Panslavic movement was hailed by widely different parties—by the Slavophils, who in Western civilisation 'saw nothing but the darkness of ignorance and superstition;' by politicians, who fancied that the road to Constantinople was over Vienna; and by the 'Young Russia' party, whose interests lay in agitation. The bases of union proposed were as various as the parties proposing them—the Orthodox faith to be received alike by Protestant Czechs and Catholic Croats, a general acceptance of the Russian language, or the adoption of the communal system of the Russian villages. The Crimean War (1854–55) came as a sudden check to high-formed hopes and schemes, the 'great brother' proving weaker than men had supposed, and having enough to fill his hands at home. Accordingly Bohemia set itself to achieve its independent liberties; the Slavs of Hungary joined with the Magyars in demanding a constitution; and Servia and Bulgaria entered on a course of native reform, establishing schools and printing-presses, rallying round their Church autonomy, and echoing Prince Michael's words that 'a strong and free Slavonic state would be the best rampart of the Ottoman Empire.' Except for Russian propagandism, the Panslavic movement would thenceforth have gradually dropped out of sight. But by sowing broadcast such pamphlets as the *Epistle to the Servians* (1860), and holding out inducements to young Slavonians to study at their universities, the Russian Panslavists carried on a silent campaign in Turkey, which culminated in the Moskow Ethnographical Exhibition of 1867. The second Panslavic Congress then held proved a greater fiasco than the first. The Bohemians commented strongly on the absence of Polish representatives, and Palacky denounced as a chimæra the conception of a common (Russian) tongue; Russian P., he said, was sheer Panrussism. Words of brotherly amity failing, Russia next resorted to a different line of argument—the argument of necessity. The phrases 'historical destiny' and 'inevitable choice between becoming Germans or Russians' acted powerfully on minds familiarised with *kismet*, and did much to kindle the insurrection of the Herzegovina (1875). Just before its outbreak Panslavist committees had been established in Moskow and every Southern Russian town of any size, which furnished funds and arms, and played an intermediary part between the insurgents and the Imperialist Government of St. Petersburg. The members of these committees were almost to a man advanced revolutionists, whose object was neither the destruction of the Ottoman Empire nor the deliverance of suffering fellow-Christians, but the overthrow of absolutism at home by involving Russia in an exhausting war. 'If Russia were to conquer,' was their language at the commencement of the war, 'it would be our greatest misfortune, for it would apparently prove to the people that the government had been good, and that nothing required to be changed.' Towards the close of 1875 the committees kindled anew the insurrection at a time when it seemed dying out; in 1876 their agents, Jonin, the consul-general at Ragusa, Wasselitsky, director of the Cettinje hospital, and Colonel Monteverde, afterwards sub-chief on Tchernaieff's staff, were busy enrolling volunteers in Servian and Montenegrin corps; a year later the Imperialist government stepped in, to enter on a war which Russian Panslavists had foreseen from the first, and which they counted on—rightly or wrongly time alone will show—as a means to the attainment of their end. See E. L. Mijatovics, *History of Modern Servia* (Lond. 1872), and *P., its Rise and Decline*, in the *Fortnightly* (July 1873); D. M. Wallace, *Russia* (2 vols. Lond. 1877); and *Panslavists and the Slav Committees* in *Macmillan* (November 1877).

Pan'sy. See VIOLET.

Pan'tagraph (Gr. *pan*, 'all' and *graphō*, 'I write' is a kind of link-work by which a plan may be copied, reduced, or enlarged. It consists of a jointed rhombus ABCD, of which the sides AB and AD are prolonged to double their length to the points O and R respectively. If a line OPQ be drawn, cutting CD and DR in P and Q respectively, then evidently by similar triangles OQ : PQ = AQ : DQ = AO : DP. Hence if the points P and Q be taken so as to satisfy the one condition that O, P, and Q are in the same straight line, the ratio OP : OQ is the same for every possible distortion of the frame, and hence if O be fixed, the two points will trace out exactly similar paths, but differing in dimensions according to the above ratio. For use the links CD and DR must be graduated and the pairs of corresponding points marked, so that the sliding boxes with the attached pencils or tracers may be adjusted in any required position.



Pantagraph.

Pantella'ria, a volcanic island of Italy, in the Mediterranean, 47 miles from Cape Bon and 80 from Trapani. It is 30 miles in circuit, produces wine, olives, cotton, and capers, and is noted for its donkeys and mineral springs. The town of Oppidolo, with its old castle, lies on the N.W. side. P., the ancient *Cosyra*, was a place of banishment under the Roman emperors. Pop. (1874) 7000.

Pan'thays are the Mohammedan inhabitants of Yunnan in S.W. China. This is the name given to them by the Burmese; by the Chinese they are called Auayz, but they call themselves merely Muslim. Their country is cut off by wide mountain ranges both from the sea and from any co-religionists, and their origin is a mystery. The most plausible conjecture, embodied in their own traditions, is that they are the deported descendants of an Arab force that once came to help a Chinese emperor. They are fair, tall, and strongly built, and in dress approximate to the Chinese; but they scrupulously preserve their own religious usages. In 1855, suffering under the exactions of the governor, and perhaps stimulated by the success of the Taepings in E. China, they rose in rebellion; and being assisted by the hill tribes, established an independent state. They cordially received a British expedition to promote trade in 1868; but in 1871 the Chinese imperialists, who had never ceased the struggle, took their capital Tali Fu, the Sultan committed suicide, and the Panthay rebellion was at an end. The country has recently been traversed by Lieut. Gill, R.E., who left Shanghai in February and reached British Burmah in November 1877. See Dr. Anderson's *Mandalay and Momien* (Lond. 1876).

Pan'theism, as a name was first given by Fay in his answer (1709) to Toland's *Socinianism Truly Stated . . . . by a Pantheist to an Orthodox Friend* (1705). The popular and etymological definition of the word would be that system of religion which identifies God with the universe, or according to which 'the all is God' (Gr. *to pan theos esti*) or 'God is the All.' But, as has been said, 'the word P. is the most indefinite of all indefinite words.' The actual meaning of the name depends on what is meant by the All, and what by God. Hence all so-called P. has lain between the two extremes of Materialistic P., according to which God is simply the gross material universe, and Spiritual or Idealistic P., according to which there is no material universe, what we call matter being merely an appearance, the image or shadow of the Infinite Being. It is this latter form of P. which is generally understood to be intended when the epithet Pan-

theist is applied to any one in modern times. Between these two extremes there is an intermediate form, which ascribes to the Infinite and Universal Being the attributes of both mind and matter, namely, thought and extension. P. has been the most widespread form of human thought regarding the origin and nature of the universe, underlying, as it has done, almost all the forms of religion which have ever existed in the world. Fetishism (q. v.), the lowest form of religion, rests on the assumption that Nature is Divine. But the earliest known origin of P. proper was in India, where it was taught that the Eternal Infinite Being creates by self-evolution, whereby he becomes and is all existence. In the Rig-Veda (q. v.) Brahm ('He that is') is all things; all material forms are simply the forms of Brahm. The other great religious systems of antiquity—the Persian, Egyptian, and Greek—were also Pantheistic. All had their foundation in the doctrine of Emanation. The deities of the later Polytheism, personifications of the powers of Nature, were emanations from one infinite, inconceivable, nameless Being (Brahm; 'Zeruane Akerne, which is not a name but means beginningless time; Ammon, 'the hidden One;' Zeus, 'the sky,' the unknown God) dwelling in the Light, as with the Persians, or in the Darkness, as with the Egyptians, who represented Nature in its infinitude, in which all things are contained, and of which all living things are the offspring. The fundamental principle of the different forms of Greek philosophy, Ionic, Eleatic, and Stoic, which all endeavoured to discover some one principle—material, spiritual, or double, that is active and passive, or material and spiritual—to which all modes of manifestation of being could be referred, was Pantheistic, in a material, spiritual, or hylozoistic form. With Plato God was an Idea which comprehended all other ideas, the universal intelligence which became individualised in the different orders of intelligent beings, gods, demons, and men. Of Neo-Platonism, according to which the soul of man was a mode of God's existence, and the universe the effluence of God, there were three phases: one allied to the Pagan philosophy; another to Judaism, as in Philo-Judæus (q. v.); and a third to Christianity, as in some even of the Christian Fathers, *e.g.*, Origen (q. v.), Clement Alexandrinus (q. v.), and Dionysius the Areopagite (q. v.). The influence of Greek and Oriental philosophy was still more apparent in the heresies of Manichæism and the different forms of Gnosticism; but the most pronounced P. in connection with the Christian Church appeared in the *De Divisione Naturæ* of Erigena (q. v.), whose four divisions were reducible to two—God, from whom all emanates, and the things which emanate from him; and these again to one—the identity of God and creation. During the Middle Ages, notwithstanding the exertions of the Church, the prevailing philosophy was Pantheistic. The doctrines of Erigena and the Averroism (see AVERROES) of Amalric de Bena and Giordano Bruno (q. v.) were not only professed by popular mystic sects, *e.g.*, the Beghards, Albigenses, and Brethren of the Free Spirit, but prevailed inside the Church, *e.g.*, among the Franciscans (q. v.), especially the Fratricelli (q. v.), and even the Schoolmen, according to whom the fundamental idea of the co-operation of Grace is the Pantheistic notion of a participation of Deity. The father of modern P. was Spinoza (q. v.), although his doctrines were purely those of his master Descartes (q. v.), the founder of modern ideal philosophy, who shrank from following his own principles to their legitimate conclusion. Descartes defined God as an infinitely perfect, uncreated, and necessarily existing Being; alongside of whom was the Universe, an infinite substance. Spinoza could find room only for one Infinity, and held that the created was merely modes of the uncreated, that the spiritual and the material were originally one. In the modern transcendental philosophy of Germany the forms of thought originated by Kant (q. v.) were developed into P. by Fichte (q. v.), Schelling (q. v.), and Hegel (q. v.). See Hunt's *Essay on P.* (Lond. 1866).

Pan'theon, a Roman temple built by Marcus Agrippa in his third consulate, 27 B.C., stands near the centre of the Campus Martius. It is in excellent preservation, and consists of two parts, the temple proper and the portico. The former is a circular building of fine brickwork 140 feet in diameter and height, rising into a dome which is the finest in the world, and which has universally served as a model in modern architecture. The interior is lighted by a circular aperture 40 feet wide in the centre of the dome, and contains eight splendid monolith columns, 32 feet high, of *giallo antico* marble. The portico, 100 feet wide and 40 feet high, is supported by 16 columns of Corinthian granite 13 feet in circumference, and 39 feet in height, and the frieze contains the inscription of Agrippa. The name P. may either have been derived from the fact that the building contained at one time the shrines of several deities, or from the unique appearance of its vast unsupported ceiling causing it to be likened to the vault of the heavens, the residence of the gods. In 609 it was consecrated by Pope Boniface IV. as a Christian church under the name of *Ste. Maria ad Martyres*, in commemoration of which event the festival of All Saints was instituted. The modern name of the church is *Ste. Maria Rotonda*. Within its walls lie the remains of Raphael and other famous men. In January 1878 it received the remains of Victor Emmanuel, the first King of United Italy.

Pan'ther, the name of a carnivorous quadruped of the family *Felidæ*, scientifically named *Felis pardalis*. By many zoologists the P. is regarded as the immature form of the Leopard (q. v.); some maintain that it is only a variety of that animal; while others consider it a totally distinct species. It is a native of the southern parts of the Old World. Its colour is a tawny yellow, and the spots consist of circles of smaller spots. The average length of the P. is six to seven feet.

Pan'tomime (Lat. *pantomimus*, from the Greek), a dramatic performance in which gesture takes the place of dialogue. Imitative acting of this kind has been common among the Chinese, the Persians, and other Oriental nations for many centuries. The Romans patronised with keen appreciation representations of dance and gesture only, the performers in which were called *pantomimi*, and similar entertainments spread from Italy at a very early period over all Europe. At the present day in some Continental opera-houses—as in that of Vienna—an entire night's entertainment composed solely of ballet, with pantomimic action, is frequently given. The word P. has now, however, a special signification as applied to the Christmas entertainments at our theatres so popular with young people. Almost every theatre in London a few years ago produced a pantomime on boxing night, but many of the smaller houses, unable from want of stage accommodation and resources to compete with their more spacious rivals, have discontinued the practice. In the national and historic theatres of Drury Lane and Covent Garden, we have still, however, all the dazzling glitter and fairy magnificence of yore. The legitimate drama is suspended that the heroes and heroines of the nursery, the princes and princesses of fairy-lore, and the genii and demons of superstitious childhood, may strut the boards, marshal gay processions of richly-attired knights and ladies, and survey the butterfly splendour of a hundred tripping nymphs. Thousands of pounds are spent, and hundreds of performers engaged, that the lavish glory of the spectacle may be complete. The Crystal Palace and Surrey Theatre pantomimes have well-established reputations, while those of Edinburgh, Liverpool, Glasgow, Manchester, Dublin, &c., are scarcely inferior. At the Adelphi Theatre in 1876 the experiment of a P. acted by children alone was tried for the first time with marked success. The P. proper, or 'harlequinade,' is the coarsely comic after-piece which follows the transformation scene of the extravaganza, in which the principal performers are the clown, a hilarious and athletic rascal, and the pantaloon, his hoary brother reprobate, who indulge in racy practical joking and wild horse-play, while harlequin with magic wand and the graceful columbine relieve the picture by illustrations of the poetry of motion. 'Sprites,' acrobatic performers, frequently appear also in the harlequinade. This sort of entertainment is said to have been first introduced into the country in 1702 by a dancing-master of the name of Weaver. The famous clown Grimaldi was the populariser of the harlequinade, which underwent many modifications in his hands.

Pantop'oda, a division of *Arachnida* (q. v.), represented by the 'sea-spiders' belonging to the genus *Pycnogonum*, of which *P. littorale* is a familiar species. These animals are notable from the fact that the digestive system extends into the legs, of which there are four pairs. The abdomen is rudimentary, and there are no specialised breathing-organs. The sexes are distinct. The order P. is sometimes also known under the name *Podosomata*.

Pa'oli, Pasquale di, a patriotic Corsican leader, born in 1726 at Rostino, in the Island of Corsica, was brought up at Naples, whither his father, Giacinto de P., had retired on the failure of his attempt to free his country. In 1755 P. was elected Commander-General of Corsica and head of an independent democracy, a position he held for twelve years, effecting many useful reforms, and accomplishing the expulsion of the Genoese. But the island having been ceded to France in 1768, he was completely defeated by the French troops under the Comte de Vaux, and forced to seek refuge in England. On the outbreak of the French Revolution in 1789 he was recalled to Corsica, where he founded a republic and allied himself to the British, with whose aid he succeeded in driving out the French. He then gave up the island to the English—a step which aroused the displeasure of his countrymen, whereupon P. returned in 1796 to London, where he died, 5th February 1807. See Boswell's *Account of Corsica* (Glasg. 1768); Lives of P. by Arrighi (Par. 1843); Klose (Brunswick, 1853); and Bartoli (Ajaccio, 1867).

Pa'pa, a town in Hungary, on the Tapolcza, 25 miles S.W. of Raab by rail, has a stately castle, and fine Roman Catholic Church, a Greek church, and a Reformed College, and manufactures cloth, pipes, and stoneware. Pop. (1869) 14,223.

Pa'pacy. See POPES.

Pa'pal States, formerly comprised that part of Italy of which the Pope was the temporal sovereign. The extent of the territory, varied at different times, but in 1859 the area was 15,774 sq. miles, and the pop. over 3,000,000. It stretched from Naples in the S. to the Po in the N., and was rather irregular in shape, the northern half lying for the most part E. and the southern half W. of the Apennines. The P. S. originated in the gift of Pippin the Short to Pope Stephen II., but it was not till the 11th c. that the temporal sovereignty of the Popes became a reality. Their alliance with the Norman conquerors of Naples, and the devotion of the Countess of Tuscany to the Papal See, resulted in a large extension of their authority N. and S. But it was not till the 16th and 17th centuries that the popes began to play a thoroughly secular part in Italian politics. Alexander VI., Julius II., Leo X., Gregory XIII., are among the most notable of the pontiffs to whom the enlargement of the P. S. is due. Napoleon Bonaparte incorporated the States with France, but the Congress of Vienna (1814) restored the papal authority. In 1859 the Romagna proclaimed its annexation to Sardinia; in the year following Garibaldi's victories in Sicily and Naples led to the revolt of Urbino and the Marches, which were also annexed to Sardinia, and finally, in October 1870, on the withdrawal of the French troops, Rome passed into the possession of Victor Emmanuel, and the temporal power of the Papacy came to an end.

Papavera'ceæ is a natural order of dicotyledonous herbs, usually with milky or coloured juice. The leaves are alternate, without stipules; the flowers are generally showy and on long stalks, with two or three deciduous sepals, and four or six petals crumpled in bud; the stamens are numerous; the fruit is long, siliquiform, one-celled, or capsular and many-celled, opening by pores at the apex; the seeds are many and small, the albumen, oily and fleshy. The P. abounds in Europe, extending sparingly eastward into N. Asia and Japan. Some are found in tropical America, but they are scarce in the southern hemisphere. The family possesses well-marked narcotic properties, and some are emetic, purgative, or acridly poisonous. The principal genus is *Papaver*, or the Poppy (q. v.). See CELANDINE, and SANGUINARIA. Representatives of *Eschscholtzia* are common in gardens.

Papaw', named by botanists *Carica Papaya*, belongs to the natural order *Papayaceæ* (by some systematists reduced to a tribe of *Passifloraceæ*). It is a soft-wooded, fast-growing, short-lived tree, about 20 feet in height, thick and gouty at the base, and bearing a crown of large glabrous palmate leaves on long stalks. The succulent fruit is of a dingy orange-yellow, generally oblong in shape, containing numerous black, wrinkled seeds, embedded in a soft mucous pulp. It is indigenous in Brazil, and probably also in Central America and the W. Indies, but is now cultivated in many tropical countries, and must have been early introduced into India. The fruit, for which it is chiefly valued, is eaten in an unripe state as a vegetable, and is likewise made into a preserve; when ripe it is very sweet and pleasant. The seeds are pungent. A peculiarity of the P. is that meat washed in water impregnated with its milky juice becomes tender, and the same result is obtained by suspending the joint amongst the leaves of the tree. In *C. spinosa*, the Chambaru of Guiana and Brazil, the juice is exceedingly acrid, causing blisters if it comes in contact with the skin. The fruit is not eaten, and the flowers have a disgusting carrion-like odour. The fruits of other species, *e.g.*, *C. citriformis* and *C. pyriformis*, are eatable, but are insipid. N. American P. is *Asimina triloba*, belonging to *Anonaceæ*. It yields a fragrant, fleshy, edible fruit.

Pap'enburg, a town of Prussia, province of Hannover, 27 miles S.S.E. of Emden, with which it is connected by rail and canal. It has a navigation school, and a trade in grain, peat, and timber, and manufactures sailcloth and cordage. Pop. (1875) 6819.

Pa'per (Fr. *papier*, from Lat. *papyrus*), a term derived from the material principally employed (see PAPYRUS) by the cultured nations of antiquity for writing purposes. The use of papyrus declined and altogether ceased with the decay of the Roman Empire and the gathering gloom of the dark ages, and when reviving learning gave rise to a renewed necessity for writing materials, P. had become a substance recognised among European nations. The origin and early history of P. appears to be lost in insurmountable obscurity, but all circumstances point to China as being the country where the art of P.-making was first practised, and from which a knowledge of the material was first obtained. It is certain that the industry was established in China several hundred years before the Christian era, and at that remote period P. was an article of much importance among the Chinese. The principal source of Chinese P. to the present day is the inner bark of the P. mulberry tree, *Broussonetia papyrifera*—the material which forms the principal part of the tapa or bark cloth of the South Sea Islands, and doubtless the facility with which this material may be pulped in water, and the readiness with which the pulp mats or felts on drying would be observed by the Chinese, and thus lead naturally to the preparation of P. Although the P. mulberry bark thus furnished the first P., the Chinese were not long in discovering that many other fibrous materials could be used for P.-making, and at an early period they utilised other closely allied bast fibres, cotton, bamboo-shoots, and straw; and at a later period they introduced cotton and linen rags. While thus the Chinese attained great experience in the art, western communities learned only slowly to make and use P. About the 11th c. the Arabs prepared P. from raw cotton, which for a period of nearly three centuries was the only quality of P. known in Europe; and so bad was it that in 1221 the Emperor Frederick II. ordered all imperial proclamations written upon P. to be transcribed on parchment within two years. P.-making appears first to have been practised in Spain early in the 14th c., and in 1390 a mill was established at Nürnberg, where it was discovered that linen and hemp were, equally with cotton, available for the manufacture, and moreover that the P. made from these fibres was much stronger and more durable than cotton P. The earliest notice of P. being made in England occurs in a work printed by Caxton about 1490, where, in allusion to P. made by John Tate, it is said:—

> 'Which late hathe in Englond doo make thys paper thynne,
> That now in our Englyesh thys booke is printed inne.'

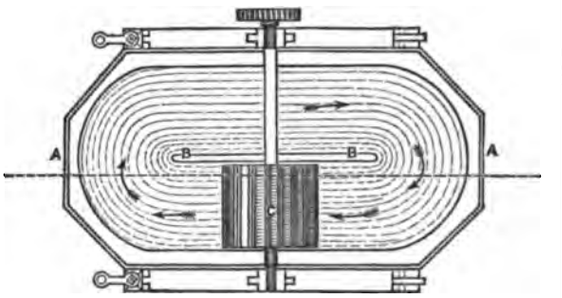
In the household book of Henry VII. two sums are noted as being given to Tate, one in 1498 and the other in 1499, as an encouragement for the working of his mill, which was situated at Stevenage in Herts. The art, however, did not make very rapid progress in England, and it was not till well in the 18th c. that the industry and perseverance of James Whatman raised P.-making in Great Britain to such a degree of perfection that it could compete successfully with the best products of Continental manufacturers.

P. may be regarded as a species of felt of fibrous material prepared by disintegrating the fibres to their smallest practicable size, making them into a thin uniform pulp, spreading the pulp out into thin layers, draining, drying, and pressing it. Both animal and vegetable fibres can be made into P., but except in the case of blotting P. and similar bibulous qualities, which are principally made from woollen rags, vegetable fibres are chiefly employed. Some of the materials from which P. was made in early times have been already alluded to; but as the

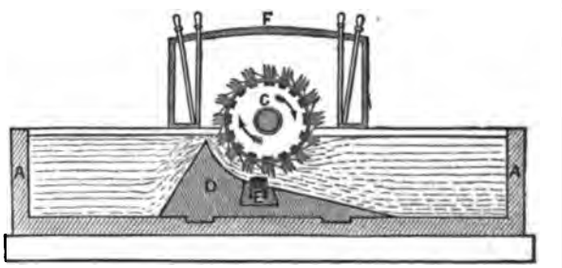
demand for the material has in modern times grown in an unparalleled manner, the substances which have been proposed for P.-making, and used with more or less success, are very numerous. The materials which most conveniently adapt themselves for P.-making happen to be those which are serviceable in textile industries, and as the rags and refuse of textile fibres are as well suited for P.-making as the raw fibres, it was only to rags that the manufacturers looked for their raw materials so long as the supply was equal to the demand. Thus, of course, the fact that fibres could be first used for clothing and like purposes, and afterwards devoted to P.-making prevented the profitable cultivation of these fibres for the direct and immediate use of P.-makers. But as the supply of rags became insufficient, other sources of P.-making materials had to be sought; and although the coarser qualities of P. presented no difficulty, it became a serious question how to maintain the supply of qualities of P. fit for printing and writing purposes. The desirability of obtaining new and additional sources of P. was indicated by the fact that so early as 1765–71 J. C. Schaeffer published a work, *Sämmtliche Papierversuche*, in six parts, in which no less than 81 specimens of P. prepared from different materials are incorporated. Among all the substances which have been proposed, and which are practically useful for supplementing the supply of cotton and linen rags in the fabrication of P., only a few have come into extended use in Europe, and of these the chief are esparto, diss, straw, and bamboo, all belonging to the order *Graminaceæ* or grasses, and various kinds of white wood. Of substances more rarely used or employed only by Oriental P.-makers there may be mentioned the leaves of the dwarf palm (*Chamærops humilis*), and of some other palms; the reeds of *Arundinaria macrosperba*, employed in America by the American Fibre Disintegrating Co.; sugar-cane refuse or megass, used in the West Indies; the bast of *Broussonetia papyrifera* and other species of *Broussonetia*, *Edgworthia papyrifera*, *Passerina gaufiri*, which, with two or three other fibres, yield the bulk of the P. made in China and Japan; bast of the baobab (*Adansonia digitata*); jute cuttings and 'butts,' being the ends of jute fibre; nettle stalks, used in Hungary; rhea fibre (*Boehmeria tenacissima*), China grass (*B. nivea*), and gombo bast (*Abelmoschus esculentris*), used in Paris. Potato stalks and hop bine have also been occasionally employed.

Rags, which yet form the staple and most desirable material for P.-making, are classified for the purposes of the manufacturer into 'fines,' 'seconds,' and 'thirds,' the latter class containing rough cotton fabrics, such as fustians, &c., and 'stamps' or 'prints,' principally printed and dyed calico rags. The expense connected with the preparation of straw pulp greatly limits the use of that material, but it is employed for common wrapping papers, and added to rag and esparto pulp for the cheaper kinds of P. Esparto, which is now a most important material, is the product of two species of *Macrochloa*, the one (*M. tenacissima*) found on the Mediterranean coast of Spain, and the other (*M. arenaria*) on the opposite African coasts. P. from esparto leaves was shown in the Great Exhibition of 1851, but it was not till ten years later that, through the exertions of Mr. T. Routledge, it came into prominent notice, and the import into England rose from 8000 tons in 1861 to 174,720 tons in 1877. Esparto is easily pulped, and yields a large percentage of ligneous fibre. Diss (*Ampeladesmos tenax*) is an allied grass obtained from the N. African coast. The value of bamboo as a P. material has been recently insisted on by Mr. Routledge. It is from the young green stalks of the bamboo, freed from their green epidermis, that the 'India P.,' used for taking the delicate impressions from engravings called 'India proofs,' is prepared. In connection with the use of wood in P.-making no less than 120 patents have been taken out in England during the present century. The soft white and non-resinous woods are most suitable for manufacturing; and in America, where the preparation of wood pulp has attained great importance, the wood of the tulip tree or American poplar (*Liriodendron tulipiferum*) is principally used, but the lime, poplar, aspen, willows, &c., also form suitable woods. P. manufacture involves two distinct sets of operations—(1) the preparation of the pulp, and (2) making of the P. from pulp.

Pulping of Rags.—The rags are first carefully gone over by women; seams are opened out, buttons, pins, &c., removed, and on a fixed knife the assorted qualities are cut up into small pieces. They are then placed in a '*dusting*' machine, and as far as possible cleaned by passing a powerful fan-blast through them. Thus prepared they are placed in a revolving cylinder boiler, and boiled for several hours with caustic soda under pressure, after which they are ready for maceration. The machine used for this purpose is termed an engine or 'Hollander,' being a Dutch invention of last century. It consists essentially of a large strong cast-iron cistern AA, seen in plan and secction in acompanying figures. The cistern is divided in the



centre by a partition *BB*. On one side of this partition there is a cylinder *C* studded with knife-edges, and which is set in rotation by an axle bearing on the two sides and the partition of the cistern. Under the cylinder is an iron breast and back fall D, sloping gently up at the intake side, and in it, directly under the cylinder, is studded a set of knife-edges *E*, against which the cylinder draws the material when it is in motion. A



cover F is placed over the cylinder when it is in operation, as otherwise, by the rapidity of its revolutions, the rags would be thrown quite out of the cistern. The direction in which the cylinder revolves is indicated by arrows, and the rags mixed with clean water circulate round and round in the direction also shown by arrows. The material passes through this apparatus with suitable modifications three separate times before it is completely prepared. In the first—the washing engine—while the rags are circulating and being torn or broken in, clean water is being constantly run in, and dirty water is drained away through fine gauze. The contents of the washing engine are next passed into the potcher or engine for bleaching, which is effected by a solution of chloride of lime. Rag pulp is passed into stone cisterns, where it lies in the solution for a day, and is subsequently drained and pressed to free it from the chlorine. Esparto and other pulps are pressed direct from the potcher. All remaining traces of chlorine are removed by washing or by antichlor (hyposulphate of soda) in the second or intermediate engine, where it is torn up to the condition of 'half stuff.' The half stuff is subsequently drained into the third beating engine at a lower level, where it is finished into a smooth uniform pulp with great rapidity, the cylinder of the machine revolving at the rate of from 100 to 150 revolutions per minute. The size in the case of printing paper is introduced into the beating engine before the pulp is finished, and if the paper is to be blued or any way tinted the colouring matter is also at this stage added. The size for printing P. consists of pounded alum and resin, and the blue is artificial ultramarine or smalts. In the successful preparation of pulp the quality of the water used has much influence; hence P.-mills are all centred on streams yielding a copious supply of pure water.

Hand-made P.—Till the early part of the present century all P. was made by the process here alluded to; but now it is employed for only a very small fraction of the total supply, principally for such special purposes as bank-notes, deeds, and records, account books, architectural and other drawings, &c. The prepared pulp is placed in a large vat, in which it is kept in continual agitation sufficient to prevent any precipitation. The sheets of P. are made by means of the 'mould' and the 'deckle.' The mould is a square hard-wood frame covered with wire-cloth, and made slightly larger than the sheet of P. for which it is used. The deckle is a thin frame held by the workman on the top of the mould, and enclosing and holding a sufficient quantity of pulp to make a sheet of the required thickness. Mould and deckle, thus forming a kind of shallow sieve, are dipped into the pulp vat, and drawn out in a horizontal position. The superfluous pulp flows over the edge of the deckle, and immediately the water begins to drain away through the wire cloth of the mould. The apparatus is moved about in a dexterous manner, so as to produce a regular distribution of pulp and a sheet of uniform thickness. The deckle is removed, the mould placed in a sloping position for a little, and the sheet, which has now some amount of cohesion, is placed on a piece of felt, which imbibes further moisture from the sheet. A pile of sheets and felts, equal to six quires of P., are thus made up, and put into a powerful press, where by squeezing still more moisture is expelled, and at the same time the surface of the P. is somewhat smoothed and levelled. Subsequently the sheets are separated from the felts, and piled together in another press by themselves, where they are still further dried and smoothed. They are next hung separately in a loft to dry, from which they are taken to be sized. The size is prepared from shreds and parings of parchment, and to the thin solution of size a little alum is added. Into this the sheets are dipped, the superfluous size is squeezed out and run back into the vat, and the sheets are again hung up to dry. Finally, they are examined, imperfect sheets are removed, they are piled and squeezed in a hydrostatic press, made up into quires and reams, and so ready for the stationer. The water mark and the makers' names seen in many papers are produced by bending wires to the form of the required device or letters, and attaching them to the surface of the wire cloth of the mould or machine. 'Laid' P., in which close placed parallel lines are observed crossed or barred with single lines wide apart, is made on a wire cloth consisting of close-set parallel wires held together by cross wires set at regular intervals, to which they are bound by fine wire. In 'wove' P. no such markings are seen, as the wire cloth used for it is ordinary woven wirework. These water marks are seen on account of the P. being thinner at those points where there is any elevation on the surface of the wire cloth.

Machine-made P.—While the size of hand-made P. is limited by the size of the moulds and deckles which workmen are able to support and move, machine-made P. may be altogether unlimited in length, because it is made in a continuous sheet, while its breadth is only limited by the breadth of the machine on which it is made. The one result of obtaining a continuous web of P. is an improvement of enormous importance when the necessity for considerable lengths in P. hangings, &c., is considered, and more especially when it is borne in mind that now all important daily journals are printed on 'web machines' (see PRINTING). The advantages in point of saving time and material are however even more considerable, while in uniformity of texture the machine-made P. is an improvement on that made by hand. The credit of originating the most beautiful and important machine now used for P.-making, is due to M. Louis Robert, a clerk in a P. mill at Essone, in France, which belonged to M. Leger Didot. The machine was patented in France by M. Robert in 1799, and in 1801 M. Didot brought the invention to England, where a patent was secured and assigned to Messrs. Fourdrinier, who with great and long continued labour and at an expense ruinous to themselves succeeded in making the machine a practical success. Many improvements have since the early part of the century been wrought on the Fourdriniers' machine, which is now one of the most perfect pieces of machinery in operation in the whole range of the industrial arts.

Without attempting any minute description of the P. machine it will be sufficient to indicate what it actually does. The pulp passes from the vat in which it is kept in motion by a cock into a trough in which is a mechanism for freeing it from knots. From the trough it flows out in a regular even stream over a leather apron, till it falls on the wire cloth 'form,' which in the machine is an endless band passing over and under a series of copper rollers of small diameter. The wire cloth as it progresses has a vibrating motion communicated to it whereby the draining of the pulp is facilitated, and the edges of the sheet are bounded by 'deckle' straps of indiarubber which press against the upper surface of the wire cloth. The draining of the pulp, while it travels over the wire cloth, is still further hastened by a partial exhaustion of the air under the wire cloth by means of air pumps or fan blast. After passing over the suction apparatus the pulp passes under a wire cylinder called a 'dandy roll,' which gives it the character of 'wove' or 'laid, and being now somewhat compacted, it passes between a pair of heavy felted rolls called 'couchers,' after which it leaves the wire cloth form, and passes on to an endless felt, on which it is carried forward till it is successively caught and squeezed between two pairs of rollers. The P. has now sufficient consistency to adhere without further support, and leaving the felt it passes over the surface of a series of drying cylinders heated internally by steam, from which it is wound upon a reel as finished web P. Writing papers undergo a subsequent process of sizing and glazing in a long drying chamber before they are ready for cutting into sheets of the different sizes used, but in the case of printing P. the requisite size is put into the pulp, and no further process is necessary except cutting into sheets where the P. is not used in the web.

The machine-making of P. has to a great extent rendered obsolete the old distinctions of sizes in P. which prevailed when only the hand moulds were used. Of hand-made writing and drawing papers the largest size made—called antiquarian—is 52½ × 30½ inches, and through numerous sizes, including double elephant, 39½ × 26½; atlas, 33 × 26; elephant, 28 × 23; imperial, 29½ × 21½; royal, 23½ × 19; post, 19½ × 15½; copy, 20 × 16; foolscap, 16½ × 13¼; it passed to the smallest—pott—15½ × 12½. Even in the case of hand-made P. these sizes varied, and in addition to many other sizes and designations, printing papers and wrapping papers had each for themselves a distinct set of sizes and names. Machines for cutting the webs of machine-made P. accurately to any size are in use, and names and water marks are introduced on the endless wire-cloth forms, so that each sheet of the P. when cut will show the names and devices at the same place.

Mill-board (q. v.) is simply a coarse P. made either by hand or in a modified form of machines having a huge drum around which successive layers of soft pulp are wound till the requisite thickness is attained. Pasteboard consists of a central layer of coarse P. on each side of which a thin sheet of fine P. is pasted. The finer boards, such as Bristol board, London board, &c., consist of sheets of P. pasted together, the sheets used varying in number according to the desired thickness of board. The varieties of P., as must be obvious to the most superficial observation, are almost numberless, but they may be all classified under such heads as writing, printing, wrapping or packing, fancy papers, and 'boards.'

Rudel's tables for 1873 gave the number of mills in the world as 2309, of machines 2042, and the product as 1,198,000 tons. According to Lockwood's tables for 1872 the United States had 812 P. mills (value $35,500,000), 299 Fourdriniers' machines, 690 cylinder machines, 3296 engines, employing 13,427 men, 7700 women, and 922 children; yearly produce 317,637 tons (value $66,500,000). Mr. W. Arnot, F.C.S., Edinburgh, in a lecture on the manufacture of P. at the rooms of the Society of Arts, London (January 1878), stated that the number of mills in Great Britain was 385, of which 65 were in Scotland. The mills had 536 machines at work, producing annually 350,000 tons of P., to which should be added 10,000 tons made by hand, the value of which amounted to £20,000,000. With respect to the consumption of P. in different countries Mr. Arnot stated that in Russia the annual consumption was 1 lb. per head of the population, in Spain 1½, Mexico and Central America 2, Italy and Austria 5, France 7, Germany 8, United States 10½, and Britain 11½.

Paper Days, in English law, are certain days in each term, so called because on them the court hears the demurrers (see DEMURRER) or issues at law which have been entered in the Paper Book (q. v.) for argument, before they enter upon motions.

Paper Hangings are a modern substitute for the costly tapestries, figured silks and velvets, &c., formerly used in decorating the interior walls of dwelling-houses. P. H. have been in use in China from time immemorial, and large quantities were imported into Britain towards the close of the 17th c., at which time the home manufacture was first established. In 1634 Jerome Langer patented a process of producing cheap substitutes for tapestries by affixing with oil-size dyed wool in powder called *flock* to linen and cotton grounds. He does not seem to have used paper, but later in the same century flock P. H. began to be manufactured, and afterwards block-printed and stencilled P. H. were introduced. The growth of the new industry was for a century and a half greatly impeded by a heavy impost, and consequently P. H. were then only found in the homes of the wealthy. In 1836 the duty on P. H. was repealed, with the happy result of greatly advancing the manufacture. The invention of the paper-making machine, too, gave a great impetus to the art by providing endless sheets of paper in place of the small separate sheets previously available. P. H., as now manufactured, are of two kinds, *hand* or *block* and *machine-printed*. In block-printing the paper first receives a uniform coat of colour to form the ground, and the pattern is produced by many operations with figured wooden blocks, supplied with colour or size. The blocks, which measure 21 inches in breadth and vary in length according to the pattern, bear particular portions of the complete design, either carved in relief for printing a surface pattern, or formed with strips of brass fixed edgewise and bent into ornamental contours for an outline pattern. The blocks also carry 'guide lines' and pins to guide the printer in laying them on the paper. The peculiar glossy grounds of *satin* papers are produced by coating with Paris white and then polishing with brushes and powdered French chalk. *Flock* P. H. have dyed wool in powder sprinkled over a kind of size, and *gold* P. H. take their name from a similar application of gold or Dutch metal in leaf or powder. The brilliant effects of *stamped gold* P. H. are obtained by impressing heated metal dies on the gold leaf, and *embossed* P. H. are finished by being passed between an engraved brass cylinder and a paper roller, markings in imitation of leather being produced in this way. Machine-printed P. H. are inferior in many respects to block-papers, but their sale is enormously greater on account of their cheapness. The tinted paper is rapidly passed in the continuous web through a machine resembling a calico-printing machine, and leaves it with the design complete, and also marked off into 12-yard pieces, which are ready for the market after being rolled up by machinery. A two-colour pattern is printed at the hourly rate of 500 pieces, and 100 pieces of a twenty-colour pattern are thrown off in the same time. Each of the printing-rollers has that portion of the pattern belonging to one colour inlaid in brass outline, and for broad-surface printing the interspaces are filled with felt, which takes up the colour from the trough and parts with it when pressed against the paper. British P. H. have of late years been brought to a high state of perfection, and this is greatly due to the valuable services rendered to the art by Owen Jones and other celebrated designers. For artistic excellence French productions stand unrivalled.

Paper-Mulberry. See MULBERRY.

Paper-Nautilus. See ARGONAUT and NAUTILUS.

Paphlago'nia, anciently the most northern province of Asia Minor, was bounded N. by the Black Sea, W. by Bithynia, S. by Galatia, and E. by Pontus. The country measured about 200 miles from E. to W., and about 100 from N. to S. The northern part consists of fruitful plains, but the S. is rugged with the spurs of Mount Olgassys. The only town of great importance was the capital Sinope, on the shore of the Euxine. The name P., which is very old, being mentioned by Homer (*Il.* ii. 851, &c.), is derived (according to legend) from Paphlagon, son of Phineus. The Paphlagonians were famed in antiquity as soldiers, and especially for their cavalry. P. was conquered by Crœsus, along with the rest of whose possessions it passed to Persia. After a brief period of freedom, it fell into the hands of Mithridates. Under the Romans it was first ruled by tributary princes, but after the 1st c. A.D. it formed part of the province of Galatia.

Pa'phos (mod. *Baffo*), the name of two ancient cities situated in the S.W. of Cyprus: **Old P.** (*Palaipaphos*) on an eminence, 2 miles inland; and **New P.** (*Neapaphos*), on the seashore, 8 miles to the N.W. The former contained a famous temple of Aphrodite, who was fabled to have landed here when she sprang from the foam (Hom. *Od.* viii. 362); while at New P. St. Paul preached before Sergius Paulus, and struck the sorcerer Elymas with blindness.

Pa'pias, one of the Apostolic Fathers (q. v.), and Bishop of Hierapolis, a city of Phrygia, is said to have suffered martyrdom in the year 163 A. D. Irenæus, from whom, with Eusebius, all our information regarding him is derived, calls him a disciple of John (doubtless meaning the Apostle) and companion of Polycarp (q. v.). Eusebius, however, quotes his own words to show that it was not the Apostle, but John the Presbyter, who was the instructor of P. He wrote a Greek work in five books entitled *An Exposition of the Lord's Sayings*, of which only a few extracts are preserved by Eusebius, who informs us that the work was compiled from unwritten tradition, containing 'some strange parables and doctrines of the Lord, with other fabulous stories, which the authority of so venerable a person. . . . imposed upon the Church for genuine.' P., like most Christians of his time, held the doctrine of a Millennium (q. v.), a belief which Eusebius explains in the case of P. by his interpreting literally and grossly what the Apostles had delivered in a typical or mystical sense. There is one important tradition recorded by P. regarding Matthew and Mark—namely, that the former 'wrote *The Sayings* in the Hebrew language,' and that the latter, having become the interpreter of Peter, 'wrote accurately what things he remembered.' See Donaldson's *Christian Lit. and Doct.* (Lond. 1864).

Papier-Mâché (Fr. 'mashed paper') is a material used for making small boxes, cabinets, trays, portfolio covers, ornaments on large gilt frames, and the architectural decoration of interior walls and roofs. It consists mostly of waste paper repulped and pressed in moulds to the required form; old wall posters, &c., are found to be very suitable for this purpose, owing to their coatings of paste. For the finer varieties of work, sheets of paper glued together are employed, these being damped and moulded in the same way as the pulped paper. When the moulded article is made, if not intended for an architectural ornament, it is varnished and decorated in various ways, the most common method being to coat it with successive coverings of Japan black, in which thin slices of mother-of-pearl are imbedded to form an ornamental design. When, by repeated coatings, the Japan black is level with the top of the inlaid pearl, the surface is smoothed and polished, and generally finished with colour or gold, and a coat of transparent varnish. The P.-M. trade is an important Birmingham industry, where imitations of the fine lacquer-work of Japan and China are largely produced. On account of its lightness, P.-M. is a material in considerable use for the ornaments of large gilt picture frames; the House of Lords and many other important public buildings are internally decorated with P.-M. gilt ornaments.

Papil'io, a genus of Butterflies (q. v.), including many well-known forms, *e.g.*, the swallow-tail (*P. Machaon*), Sarpedon (*P. Sarpedon*), Hector (*P. Hector*), &c. In this genus, which forms the type of a family (*Papilionidæ*), the hinder wings have a prominent 'tail.' The larvæ vary in appearance and size.

Papiliona'ceæ is by far the largest of the three sub-orders of *Leguminosæ*, comprising about 300 genera and 5000 species. In it are included all those with papilionaceous or butterfly-like flowers. The flower of the pea is a good illustrative example. It consists of five petals, the upper one is exterior and is called the *standard* or *vexillum*, the two lateral ones are termed *alæ* or *wings*, and the two inferior, more or less cohering, form the *carina* or *keel*. The useful and beautiful plants included in P. are very numerous, and their medicinal properties very various. The principal ones are described under separate titles, *e.g.*, Bean, Broom, Calabar Bean, Clova, Gum Tragacanth, Indigo, Kidney Bean, Kino, Laburnum, Liquorice, Lucerne, Melilot, Pea, Sandal-wood. The whole of the British leguminous plants, numbering 78 species, belong to this sub-order.

Papill'æ, the name applied in anatomy to indicate any small or minute protuberances of the skin-surface. Those of the skin are good examples. They consist of processes of the *dermis* or true skin covered by the *epidermis*, and receiving the termina-

tions of the nerves, thus becoming adapted for exercising the functions of sensory organs. See SKIN, TOUCH, TASTE, &c.

Papin, Denis, a famous French physicist, was born at Blois, August 22, 1647. He studied medicine at Paris and practised for some time as a physician; but, encouraged by Huyghens, he ultimately turned his attention to physical science. The Edict of Nantes compelled him to leave his country, and after a considerable period spent in England, where he became intimate with Boyle and other English philosophers, he was offered in 1688 the chair of mathematics in the University of Marburg in Hessen-Kassel, which he accepted and held for many years. He died at Marburg in 1715. P. is best known for the invention of the *digester* which goes by his name (see DIGESTER, PAPIN'S). He made, further, many important discoveries in the action of heat, and was the first to construct a veritable steam engine. He also improved the air-pump, and demonstrated the alteration of the boiling point of a liquid under altered pressure. See La Saussaye et Péang, *La Vie et les Ouvrages de D. P.* (Par. 1869).

Papinia'nus, Æmilia'nus, one of the most famous Roman jurists, was born about 140 A.D. He is said to have been related to Julia Domna, the second wife of the Emperor Severus, and this is supported by the many favours conferred upon him by that monarch, whom he succeeded as *Advocatus Fisci*, and under whose reign he was created successively *Libellorum Magister* and *Præfectus Prætorio*. It is probable that during the residence of Severus in Britain (208–211) P. also lived there; and it is said that the Emperor, before he died at York (211), commended his two sons Caracalla and Geta to his care. Caracalla, however, having in the second year of his reign murdered his brother, and no doubt considering that the strict integrity and great legal knowledge of P. must render the latter hostile to himself, caused him to be put to death (212). P., who has always been regarded both in character and intellect as a model jurist, wrote several important works, which were annotated by Paulus and Ulpius, and on which Cujacius composed elaborate commentaries. There are extant 595 extracts in the Digest (q. v.), from his seven books of *Quæstiones*, nineteen of *Responsa*, two of *Definitiones*, and two *De Adulteriis*.

Papp'enheim, an old Swabian family, which took its name from the district of P., in Middle Franconia. In 1439 the family divided into four branches, Gräfenthal, Algöw, Treutling, and Alzheim. The first three are long since extinct, and of the fourth, the only representative, a Protestant, holds the estate of P. in Bavaria. For the loss of the office of Marshal of the Empire, since the 12th c. hereditary in the family, compensation was given at the Peace of Paris in 1815. In 1831 the head of the family received the title of 'Erlaucht' from the King of Bavaria.—**Gottfried Heinrich von P.,** born 29th May 1594, distinguished himself as an Imperial general of cavalry in the Thirty Years' War, not more by his extraordinary bravery than by his harshness and cruelty. His first great exploit was as a colonel in the battle of Prag in 1620. In 1623 he was placed by the Emperor at the head of a regiment of cuirassiers, which was afterwards generally known as 'the Pappenheimers.' He was made a field-marshal in 1629; from the summer of that year he lay before Magdeburg, remaining there after Wallenstein's deposition, under the command of Tilly. It was mainly through the exertions of P. that Tilly took that city (10th May 1631). After Tilly's defeat at Breitenfeld, P. accompanied him to Westphalia and Hessen, where with changing fortune he led the petty war against the Landgraf Wilhelm V. Failing in an attempt on Maastricht in 1632, he was recalled by Wallenstein to Thuringia. From Halle, whither Wallenstein had sent him, he turned (6th November 1632) with his cavalry to the battlefield of Lützen, too late to prevent defeat. Mortally wounded, he died the next day at Leipsic. See Hess, *Gottfried Heinrich Graf zu P.* (Leips. 1855). His line died out with his son in 1647.

Papp'us. In *Compositæ* the margin of the calyx develops after the withering of the flower, sometimes remaining membraneous and entire (*coronate*), but is usually transformed into bristles or hairs called P. This may either be simple (*pilose*), or feathery (*plumose*), and either stalked (*stipitate*), or not stalked (*sessile*). Of pilose stipulate the dandelion is an example; of the pilose sessile, the groundsel; of plumose stipitate, the goat's beard; and of plumose sessile, the scorzonera. The chicory and tansy have a coronate P. Instances occur also in the valerian and teazle orders. The advantage of P. is the ready dispersion of the seeds by the wind.

Papp'us of Alexandria, one of the later Greek geometers, flourished, according to Suidas, under the reign of Theodosius the Great (A.D. 379–395). His chief work is his *Mathematical Collections*, which consisted originally of eight books, of which, however, the first and second have been lost. Wallis, it is true, in 1688 published a *part* of the second book at the end of his edition of Aristarchus, and from its nature it has been supposed that these first two books treated of arithmetic. The other books collect together the most interesting of the theorems of ancient geometry, the duplication of the cube, the properties of plane and solid figures, and also investigations of some of the curves of higher orders than the second. The seventh book is on geometric analysis, and is prefaced by a history of this branch of the subject, and the eighth treats of machines. His other reputed works have been lost, except a fragment of a *Commentary on Four Books of Ptolemy's Syntaxis*. There are two Latin versions of P., by Commandine (1588) and by Manolessius (1660); the Greek text was published by Eisenmann (Par. 1824).

Papu'a. See NEW GUINEA.

Pap'ulæ and Pap'ular Disea'ses. A papule or pimple is an elevation of the cutis covered by its cuticle, due to effusion of inflammatory lymph into the substance of the true skin. P. generally terminate by resolution, sometimes by slight desquamation, and occasionally by ulceration. P. D. are chronic in their course, non-contagious, and attended sometimes with itching.

Papy'rus (*Cyperus Papyrus*) has recently been shown to have a much wider distribution than was formerly supposed. In Africa it probably forms a characteristic member of the tropical flora. On the White Nile, and in Abyssinia to 12° N., it was found by Bruce: by more than one authority it is stated to be abundant on the banks of the Lagos in the Niger District, and it has been gathered not only from the Congo but as far S. as Delagoa Bay. In the last century, when Bruce saw it in Lower Egypt, he did not consider it native. It is now extinct there, and the probability is that it had been originally introduced from Nubia and cultivated, gradually dying out when left to hold its ground without human intervention. In his progress up the Nile in 1872, Dr. Schweinfurth first came upon the P. in lat. 9° 30′ N., below the point where the main river is joined by the Gazelle. At the westerly bend of the Nile, there is a vast jungle of P. in which the plants are 15 feet high. A passage in Strabo infers that those who had the manufacture of the writing materials from P. were careful to restrict its growth to a few places in Lower Egypt. It was also identified by Bruce in the upper waters of the Jordan, where in 1864 the Rev. H. B. Tristram saw many acres of it in the almost inaccessible marshes of the Hûleh—the waters of Merom of the Bible. He reports that the Beduins there cut down the stems for thatching purposes, and collect the roots as fuel. In this locality Mr. Macgregor (*Rob Roy*) speaks of it forming along with a cane a vast floating forest, perfectly dark inside. 'I could not penetrate more than three feet. Many of the stems were as thick as my arm. The water percolates below and through the spongy mass, and there loses at least half its volume by absorption and evaporation. The impassable barrier is about a mile wide.' Mr. Tristram also found it growing luxuriantly by the shores of the Lake of Galilee, and from a very early period it has been known as a plant of the plains of Acre and Sharon. In Sicily, where it grows on the eastern side of the island about Syracuse and Milili, and formerly growing at Palermo, the late Professor Parlatore considered it introduced from Syria in the 10th c., being first mentioned in the travels of Abn-Haucal, an Arab author of that date. But Parlatore has endeavoured to show that whilst the Sicilian plant was identical with that of Syria, it was distinct from the true P. of the Nile. The differences consist in claiming for what may be called the Mediterranean plant (*C. Syriacus, Parl.*) a spreading inflorescence like a mop, with very short linear leaflets (*bracteoles*) subtending the spikelets; and, in contradistinction, for the Nile plant (*C. Papyrus, Parl.*) a close besom-like inflorescence, with very long bracteoles, which are also more numerous. This view has not obtained general acceptance among botanists. A *Cyperus* discovered in Madagascar (*C. Madagascariensis*) is closely allied to the P., if not a

variety. It occurs also in Mauritius, but is a doubtful native there. The P. was first cultivated in a botanic garden by Cæsalpinus, who introduced it to Pisa from Sicily. L'Obel saw it there, and identified it with the plant described by Theophrastus and Pliny (*Adversaria Nova*, 1576, p. 38). The earliest figure is that given by Prosper Alpinus in 1640.

P. was used in Egypt and among other civilised communities, almost exclusively in remote times, for books and written documents. The substance was prepared from the liber, or internal white pithy substance of the plant which was known to the ancient Egyptians by the name *Byblos*. The intimate relation which this plant and its products had to literature is seen in the fact that from its name P. is derived the word paper; its Egyptian name byblos passed into the Greek *biblion*, a book, and from liber, the part of the plant employed, is derived the Latin word *liber*, a book. Among the ancient Egyptians in the Upper Nile the plant was cultivated with the greatest care. It was known to the Greeks at an early date, but first came into general use among them after the time of Alexander the Great, and its manufacture continued to form for several centuries a great industry at Alexandria. Its use lingered on till the 12th c. both in the Eastern and Western Empire, but long before that time it had been largely superseded by Parchment (q. v.). The mode of preparation was simple. The white cellular tissue of the P. was separated into thin layers, and spread out on a level surface, three layers, crossing at right angles, being superimposed on each other. By pressure these, while in a damp, sappy condition, became united into one uniform sheet, which, after drying, was smoothed and softened by hammering, and polished by rubbing with an ivory rubber. P. is yet made in Sicily in small quantities, but merely as a curiosity. For books, sheets of P. were united into a continuous length, which were made in rolls (Lat *volumina*, from *volvo*, 'I roll'), whence the modern 'volume.' The Egyptian *papyri* are of great antiquity, some probably as old as 2000 B.C. They have been found chiefly beside or upon the bodies of mummies, and relate to almost all kinds of religious and secular subjects. They are divisible into *hieroglyphical*, *hieratic*, and *demotic papyri*, according to the characters in which they are written. (See EGYPT and HIEROGLYPHICS.) The excavations at Pompeii and Herculaneum also resulted in the discovery, among other things, of a large quantity of *papyri*.

Para', the southern and most frequented branch of the Amazon, with which it is connected by several narrow and very deep channels. It is 200 miles long and 36 miles wide at its mouth, and is entirely navigable for the largest vessels. Its principal affluent is the Tocantins (q. v.).

Para', a province of Brazil, occupying the N.E. portion of that empire, and extending from the Guiana frontier to the parallel of 10° S. lat., and from 46° to 57° W. long. Area, 412,464 sq. miles; pop. (1872) 259,821, of whom 27,199 were slaves. The province consists for the most part of an alluvial plain, covered with luxuriant forests and drained by magnificent rivers, of which the principal are the Amazon, Tapajos, Xingu, and Tocantins. In addition to its forest wealth and agricultural capabilities, the province is known to possess valuable, though still unworked, natural resources in the shape of gold, diamonds, iron, and coal.—**P.**, or **Belem**, capital of the province of the same name, is at the junction of the river Guamá with the estuary known as the P. river, which is here 20 miles wide. P. was founded in 1615, but through misgovernment had a very troublous career till 1848, since which year it has steadily progressed. The streets, which are traversed by tramways, are well laid out, and are lined by handsome houses and public buildings. Of the latter, the chief are the palaces of the governor and bishop, and the cathedral. As the emporium of the Amazon valley trade, P. is of great commercial importance. During 1875 the imports amounted in value to £675,000, and the exports to £1,700,000, the principal articles of export being indiarubber, nuts, cocoa, hides, piassaba, balsam capivi, and annatto. The climate of P., in spite of its equatorial position, is remarkably healthy. Eleven newspapers are published in the town, the pop. of which in 1872 was 25,000.

Para, a small Turkish coin, usually made of copper, and valued as the 1-40th part of a Piastre (q. v.). Consequently it is about 1-18th of an English penny.

Par'able (Gr. *parabolē*, from *paraballein*, 'to compare'), as a form of conveying instruction has been almost universally employed, but its true home has always been among Eastern nations, whose exuberant imagination, combined with elevation of thought and of feeling, has made them adepts in the art of inventing and interpreting ingenious comparisons and riddles. A P. may be defined as a fictitious narrative invented for the purpose of conveying truth in a more engaging form than direct assertion. It has been distinguished from the Fable (q. v.), as being intended 'to set forth a truth spiritual and heavenly;' from the Myth (see MYTHOLOGY), in which the vehicle of a truth and the truth itself are blended together, by the distinctness always apparent in the P. between the shell and the kernel; from the Proverb (q. v.), which is more concentrated than the P., and generally more obscure; and from the Allegory (q. v.), by keeping distinctly apart the two things compared, while in the allegory the properties and qualities of the one thing are transferred to the other. See Trench's *Notes on the Parables of Our Lord*, (9th ed. Lond. 1864).

Parab'ola is a plain curve of the second order, and may be defined as the locus of the point whose distances from a given point and a given straight line in the plane of the curve are equal. The given point is called the focus, and the straight line the directrix. The line drawn through the focus perpendicular to the directrix is the axis of the P., and the line drawn from any point in the curve parallel to the axis is a diameter. From the method of its description, the curve can meet a diameter in only one point, so that a P. is a curve with infinite branches. The point where the curve cuts the axis is called the vertex, and the perpendicular from the vertex upon any tangent-line intersects that tangent-line in the directrix. Chords drawn parallel to the tangent at a given point are bisected by the diameter drawn through that point—a property common to the other conic sections—the circle, ellipse, and hyperbola. The P. is the curve in which a right cone is intersected by a plane parallel to the side of the cone; and this view of the curve also indicates its non-closed nature. It may be regarded indeed as the limit of an ellipse, whose eccentricity is increased indefinitely; and the portions of a very eccentric ellipse which are close to the extremities of the major axis may be treated as portions of parabolas. Thus the paths of comets at their perihelion passage are calculated as parabolic. The focal line and the diameter through a given point make equal angles with the tangent at that point; or their contained angle is bisected by the normal. Hence all rays of light parallel to the axis are reflected from the internal side of a P. or paraboloid (see PARABOLOID) so as to pass through the focus. The equation to the P. referred to its vertex as origin is $y^2 = 4ax$, where x is measured along the axis, y along the tangent at the vertex, while a is the distance of the focus from the vertex or of the vertex from the directrix. When $x = a$, $y = \pm 2a$, and the double ordinate $2y$ $(= 4a)$ through the focus is called the *parameter* or *latus rectum*. If the origin be transferred to any point on the curve, and the co-ordinate axes be taken along the diameter and along the tangent at the point, the equation still retains the same form, and a is still the focal distance of the *origin* from the focus. In analysis, any curve having an equation of the form

$$y^{m+n} = a^m x^n$$

is called a P. There are two of the third order, $y^2 = a^2 x$, the *cubical* P., and $y^3 = ax^2$, the *semicubical* P.

The quadrature of the common P. was effected by Archimedes, who proved that the area enclosed by an arc, the diameter through one of its extremities, and the ordinate through the other, was equal to two-thirds of the parallelogram constructed on the ordinate and abscissa. The P. is also the curve which a projectile describes under the action of a constant force acting in one invariable direction. See PROJECTILES.

Parabola'ni (Gr. *parabolanoi*, from *paraballesthai*, 'to expose one's life to danger') were an inferior order of the clergy in the early Church, first mentioned in the Theodosian Code (415), although there spoken of as an existing institution. Their duties were to wait upon the sick, especially in times of pestilence. At Alexandria they were incorporated into a society to the number of 500 or 600, and were chosen out of any class except those who were bound to serve in civil offices. At first under the government of the chief civil magistrate, they were afterwards put under the entire control of the Bishop.

Parab'oloid is generally any surface of the second order, some of whose plane sections are parabolas. Elliptic and hyperbolic paraboloids are distinguished according to the nature of their other sections. The *P. of Revolution* is generated by the rotation of a parabola round its axis. Its section by a plane perpendicular to the axis is therefore a circle. In physical science, this surface is interesting as the form of surface which should be given to a reflector, so that parallel rays may be all reflected to one definite focus. See PARABOLA.

Paracel'sus, whose proper name was **Philipp'us Aure'olus Theophrast'us Bombast'us von Hoh'enheim**, a celebrated physician, alchemist, and mystic, was born December 17, 1493, at Maria-Einsiedeln in the Swiss Canton of Schwyz. His early education was conducted by his father, Wilhelm Bombast von Hohenheim, who practised as a physician; but later he studied at various universities, attending the lectures of celebrated professors, at the same time frequenting the laboratories of the alchemists and the workshops of the necromancers. This early wandering life showed him many of the falsities then prevailing in the schools of medicine, which required, in his estimation, a thorough reformation. He travelled through Italy, the Netherlands, and Denmark, supporting himself by working wonderful cures. He seems to have become acquainted wlth the properties of several medicinal substances, among others *Laudanum*, which was so named by him. On his return to Germany, the cures he effected secured him a wide reputation, and in 1527 he was appointed Professor of Medicine at Basel. He speedily, however, roused the hatred of his colleagues by his attitude towards the old physicians, whom he openly condemned, going the length even of burning the works of Galen and Avicenna. In 1528 he was forced to leave Basel, and thereafter he led a wandering and dissipated life; still, however, retaining his skill and maintaining his reputation as a physician. In 1541 he was called to Salzburg to be physician to Archbishop Ernst; but soon after, on September 23d of the same year, he fell a victim to the hatred of his enemies. Alchemist and mystic though he was, and imperfectly educated at best, he was not the mere quack or charlatan which his earlier biographers represented him to be. He had a varied store of knowledge, derived from his peculiarly chequered experiences; and there is little doubt that he made not a few important discoveries in chemistry and medicine. His ungoverned spirit of reform unquestionably influenced for good the imperfect science of his time. He wrote an incredible quantity of manuscript, very little of which he published himself. Complete editions of his works appeared at Basel (10 vols. 1589), Strassburg (3 vols. 1616–18), and Geneva (3 vols. 1658). See Lessing's *P. sein Leben und sein Wirken* (1839), Marx's *Zur Würdigung des Theophrastus von Hohenheim* (1842), and Lindner's *Theophrastus als Bekämpfer des Papstthums*. A bibliographical study of his writings by Friedrich Mook (Würzburg, 1876) is laborious and useful, though not free from grave errors.

Par'achute (Fr. *parer*, 'to ward off,' and *chute*, 'a fall'), an apparatus shaped like an umbrella, designed to enable a descent to be safely made from a balloon or an eminence. Its use was suggested as a means of escape from a building on fire by M. le Normand, and in 1783 he proved its efficiency by alighting unhurt from a lofty house at Lyons. M. Blanchard applied it to the balloon, but his first descent in it was so rapid that his leg was broken through violent contact with the ground. Subsequently Garnerin, the French aeronaut, made frequent descents from great altitudes by the aid of a P. While in London in 1802, one of its stays giving way caused extreme oscillations of the apparatus, so that he narrowly escaped death by being thrown out in mid-air. Garnerin's P. resembled a large umbrella; the cover, of canvas, was 23 feet in diameter, and a basket car for the aeronaut was suspended from the framework. The P. was attached by a rope to the netting of the balloon, and on being separated from it, the resistance of the air opened up the loosely hanging cover, and after a few seconds of accelerating descent, the machine fell slowly with an oscillating motion to the earth. Mr. Cocking devised a P. in the form of a flattened inverted cone, which he believed would prove steadier in the air than Garnerin's. In 1839 he attempted to descend from a balloon in it, but lost his life owing to a flaw in the construction. For a description of the P. light ball, used in warfare for illuminating an enemy's camp, see BALL.

Parade' (Sp. from Lat. *parare*, 'to prepare'), (1) the mustering of troops in full equipment for inspection or exercise; (2) the ground set apart for such purposes and for reviews.

Par'adise, the word used in the Septuagint for the 'garden' that God planted 'eastward in Eden' (Gen. ii. 8). It is first used in classical Greek by Xenophon, and denotes a 'park' or 'pleasure-ground.' The word is probably of Aryan origin, as it occurs in Sanskrit under the form *paradêsa*, and doubtless reached the Greeks through Persia; but it passed into the Semitic group of languages, and is found in Hebrew as *pardês*, and in Arabic as *firdaus*. See EDEN.

Paradise, Bird of. See BIRD OF PARADISE.

Par'ados (Fr. *parer*, 'to defend,' and *dos*, 'the back'), or **Traverse**, a mound of earth thrown up at various parts of fortifications to protect defenders from a reverse fire.

Par'adox (Gr. *para*, 'contrary to,' and *doxa*, 'opinion'), a term applied by the Stoics to maxims opposed to the prejudices of the vulgar, such as 'wisdom alone is wealth;' and in modern parlance to a figure of rhetoric which couples two seemingly conflicting ideas, as Cicero's 'clamorous silence,' Tacitus's 'conspicuous by their absence,' or Boileau's 'retrieving honour by his infamy.' The besetting danger of all paradoxes is lest their seeming contradictions should become real, as pointed out by Bishop Horsley in his 19th Sermon.

Paradox'ides, a well-known genus of *Trilobites* (q. v.), forming the type of the family *Paradoxidæ*, the members of which have long bodies, the segments of the thorax or chest being free, and numbering from eight to twenty-three. The caudal or tail-shield is small. Some of the largest of the trilobites belong to this group. Its members are chiefly found as fossils within the well-known 'primordial zone' of the Upper Cambrian rocks.

Paradox'ure (*Paradoxurus typhus*), a species of *Carnivorous* quadrupeds allied to the *Viverridæ* or weasels, &c., and found in India. The common P., or luwack as it is named, is a familiar Indian species, as is also the musang (*P. musanga*) of Java. The luwack is of a dingy yellow colour, spotted with black. The tail is long and is capable of being closely coiled or twisted. The musang is noted for its ravages on rats and mice, but it also feeds on berries and fruits.

Par'affin, and Par'affin Oil. P. (from Lat. *parum*, 'little,' and *affinis*, 'likeness or relation,' in allusion to its resistance to all chemical re-agents) was first described by Baron Von Reichenbach in 1830, who isolated it from the tar of beech wood. A fatty substance had been previously extracted from an earth oil obtained at Tegernsee, in Upper Bavaria, by Herr Buchner, which was subsequently ascertained to be P. The substance, however, continued to be regarded merely as a scientific curiosity, till, in 1847, Mr. James Young obtained it on a considerable scale as a by-product in the distillation of an oily exudation occurring in a Derbyshire coal-mine. In 1849 a patent was obtained by Mr. Reece for distilling P. and P. O. from Irish peat; but although much was hoped from this new industry, it failed to be commercially remunerative. The material operated on by Mr. Young, above alluded to, having been exhausted, that gentleman began a series of researches, which resulted in the discovery that by the dry distillation of bituminous coal he obtained an oily liquid containing P., and for this discovery he, in 1850, secured a patent which may be regarded as the basis of the now great P. industry. Subsequently attention was drawn to numerous other sources of P. and P. O., and now these substances are obtained (1) by the distillation of bituminous shales, ordinary coal, and brown coal; and (2) they are prepared and purified from certain petroleums or native 'tars,' and from ozokerite, a native fatty substance found in Galicia, and under the name of *neft-gil* at Baku, on the shores of the Caspian Sea, in which substances the P. exists ready formed. In Great Britain the principal source of P. and P. O. is now the bituminous shales which occur most abundantly in the Scottish coal-fields; the first great raw material used; the famous Boghead mineral or cannel coal, being exhausted. In Germany, brown coal is much distilled, in Austria ozokerite is extensively worked, and in Russia P. and P. O. are obtained from the *neft-gil* of Baku. Rangoon petroleum, or earth oil, has for a long period been imported into England, and used by the large manufacturing

firm, Price's Candle Company, and it was P. from this source that was first extensively made into candles in 1857, under a patent obtained by Mr. Warren De La Rue in 1854, the burning oil separated from it having been sold as 'Belmontine.'

The processes of distillation of these hydrocarbons from shale, as conducted in Scotland, may be briefly indicated. The shale is broken into pieces about the size of road metal, and filled into horizontal retorts, which are brought to a low red heat, care being taken to keep the heat low, so as to prevent the formation of gaseous products. The tar or oil produced in this distillation is exceedingly impure, and it is subjected to a second distillation, by which 'once run oil' is produced, coke being left in the retort. The 'once run oil' is mixed with oil of vitriol, allowed to settle, neutralised with caustic soda, and submitted to fractional distillation, yielding first a light naphtha, second the chief part of the burning oil, and third the heavy oil which contains the solid P. The three sets of products so obtained are submitted to further distillations and other operations. The first fraction, naphtha, is again fractionally distilled into P. spirit and light oils; the second, or burning oil portion, is again treated with acid and caustic soda, and re-distilled, the first portion of the distillate going to the naphtha tank, while the last is added to the heavy oil, leaving the bulk as finished burning oil. The heavy oil now contains the whole of the solid P., to separate which the liquid is cooled by artificial means, pressed, to separate as far as possible the liquid from the solid portion, and thus crude P., or P. scale is obtained. The oil, from which the scale has been separated, is treated with sulphuric acid and caustic soda, and fractioned by distillation, as in the case of the burning oil above alluded to, the bulk of the product forming lubricating oil. The P. scale is a brown scaly substance highly impregnated with oil, and consequently possessing the characteristic smell of unrefined P. oil. The crude P. is purified by repeatedly mixing it with light oil (naphtha), cooling and pressing, by which the adhering oil and the softer portions of the P. are separated. It is then melted, steam is blown through it till every trace of naphtha disappears, it is treated with animal charcoal, and when that has subsided it is run into moulds, and cools to a beautiful translucent and semi-crystalline mass. Pure P. is inodorous, tasteless, and nearly as hard as beeswax when cold; it rapidly becomes soft and plastic when heated, and it forms a thin, highly mobile liquid when melted. It is a pure hydrocarbon, containing about 85·2 carbon and 14·4 hydrogen; its melting point varies from about 90° to 176° F.; and its specific gravity ranges from ·843 to ·940, according to its source and purity, that of low melting point having a correspondingly low specific gravity. It will thus be observed that the distillate of carbonaceous substances obtained at a low red heat consists of a mixture of hydrocarbons, which are ultimately separated into (1) light oil, spirit, or naphtha, (2) burning oil, (3) lubricating oil, and (4) solid P. The Scottish P. manufacture is now one of great extent and importance, as will be evident from the following figures, which apply to the year 1873, a year during which it was in the full tide of success. In that year the shale consumed was 800,000 tons, yielding 25,000,000 gallons of crude oil, and from which 5800 tuns of purified P. were extracted, and 9800 tuns of lubricating oil prepared. As a by-product of the manufacture, 2350 tons of sulphate of ammonia were secured; and in the various operations connected with the industry 500,000 tons of coal were used. The principal use of P. is for making candles, in the moulding of which a certain proportion of stearine is added; but it is also used in lucifer match-making as a substitute for sulphur, now almost entirely abandoned. It may also be employed as a substitute for wax in modelling fruit, flowers, &c., and it has numerous minor adaptations.

Para Grass. See PIASSABA.

Par'aguay ('the place of waters'), a S. American republic included between 22° 5'–27° 20' S. lat., and 54° 35'–58° 40' W. long. It is bounded on the N. by Brazil, on the W. by the disputed territory of the Gran Chaco and by the Argentine Republic, on the S. by the Argentine Republic, and on the E. by the same state and Brazil. Area, 57,000 sq. miles, or a little less than that of England and Wales. The country—the only one in S. America without any seaboard—is bisected longitudinally by the Sierra Anambahy, a range from 1000 to 2000 feet high, which forms the watershed and divides P. into two sections differing from each other materially in physical characteristics. That on the E. side is hilly, densely wooded, and wholly uncivilised. The W. section is more level, and the forests largely give place to plains clothed with tall, rank grass, well adapted to the rearing of cattle. The northern portion of P. is a desolate region, its forests being tenanted only by a few wandering Indians, and even animal life being scanty. Farther S., on the western watershed, is a plateau 200 feet above the level of the P. river, and on it the principal settlements exist. The S.W. angle between the P. and Paraná rivers consists of extensive marshes and lagoons. Of the latter the largest is the Ypoá ('lucky water'), which has an area of 100 sq. miles. It is the only considerable lake in P., that of Yparacay (24 sq. miles) being the next largest. The principal rivers are the P. (q. v.), which forms the W. boundary, and the Paraná (q. v.), which bounds P. on the S. and for more than half its length on the E. Of the purely Paraguayan rivers the largest from N. to S. are the Aquidaban, Ypane, Jejui, and Tebicuary. The last-named, which is much the most important, has a very tortuous course of nearly 200 miles, and is navigable by small craft for most of its length. The climate of P., though hot and unsuited to European colonisation, is on the whole healthy, except in the marshy districts. The vegetation is luxuriant, and the forests yield splendid timber and many kinds of ornamental woods. The wild animals include the jaguar, capybara, tapir, armadillo, deer, and pigs; while among the birds the most common are parrots, wood partridges, wild turkeys, and the rhea, or S. American ostrich. Alligators swarm in the rivers, and insect life is abundant to the furthest limit of human endurance. Gold and iron are found in small quantities, but with this qualification P. may be said to be wholly without mineral resources. The principal cultivated crops are tobacco, cotton, and the sugar-cane. Coffee and indigo also grow well, but their cultivation has ceased since the war. The principal export is that of Maté (q. v.) or P. tea. If the requisite labour were obtainable rice could be extensively grown in the *esteros*, or marshy districts, in the S.W. In 1875 the revenue was £121,817, and the expenditure £150,000; in 1876 the public debt amounted to £1,562,783.

The first European who set foot in P. was Sebastian Cabot, who sailed up the Paraná and entered the P. river in 1526. Asuncion, the capital, was founded in 1536, and for nearly a century was a place of much importance. From 1609 the country was for 158 years under the sway of Jesuit missionaries, and enjoyed great prosperity. They were expelled in 1767, and in 1776 P. was included in the new viceroyalty of La Plata, but in 1811 asserted its independence and became a republic. In 1814, however, it submitted to the yoke of Dr. Francia (q. v.), who as dictator ruled it with an iron hand till his death in 1844. During his *régime* P. was most rigidly isolated from the rest of the world. Francia was succeeded by Don Carlos Antonio Lopez, who in some degree relaxed his predecessor's policy of isolation. He died in 1862, and was succeeded by his son, Don Francisco Solano Lopez, who brought on war between P. and the allied states of Brazil, the Argentine Republic, and Uruguay. The Paraguayans maintained a heroic but unavailing resistance from 1865 to 1870, and the war was ended by the defeat and death of Lopez at the battle of Aquidaban on 1st March 1870. In June of the same year Congress voted a new constitution, which was proclaimed in the November following. It consists of a legislature called the Congress, composed of two houses, with a president, who is elected for six years, as the executive. An attempt at insurrection in 1874 was quelled by the aid of the Brazilian garrison which is still (1878) quartered in Asuncion, and Brazil may yet be said to exercise a semi-protectorate over P.

The great war utterly ruined P., decimating its population and reducing the inhabitants who were left to a state of miserable poverty. Not only was the country's trade annihilated, but its very means of subsistence were in part destroyed. For instance, though P. is a fine grazing country, and previous to the war possessed large herds of cattle, it now imports all its beef from the Argentine Republic, whence the cattle are driven in large numbers across the Paraná, and long distances into the interior of P. It is difficult to form a close estimate of the present pop. of P. In 1860 it was estimated by Demersey at 600,000, and in 1873 (after the war) by Behm at 221,070, though Mr. Keith Johnston thinks this to be much above the mark. The inhabitants consist of Indians, Spanish half-breeds, negroes, and pure Europeans, of whom Italians are the most numerous. The Indians belong to the great Guarani race, which once extended from the Orinoco to the Paraná. The capital, Asuncion,

situated opposite the confluence of the Pilcomayo with the P. river, has a pop. of about 10,000, of whom 3000 belong to the Brazilian garrison of occupation. There is a railway from Asuncion to Paraguari, about 35 miles S.E. See *Voyages dans l'Amérique Méridionale*, by Felix de Azara (Paris, 1809), *La Plata, the Argentine Confederation and P.*, by Thomas J. Page (New York, 1859), *Letters from the Battle-fields of P.*, by Captain R. F. Burton (Lond. 1870), *P., Brazil, and the River Plate* by C. B. Mansfield (Lond. 1871), and four articles by Keith Johnston in the *Geographical Magazine* for 1875.

Paraguay, a river of South America, issues from seven lakes in the interior of Brazil in 13° 30′ S. lat., 55° 50′ W. long., at a height of 9530 feet above the sea. It has a general southerly course of 1300 miles, with an average breadth of half a mile, and the country through which it flows is usually well-wooded and fertile, except where marshy. While still in Brazilian territory the P. flows through the marsh of Xarayes, which is 200 miles long, and in the rainy season expands to a great width. In the latter part of the course of the P. lateral channels, known as *riachos*, are frequent. It finally unites with the Paraná (q. v.) in 27° 20′ S. lat. The principal tributaries of the P. are the Cuyabá and Tebicuáry on the left bank, and the Pilcomayo (q. v.) and Vermejo on the right bank. Asuncion, the Paraguayan capital, situated at the confluence of the Pilcomayo, is the principal town on the banks of the P. The current of the river being moderate, and the channel deep and free from obstructions, it is navigated by steamers for two-thirds of its length, and by small craft for a considerable distance farther up.

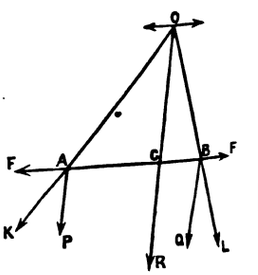
Paraguay Tea. See MATÉ.

Parahyba, a province in the E. of Brazil, bounded by the Atlantic and the provinces of Rio Grande do Norte, Ceará, and Pernambuco. It has an area of 20,346 sq. miles, is mountainous, and liable to severe droughts. Cotton and sugar are the chief articles of export. Gold is found in various parts. Pop. (1872) 362,557.—**P.**, capital of the preceding province, is situated on the P. ('bad water') river, 10 miles from its mouth. It has two colleges, a cathedral, and several convents, and is fortified. Pop. about 15,000.

Par'allax is the apparent displacement of an object due to change of position of the observer, and is measured by the angle contained between the lines drawn from the object to the two positions of observation. Obviously, for a given change of position, the greater the distance of the object the less must the P. be; and if the object be sufficiently far off, the P. may become quite inappreciable. In astronomy the term P. is employed generally in a very limited sense. It is the correction which must be applied to the observed position of a heavenly body to reduce it to its true *geocentric* position—*i.e.*, its position as viewed from the centre of the earth. When the heavenly body is in the zenith of the observer, this correction is at its minimum—zero namely; and when the body is in the horizon, the correction is at its maximum, and is then called the horizontal P., its value being the arcual angle subtended by the earth's radius at the position occupied by the observed body. The only body whose P. can be directly determined by observations from the earth is the moon, whose equatorial horizontal P. has a mean value of 57′ 4″·17. The corresponding quantity for the sun is somewhat less than 9″—a quantity too minute to be measured directly. The parallaxes of the planets Mars and Venus—the former at opposition, the latter only at transit—can, however, be directly measured with considerable accuracy, and from these the P. of the sun can be calculated (see SUN). The fixed stars are so distant, that even the fraction expressing the geocentric or diurnal P. of the nearest of them is utterly meaningless on account of its excessive minuteness. The heliocentric or annual P.—P. due to change of position of the earth *in its orbit*—of 61 *Cygni* is, according to Bessel, 0″·348, which is equivalent to the 15-millionth part of a second of geocentric P.

Par'allel, a term of extensive application in geometry. According to Euclid, P. lines are straight lines which are in the same plane, and which being produced ever so far both ways never meet. Similarly P. planes are planes which extended ever so far in any direction never meet. Such planes have evidently the same normal; and the definition that P. planes are such as have the same normal can be applied to any curves or surfaces. Generally, then, P. curves or surfaces are any curves or surfaces which have the same system of normals. Concentric circles or spheres form a P. system; also confocal ellipses and ellipsoids, and all involutes of a common evolute. To the mathematician such a conception of parallelism presents no difficulty. At the very beginning of the study of P. lines, however, there is a peculiar difficulty, to surmount which has been the endeavour of many famous geometers. The difficulty is not one of conception but one of demonstration—to pass, namely, from the definition to the proposition that a line falling upon two P. lines is equally inclined to both. To prove it, Euclid was forced to assume as an axiom that, 'if a straight line meet two straight lines so as to make the interior angles on the same side of it less than two right angles, these straight lines being continually produced will at length meet on the side on which the angles are which are less than two right angles.' This, however, is as much a proposition as the seventeenth in the First Book, of which it is the converse, and is therefore not a self-evident truth. Later geometers—Wolfius, Boscovich, Simpson, &c—have substituted for it other axioms; but these also are open to the same objection, and are more fitly called postulates. Legendre has met the difficulty by establishing the whole theory of P. upon the proposition that the three angles of a triangle are together equal to two right angles. In Euclid this proposition depends for its demonstration upon the previous propositions respecting parallels; consequently Legendre was compelled to prove it by a totally different method. This demonstration is exceedingly refined and subtle, but for that very reason is not admissible into books on elementary geometry.

Parallel Forces are forces which act upon a body in directions parallel to each. Let P Q be two parallel forces acting at the points A B of a body respectively. It is required to find the position of the resultant force, if there be one. A and B are points of a rigid body; hence we may apply two equal forces (F) acting at A and B in opposite directions without affecting the system. They simply balance each other. Consequently, we may compound these with P and Q, and obtain the forces A K and B L, which may be regarded as acting simultaneously at O, their point of intersection. Resolve both parallel to the line of the forces F, and along OC, which is parallel to P and Q. The former portions evidently balance; while the latter must be added and equal the sum of P and Q. Further from the consideration of similar triangles, it appears that

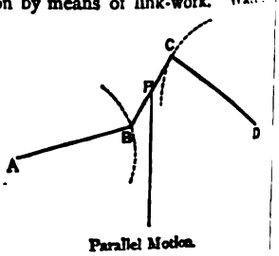


Parallel Forces.

$$AB : CB = Q : P.$$

Hence the resultant of two parallel forces acting at two points of a rigid body is in the same direction, has a magnitude equal to the sum of the two original ones, and acts at a point which divides the line connecting the first two points in a ratio which is inversely as the corresponding forces. The extension of the proposition to any number of parallel forces is obvious. If P and Q had been in opposite directions, the combination would have been of the nature of a couple, and it would have been impossible to represent it by a single resultant force. See COUPLE

Par'allel Motion is the name given to conversion of circular motion into rectilinear motion by means of link-work. Watt's P. M. is familiar to all from its extensive use in steam-engines; but it is only an approximation to true P. M. It consists essentially of three links, AB, BC, CD, of which the first and last are equal and have their extremities A and D fixed. The middle point P of the link BC describes a very near approximation to a straight line, as the C and B move in their respective circles.



Parallel Motion.

True P. M. can be effected

only by the use of a more complex link-work. The simplest form consists of no less than five links. See PEAUCELLIER CELL.

Parallel'ogram, in Mathematics, is a quadrilateral whose opposite sides are equal and parallel. Its opposite angles are therefore equal, and either diagonal bisects it. Particular forms are distinguished further by peculiar names, such as the square, the rectangle, and the rhombus.

Parallelogram of Forces is the name frequently applied to the geometrical construction by which the resultant of two given forces is obtained. See COMPOSITION AND RESOLUTION OF VELOCITIES AND FORCES.

Parallel'opiped, a solid figure bounded by three pairs of parallel planes. Its six faces are parallelograms, and its twelve edges consist of three sets of four equal and parallel straight lines. Its volume is equal to the area of any one face multiplied by the perpendicular distance between this face and the opposite and *parallel* one. The *cube* is a particular form of P. in which all the edges are equal.

Par'allels, in Geodesy, is the name given to the circles of latitude, which are small circles drawn on the terrestrial sphere parallel to the equator. See LATITUDE.

In military language, P. are the trenches formed by an attacking army parallel to the attacked work. They are connected to each other by approaches or zigzag trenches.

Paral'ysis (Gr. *para*, 'through,' and *luō*, 'I loose') is a disease the chief characteristic of which is loss of motor power or sensitivity in one or more parts of the body. The loss of motor power, in the parts affected, is the most striking characteristic, and when the loss is incomplete it is now often termed *paresis;* but, when complete or nearly so, it is termed P. P. may be general or partial according as the whole or only part of the body is affected. When limited to one side it is termed *hemiplegia;* and, when to the lower half of the body, *paraplegia.* When a small portion of the body only is affected it is called *local P.;* and if the nerve specially affected is known it is designated accordingly, thus, *facial P., P. motor oculi,* &c. P. may be due to certain occupations, and hence the designations *lead P., mercurial P.;* or it may be associated with certain symptoms from which it derives its name, as *wasting P.,* and *P. agitans.* In most cases, sensitivity and motor power are simultaneously lost or impaired. When motion alone is lost the affection is called *akinesia,* and when there is a loss of sensitivity only it is termed *anæsthesia.* P. is a symptom of certain diseases of the nervous system, and is purely a nervous affection. In most cases it is a symptom of disease in some other part of the body than that in which the P. exists, as in the brain or spinal cord, or in the nerves proceeding therefrom; but it is sometimes a purely local affection depending upon a morbid condition of the terminal extremities of the nerves. The various morbid conditions which may give rise to P. are described under Diseases of the Nervous System (q. v.); but it is highly probable that P. may sometimes result from mere functional disorder of the *cerebro-spinal* centres, as a post-mortem examination frequently fails to reveal any apparent lesion.

The following are among the more prominent paralytic affections. *General P.* is a gradually advancing form of the disease which sooner or later involves nearly every muscle of the body, and is invariably associated with mental derangement. The mental and physical symptoms are generally both present from the first appearance of the disease; but the latter are frequently obscure except to the specialist. The psychical symptoms are generally aberrations of the moral faculties, and more frequently relate to exaggerations of position, power, and wealth. The physical symptoms are most commonly P. of the lips and tongue, leading to defective, blurred articulation; and of the facial muscles, giving the face a blank, stupid look. The disease, as its name indicates, progresses to an invariably fatal termination, and death occurs from difficult deglutition leading to choking, or from exhaustion. *General P.* is an incurable disease.

Hemiplegia (q. v.), is generally called a *paralytic stroke,* and is most commonly due to cerebral hæmorrhage. The left side of the body is most frequently paralysed, although the actual seat of the lesion is, in the great majority of cases, on the right side of the brain, the phenomena being accounted for by the decussation of the pyramids. Hemiplegia may be permanent; but when otherwise the restoration of power appears first in the leg. The active *local treatment* of the disease is recommended to be commenced about two weeks after the original seizure, in the form of friction over the paralysed parts, with flexion, and extension of the joints. Preparations of phosphorus may be given internally and strychnia may be injected subcutaneously; but the most reliable remedy is electro-galvanism.

Paraplegia seldom partakes of the character of a paralytic stroke, and has usually an insidious commencement, the premonitory symptoms being weakness, coldness and tingling in the feet and legs, gradually increasing until the power of motion is gone. The muscles of the lower part of the trunk and of the bladder and rectum are often affected, and rest is frequently disturbed by involuntary movements of the limbs. P. may be caused by caries of the vertebræ, by concussion or compression, congestion, inflammation, or softening of the spinal cord or its membranes.

Reflex P., the most favourable form as regards cure, may accompany and depend upon other affections, as hysteria, pregnancy, worms, or urinary diseases. The *treatment* of the disease depends on whether the P. is primary or secondary, dependent on congestion or diminished nutrition. In the former case, the ergot of rye should be administered internally, and belladonna applied externally, as both of these remedies contract the vessels of the cord and its membranes; but, in the latter case, strychnia combined with opium, if there is much restlessness, should be administered, and the patient should be put on a generous diet.

Facial P., sometimes called *Bell's P.,* is an affection of the portio dura, or facial portions of the seventh pair of nerves either at its origin or in its course, or as the result of pressure, causing P. of motion, more or less complete, of the muscles supplied by the nerve. In such cases the expression of the countenance is very peculiar, one side of the face being natural and the other having a blank unmeaning expression. The eye of the side affected cannot be closed, tears run over the cheek, the mouth cannot be pursed up to whistle, nor expanded to smile. When *facial P.* is the result of cold, debility, or syphilis, recovery may be effected in from six to eight weeks, but when it is dependent on cerebral or intercranial lesions the prospect of cure is doubtful. The most successful mode of *treatment* consists in general hygienic measures and tonic remedies, especially strychnia, and the persistent use of electricity, one pole of the induced current being placed over the point of exit of the nerve, while the other is applied in succession over the various muscles supplied by it.

Mercurial P. or *tremor* is characterised by tremors and jerkings of the voluntary muscles, commencing in the arms and extending to the legs, tongue, and jaws. The disease is caused by long continued exposure to the fumes of mercury. *Lead P.* is peculiar to those engaged in occupations which bring them in contact frequently with white lead, the symptoms being P. of the extensors of the wrist and fingers, and wasting of the ball of the thumb, constituting what has been termed 'the drop wrist.' In such cases, the *treatment* consists in withdrawal from the cause to a fresh, pure atmosphere, and giving iodide of potassium. Electro-galvanism is also beneficial.

Wasting palsy, or *progressive muscular atrophy,* depends, apparently, on a slow, chronic inflammation in the anterior tract of the grey matter of the spinal cord. The disease is characterised by loss of strength in certain muscles of the body, particularly the shoulders, arms, and hands, followed by atrophy of the muscular tissue, progressing until every muscle of the body may be involved, with the exception of the muscles of the eyeball, or the levator palpebræ superioris. The prognosis is unfavourable, and the *treatment* consists in hygienic measures, and the steady employment of the continuous and interrupted currents, with tonics.

Infantile spinal P. depends upon inflammatory softening, leading to degeneration and atrophy situated in the anterior horns of the grey matter in the spinal cord. The symptoms are fever, convulsions, and pain in the back. Generally one limb only is affected, or the P. may be restricted to a group of muscles or embrace the four limbs. The temperature of the affected limb is lower than that of the others. The *treatment* is local and general. The induced current should be applied directly to the skin over the paralysed muscles, followed by friction, several times in the course of a day. Ergot of rye is useful, but if the stage of atrophy is reached, strychnia must be administered. If muscular contractility is lost to the induced

current, the cure will be difficult and the treatment protracted; and if the primary current is also powerless, a cure is impossible.

Paramar'ibo, the capital of Dutch Guiana, is situated on the W. bank of the river Surinam, 10 miles from its mouth. P. is protected by a fort, and is of rectangular form, measuring a mile and three-quarters in length by three-quarters of a mile in breadth. The streets are wide, and are lined with orange, lemon, and tamarind trees. The houses are mostly of wood, painted white and green, and the public buildings are of a very ordinary description. The chief among them are the barracks, military hospital, governor's residence, and the churches. Of the last there are eight, the leading religious denominations being the Moravians and Roman Catholics. Three-fourths of the trade of the colony (see statistics given under GUIANA, DUTCH) pass through P., which has consequently shared largely in the depression which has followed the emancipation of the slaves in Dutch Guiana in 1863. The principal articles of the yearly decreasing exports are sugar, rum, molasses, cocoa, coffee, and cotton. The climate of P. is very humid, the mean annual rainfall being about 100 inches. Nevertheless the town is healthy as compared with the capitals of British and French Guiana. Pop. (in 1871) 20,477.

Paramatt'a or **Parramatta** is a fine fabric used for ladies' dresses, and consists of a cotton warp shot with merino-wool. The original stuff was made with P. wool, hence the name.

Param'eter, in Mathematics, is a magnitude, whose value is constant for any one given function, curve, or surface. If the P. is made to vary, other members of the same system or class are obtained. Thus in the parabola $y^2=px$, p is the P. As long as it remains constant we are kept to the same curve; but when it is altered in value we pass to another totally distinct curve, belonging, however, to the same family.

Paramœ'cium, a familiar genus of *Infusorian* (q. v.) animalcules, popularly, and from its shape, described as the 'slipper-animalcule.' It is a typical member of the infusorian group, and is found in stagnant water and amidst organic infusions. The *cilia* fringing the body can be well seen in P. *P. bursaria* and *P. aurelia* are familiar species.

Paraná, a province in Southern Brazil, bounded on the N. by the provinces of San Paulo and Matto Grosso, on the W. by Paraguay, on the S. by the Argentine Republic and the province of Rio Grande do Sul, and on the E. by the province of Santa Catharina and the Atlantic Ocean. Its area is 108,557 sq. miles, and its pop. (1872) 126,722, of whom 10,560 were slaves. P. is mountainous, enjoys a very healthy climate, and is well suited to cattle-rearing. Its mineral wealth is great, iron and coal being plentiful, and diamonds, mercury, manganese, antimony, and rock-salt being also found within its borders. It is drained by the river Paraná (q. v.) and numerous tributaries of that stream and the Uruguay. The capital is Curitibá, and the only seaport Paranaguá, a place of 3000 inhabitants with a considerable trade in maté.

Paraná ('like the sea'), a great river of S. America, rises in the Serra da Mantiqueira, the highest range in Brazil, at a distance of only 110 miles W. of Rio de Janeiro, and after flowing W. and S. for 2400 miles, unites with the Uruguay in 34° S. lat., 58° 40′ W. long., to form the estuary known as the Rio de la Plata. The P. is a rapid stream, and in the upper part of its course its navigation is broken in two or three places by cataracts, the largest of which is that of Guayrá, in 24° 30′ S. lat. There the river, suddenly contracted from two and a half miles to sixty-five yards in width, leaps over a ledge of rock at a slope of 50°, with a vertical fall of 60 feet. For the last 900 miles of its course the banks of the P. are level and the current more moderate, but the water is muddy throughout. The channel attains a great width, and is full of islands covered with trees, mostly willows, haunted by numerous jaguars. It is now regularly navigated by steamers as far as Ytapua, in 27° S., and to a smaller degree by sailing craft. The chief towns on its banks are Corrientes, Santa Fé, and Rosario.

Par'apet (Ital. *parapetto*, from *parare*, 'to guard,' and *petto*, 'the breast,' Lat. *pectus*), a low wall originally used only to protect the ramparts of fortifications, but afterwards employed on ecclesiastical and other buildings. The P. of a fortification may be either plain or with Battlements (q. v.), and is frequently pierced with 'oillets,' or apertures for the discharge of missiles. In Norman churches and houses the P. is usually plain. This is also generally the case in Early English, though rich buildings are sometimes panelled or pierced with trefoils and other figures, while in the Perpendicular style this panelling and piercing is very common. For P. in fortification see BREASTWORK.

Paraphernalia (Gr. *para*, 'beside,' and *phernē*, 'what is *brought* by a wife;' hence 'a dowry'), a word introduced into English from the Roman legal phrase *paraphernalia bona*, the goods which a wife brought to her husband over and above her dowry, is used in English law to denote those articles of dress and ornament which are personally used by a married woman. Where a marriage settlement has not been made, the wife's P. are exempted from the general law that her property falls unconditionally to her husband. If they were the gift of the husband he may sell them, or they may be seized by his creditors, except that part of them which is necessary apparel. When the P. have been the gift of some other person, whether before or after marriage, they cannot be taken possession of by either the husband or his creditors. Under the law of Scotland this latter privilege attaches to the wife's P. however acquired, and the term is also extended to embrace articles of household furniture.

Par'aphrase (Gr. from *para*, 'beside,' and *phrazein*, 'to say') is a saying of the same thing in different words. When used in connection with rendering one language into another, it means a translation which is not literal but slightly expanded so as to elucidate the meaning. In Scotland by *The Paraphrases* is understood metrical versions of certain passages of Scripture, which are used along with the metrical version of the Psalms in the public worship of the Presbyterian Church.

Paraple'gia. See PARALYSIS.

Par'asite (Gr. *para*, 'beside,' and *sitein*, 'to feed'), literally one who eats at another's table, *i.e.*, at his expense. The term is generally applied to the needy table-friend of a wealthy person, who is content to pay for his subsistence on the latter's bounty by cringing subservience and flattery.

Parasit'ic Animals, the term applied to those animals which depend to a greater or less degree on other animals for food, or lodgment, or for both. Some parasites are mere 'lodgers,' so to speak, and live within or upon other animals; whence they are called *Ectoparasites—e.g.*, fleas, lice, bird lice, &c.—which infest the skin and outer tissues of their hosts. Parasites, in zoological language, *commensals* or 'messmates,' are represented by those fishes which inhabit the interior of the large tropical sea-anemones, in and out of whose bodies they swim freely. True parasitism, however, is when the parasite becomes dependent not merely for lodgment, but also for food, on its host. Examples of this state of things are furnished by the Tape-worm (q. v.), Fluke (q. v.), Trichinæ (q. v.), &c. Parasitism is an acquired condition. That it is so is proved by the fact that most parasites exhibit tendencies to live a free and independent existence during their young state.

Parasitic Diseases are so called from the fact that a great variety of diseases are caused by the presence of animals or of plants which live within or upon some tissue, organ, or surface of the body of man, or on other animals or plants. P. D. are classed under local diseases, and their subdivisions are *Entozoa* (Gr. *entos*, 'within,' and *zōon*, 'an animal'), *Ectozoa* (Gr. *ektos*, 'outside,' and *zōon*, 'an animal'), *Entophyte* (Gr. *entos*, 'within,' and *phytos*, 'a plant'), and *Epiphyta* (Gr. *epi*, 'upon,' and *phytos*, 'a plant').

Under the subdivision Entozoa, there are three classes—1. *Cœlelmintha*, or hollow worms; that is, worms with an abdominal cavity. 2. *Sterelmintha*, or solid worms. 3. *Accidental parasites*; that is, internal parasites having the habits, but not referable to the class, of entozoa. Each of these classes includes numerous varieties, defined by the seat of the disease; as the intestines, kidneys, liver, blood, muscles, skin, eye, &c.

Under the subdivision Ectozoa there are the following varieties:—(1.) *Phthirius inguinalis*, the crab-louse. (2.) *Pediculus capitis*, the head-louse. (3.) *Pediculus palpebrarum*. (4.) *Pediculus vestimenti*, the body-louse. (5.) *Pediculus tabescentium*.

(6.) *Sarcoptes scabiei*, the itch insect. (7.) *Demodex folliculorum*. (8.) *Pulex penetrans*, the chigoe, whose habitat is the skin and cellular tissue.

The subdivisions Entophyta and Epiphyta include the following varieties:—(1.) *Leptothrix buccalis*, or alga of the mouth. (2.) *Oidium albicans*, or thrush fungus; habitat, mouth in cases of thrush, and certain mucous cutaneous surfaces. (3.) *Sarcina ventriculi*; habitat, the stomach. (4.) *Torula cerevisiæ*, or the yeast-plant; habitat, the stomach, bladder, &c. (5.) *Chionyphe Carteri*, a cotton fungus occurring in the disease called mycetoma; habitat, deep tissues, and bones of the hands and feet. (6.) *Achorion Schönleinii*; habitat, *tinea favosa*. (7.) *Puccinia favi*; habitat, *tinea favosa*. (8.) *Achorion Lebertii*; habitat, *tinea tonsurans*. (9.) *Microsporon Audouini*; habitat, *tinea decalvans*. (10.) *Trichophyton sporuloides*; habitat, *tinea polonica*. (11.) *Microsporon furfur*; habitat, *tinea versicolor*. (12.) *Microsporon mentagrophytes*; habitat, follicles of the hair in sycosis or mentagra. The above, with some abridgment in the first of the four subdivisions, is the list of P. D. drawn up by a joint committee appointed by the Royal College of Physicians in 1869. The list, they say, might be extended by the addition of various parasitic vegetations which have been reported under the names of algæ, fungi, mycoderms, leptomiti, &c., but the characters or the existence of which are still the subject of inquiry. Since 1869, however, the field of inquiry has greatly widened, and several diseases of a widely different nature from those mentioned fall to be classed under P. D. The Germ Theory of Disease (q. v.), although still *sub judice*, claims to bring the specific fevers within the catalogue of P. D. It is highly probable that every animal and plant has its peculiar parasite, and there is undoubted evidence that P. D. may be transmitted by contagion from the inferior animals, and from plants to man. As a general rule, the ectozoa and the epiphyta do not attack those who are scrupulously clean; while the entozoa and the entophyta do not find a favourable nidus in those whose general health is otherwise good. The principal P. D. are described under their several names, as TAPE-WORM, TRICHINA, ITCH, &c.

Parasitic Plants we here limit to those plants that live upon other growing plants, termed their *host* or *bearer*, drawing nutrient substances from the tissues of the same. (For those that live upon animal organisms see ENTOPHYTES, and for such as make a resting-place merely of other plants, without penetrating their tissues and feeding on their juices, see EPIPHYTES.) Even in the P. P. thus limited there is much diversity, the highly organised being represented by the mistletoe and broom-rape, whose roots enter and prey upon nutritive matter already to a certain extent assimilated; and the lower, by fungi in which the membrane of the cells of the host is pierced by the cells of the parasite, that the latter may live in and on them. The question has often been discussed whether P. P. are the causes or only the accompaniments of disease, and it has now been decided that the disease is contagious, and that healthy plants become victims to a particular disease when the spores of that special fungus that always occurs in connection with the said disease are sown upon them. Phanerogamic parasites are in general less injurious than Cryptogamic. P. P. may be divided into two classes—viz., those that have scales in place of leaves, and draw subsistence entirely from their bearer; and those that have leaves in which sap is elaborated under the influence of air and light. Orobanchaceæ and Dodder (q. v.) are examples of the first, and Mistletoe (q. v.) is a familiar representative of the last. See also RAFFLESIA. The term *saprophytes* is applied to such plants as appear to absorb their food-material from decaying organic substances. See MONOTROPACEÆ.

Parasnáth (so called after the Jain demi-god or apostle, Parasnatha), a conspicuous hill in the district of Hazaribagh, Bengal, British India, about 170 miles N.W. of Calcutta. It is crowned by four glistening white Jain temples, which are maintained by the merchants of Murshedabad, and annually frequented by 10,000 pilgrims from all parts of India. During the years 1862–67 the spot was tried as a sanitarium for European troops, but has been rejected. On the slope is a tea garden, opened in 1877, and covering 14 square miles. See JAINS. Dr. Hooker's *Himalayan Journals* (Lond. 1854).

Par'asol (Fr. *parasol*, Ital. *parasole*, from *parare*, 'to ward off,' and *sole*, 'the sun'), a small umbrella carried by ladies as a shade from the sun's rays. Sunshades of larger dimensions than those of the present time are of great antiquity. The primitive civilised nations of the East regarded the P. as an emblem of royalty or high nobility, in the same way as the Umbrella (q. v.) is now used as a canopy of state among certain barbarous races. The P. was esteemed an article of luxury in ancient Greece and Rome, a lady always having a female slave in attendance carrying the shade. Coryat, the English traveller, mentions the use of the P. in Italy early in the 17th c., and probably it soon thereafter extended to France and England. It is supposed that the P. owes its origin to the practice of the Aryan nations carrying boughs at festivals; the Feast of Tabernacles affords an example of a similar Jewish custom. The symbolism of these shady boughs is obscure, but probably they had some connection with a sun-myth, and may have typified the death of the sun in the shades of night.

Parasu-Rama ('Rama with the axe') is the sixth incarnation or *avatar* of Vishnu, described in the *Bhagavata Purana*. In this character Vishnu undertook the complete extirpation of the Kshatriya or warrior caste, who were arrogating dominion over the Brahmins.

Par'ati, or **Par'aty**, a thriving seaport of Brazil, situated on the Bay of Angra, at the mouth of the river of the same name, 90 miles S.W. of Rio de Janeiro. Pop. 10,000.

Par'buckle is a mode of drawing up or lowering down an inclined or vertical plane any cylindrical body, such as a barrel, cask, or gun, by means of a rope. The middle of the rope is passed round a post at the top of the plane, and its ends, after passing round the object, are retained in the hands of two men, who hoist or lower equally.

Parbutti (Párvatí = 'mountain-born'), a popular name in India for the goddess Kali (q. v.) or Durgah, the wife of Siva, who is the daughter of the Himalaya Mountains.

Par'cæ, the Latin Fates, answering to the Greek Moiræ and the Nornir of Northern Mythology (q. v.). The Moiræ (akin to *meros*, 'a part') are only once spoken of by Homer in the plural (*Il.* xxiv. 49), but in Hesiod we find the three daughters of Night—Clotho the spinner, Lachesis the apportioner, and Atropos the inevitable. Similarly the P. (*cf. pars*, 'a part') first became plural in the Augustan poets, who borrowed their conceptions of them from the Greeks, and represented them as aged crones. In art, on the other hand, the Fates are usually portrayed as grave maidens, Clotho bearing a spindle, Lachesis a staff pointing to a horoscope, and Atropos a pair of scales.

Par'ceners, in English law, are persons holding land jointly, and who may be compelled to make division. See COPARCENARY, and articles there referred to.

Par'chim, a town of Germany, grand duchy of Mecklenburg-Schwerin, on the Elde, 25 miles S.E. of Schwerin, has active industries in leather, soap, tobacco, brandy, &c. Pop. (1875) 8264.

Parch'ment (Fr. *parchemin*, originally *parcamin*; Prov. *pergamen*, from Lat. *pergamena*, found in St. Jerome, or *pergamina*, in Isidore of Seville), the name given to the skin of certain animals specially prepared for writing upon, and for other uses. The word is derived from Pergamos, the invention of the material having been ascribed to Eumenes II., King of Pergamos, at a time when the export of papyrus from Egypt was prohibited by Ptolemy Epiphanes. Herodotus, however, mentions that skins were in his time in common use for writing upon, and that the Ionians called books *diphtheria*, from their being written on skins; and it is therefore probable that the invention was only improved at Pergamos. Ordinary P. is made from sheep skins; vellum, which is a fine variety of P., is made from the skins of young calves, goats, or slink lambs, and also from split sheep skins. The skins, after being unhaired and dressed as for tanning, are stretched tightly in a wooden frame called a 'herse,' and carefully gone over with a fleshing tool to remove all fleshy and fatty matter. Afterwards, the whole surface is sifted over with fine lime, and carefully rubbed with pumice stone; it is then permitted to dry in the air, but still stretched in the herse. Drum heads are made of P. from calves skins, those of kettle-drums being of asses skin. Shagreen (q. v.) is a variety of P.

Parchment, Vegetable, is a modified form of paper produced by treating unsized paper, such as ordinary blotting-paper, with commercial oil of vitriol diluted with one-half its bulk of water. The paper is simply dipped into the acid, being left in it not more than a few seconds, and on being withdrawn, is thoroughly washed with clean water, and passed through a weak solution of ammonia to free it from all traces of the acid. The paper is found, by the action of the acid, to have undergone a very remarkable change; from being soft, bibulous, and easily torn, it is now firm and compact, with all the appearance and strength of good P. Like P., also, it softens and swells up in water, but it does not become elastic and extensible. It may be used for most of the purposes to which common P. is applied, but it is chiefly employed for covering jars of preserves, and for tying over the stoppers of bottles, &c.

Par'don. The power of P. is invested in the sovereign, and may be granted for all offences against the crown and the public. But the sovereign cannot grant P. for civil injuries. Neither can a P. from the crown avail against a parliamentary impeachment. A P. must be either under the Great Seal (q. v.) or by warrant under the royal Sign Manual (q. v.), countersigned by a principal Secretary of State. P. does not deprive an injured person of his right of indemnification.

Paré, Ambroise, a great French surgeon and the founder of modern surgery, was born at Laval, in department Mayenne, in 1517. He was apprenticed to a barber and surgeon in his native place; but his strong bias towards surgery and anatomy resulted in his leaving his master and going to Paris. Here he gained the good favour of Professor Goupil in the Collége de France; and in 1536 he accompanied the French army to Italy as master barber-surgeon. His skilful treatment of gunshot wounds secured his reputation; and on his return to Paris he was received with distinction by the Royal College of Chirurgery. In 1552 he was appointed surgeon to Henri II. He held the same responsible post under François II., Charles IX., and Henri III. Though a Protestant, he escaped the massacre of St. Bartholomew through the care of King Charles, who locked him into his own chamber. His works, published at intervals from 1545 to 1585, are all written in French, and roused much bitter feeling among his contemporaries, who deemed the science of medicine dishonoured by being written in the vulgar tongue. He himself treated these and other invidious attacks as they deserved—with silent contempt; and his usefulness ceased only with his life. He died at Paris, December 22, 1590. In 1840 a bronze statue, by the sculptor David (d'Angers), was erected to him in Laval. The last and best edition of his works, with a biography prefixed, is that by Malgaigne (3 vols. Paris, 1840).

Paregor'ic Elix'ir is the popular designation of *tinctura camphoræ composita.* It contains opium, benzoic acid, camphor, oil of anise, and proof spirit, there being in each drachm one-quarter grain of powder of opium. P. E. is given to allay spasmodic cough in bronchitis and phthisis, the dose being from 15 to 60 minims. *Scotch* P., or *tinctura opii ammoniata,* is composed of opium, saffron, benzoic acid, oil of anise, strong solution of ammonia, and rectified spirit, the proportion of opium being 1 in 96 minims. The dose of Scotch P. is from ½ to 1 drachm.

Parei'ra-Bra'va. See CISSAMPELOS. The legitimate P.-B., however, is the root of a Brazilian plant called *Chrondodendron tomentosum,* and that it has nothing whatever to do with Cissampelos is now an established fact.

Paren'chyma. See CELLULAR TISSUE.

Pa'rent and Child. By 43 Eliz. c. 2, the father, mother, grandfather, and grandmother of poor children, incapacitated from working, are bound to provide them with necessaries at the rate of 20s. per month. The father alone has legal power over his children, and this he may exercise till they are twenty-one years of age. He is entitled to the custody of his children, and if they are taken from his custody the courts will grant a writ of *Habeas Corpus* to restore them; and will entertain actions of trespass brought by him against any party taking them away. He has a right to direct the education of his children, and, so long as they are under Age (q. v.), he may correct them in a reasonable manner; and his authority is supposed to be imparted to a schoolmaster or tutor, who must, however, act temperately and not in anger. By an Act of 1873 the Chancery division may, on petition, order that a mother shall have access to her infant, or the court may order that the infant be delivered to the mother, and that it remain in her custody until it attain a certain age, not exceeding sixteen. A clause in a deed of separation between a father and a mother, providing that the father shall give up the control of an infant to the mother, will not invalidate the deed; but the court will not enforce the clause unless it consider that to do so will be for the benefit of the infant. Any parent wilfully neglecting to provide adequate food, clothing, lodging, or medical aid for his child under fourteen years of age, to the injury of its health, is liable, under 31 and 32 Vict. c. 122, to fine and imprisonment. The liability of a parent to maintain his or her child is limited to such maintenance as health and decency require, whatever be the circumstances of the parent. In England, a parent may by will deprive his child of any share in the parent's estate, real or personal, after his death. In Scotland this cannot be done as regards *movable* (Eng. personal) estate. See LEGITIM. As regards *heritable* (real) estate, see DEATHBED, LAW OF; PATRIA POTESTAS. Other important aspects of the relations between P. and C. are noticed under CHILDREN, LEGAL CAPACITY OF, and articles there referred to; also under BASTARDY and LEGITIMATION.

Paren'thesis (Gr. *para,* 'alongside of,' and *tithēmi,* 'I place'), an explanatory or supplementary clause interpolated in the midst of a sentence, which is grammatically complete without it. It is usually enclosed in curved lines ( ), but sometimes in dashes.

Pa'riah, properly *paraiyan,* from *Paria,* the Tamul name for the village drum, the beating of which is the special duty of the class so called in S. India. They are persons of no caste, or outcasts, who perform the meanest of offices. In the Presidency of Madras they have been ascertained by the census of 1871 to number 4,760,000 souls, or 15 per cent. of the total population, besides those who have adopted Christianity. They are only allowed to live on the outskirts of villages, and are the objects of hatred and contempt to all classes above them. The pariahs are a laborious, frugal, pleasure-loving people, and omnivorous in diet. Notwithstanding their common classification as outcasts they were entered in the census returns under 200 different subdivisions. Europeans have also applied the term to the P. dogs, the ownerless scavengers of the East.

Pa'rian Chronicle. See ARUNDEL MARBLE.

Par'idæ and Par'us. See TIT.

Pa'ring and Bur'ning is a process locally employed in agriculture with the view of freeing the land from injurious weeds and from noxious insects and their larvæ. The process must not be confounded with the ordinary operation of burning as applied to stiff clay lands with the view of improving their mechanical condition. P. and B. is practised on old pasture and fodder lands, and sometimes after corn crops. The land is gone over with a 'paring' plough, which possesses a broad or paring share. It makes a broad shallow furrow, the portions sliced out of which are turned over on the neighbouring part of the ground, and thus alternate flat shallow depressions and elevations are secured. This process is termed 'raftering.' The remainder of the operations are thus described by a Cotswold farmer, in which neighbourhood the practice is general:—'After sufficient harrowing and rolling to reduce the crops to a moderate size, the light weedy part is raked together into small heaps at proper distances, the loose surface clod and fine earth is then pushed with the back of the rake in a ring round the bottom of each heap, which is then lighted with a wisp of straw before placed in the heap. After a little time all the cloddy ring of earth is spread evenly over the fire with an iron shovel and made firm, which stifles the fire and diffuses the heat through the whole mass. The ashes are subsequently evenly spread and ploughed up.'

Par'is is a small genus belonging to the tribe *Trillidæ* of the natural order *Liliaceæ.* It is well represented by *P. quadrifolia,* found in Europe and W. Asia, and occurring as a local woodland plant in Britain. This species has a white creeping rootstock, a round stem under a foot high, bearing (usually) four leaves, and surmounted by a solitary flower with green accuminate sepals and yellow petals, succeeded by a black berry-like fruit. The rootstock is purgative. The common name is Herb Paris, from

its old Latin name of *Herba Paris*, 'herb of a pair,' in allusion to its quaternate leaf arrangement, though they really vary from three to eight.

Paris, the metropolis of France, and by far the most beautiful of the large cities of Europe, is situated on both banks of the Seine, about 110 miles from its mouth, and in the department of Seine, lat. 48° 50′ N. and long. 2° 20′ E. With only about half the inhabitants of London (Register General's District), it ranks conspicuously as the next largest and wealthiest city of Europe. As the centre of national interests, it exerts an influence over France that is almost absolute. Long the focus of European civilisation, it still stands alone among the cities of the world for the magnificence of its architectural monuments, the wealth of its literary, artistic, and scientific collections, and the elegance and gaiety of its fashionable circles. It is no less remarkable from a military point of view, defended as it is by the most extensive system of fortifications in existence. The greater part of the city occupies a hollow or level site, 200 feet above the sea, but in the N. rise the elevations of Montmartre and Belleville to a height of some 320 feet. The Seine divides the city into two unequal parts, the larger lying on the N. side. The *Ile-de-la-Cité*, in the Seine, is the oldest part, and around it the city extends in three great belts, marked by the inner and outer Boulevards (from Ger. *bollwerk*, Eng. *bulwark*), and by the present bastioned wall, beyond which the vicinity presents a rich, populous aspect, with its elegant villas and beautiful gardens. The longest diameter of the city is 7½ miles, the shortest 5½ miles. The entire area is 35 sq. miles. Among the well-known parts of P. are the Faubourg St. Germain, with its Legitimist aristocracy; the Faubourg St. Honoré, the residence of the diplomat and financier; the Quartier Latin, the students' rookery; and the Faubourg St. Antoine, the home of the artisan. A peculiarity of the street architecture of P. is the number of dwelling-houses six or seven stories high and of unusual size, inhabited by many different families, and under the care of a *concierge* or hall-porter. The enormous number of cafés in P. sufficiently indicates the great extent to which outdoor life prevails.

Bridges, Streets, &c.—Characteristic of P. are the magnificent embankments and bridges of the Seine. The Quais des Augustins and De la Mégisserie are as old as the 14th c., but the embankments to the extent of some 12 miles were constructed under the first and third Napoleon. The oldest of the bridges, of which there are 23, is Pont Notre Dame, erected in 1500. The Pont Neuf, begun in 1578 and completed in 1604 by Henri IV., is adorned with an equestrian statue of that monarch, and spans the river by 12 arches at the N. end of the Ile-de-la-Cité. The handsome Pont de la Concorde, built in 1787–90, is 160 yards long. The finest and most important streets of P. are the Boulevards, spacious macadamised thoroughfares, with broad asphalted pavements, adorned with trees, and containing seats, *Kiosques*, or news-stalls, and *Vespasiennes*, or pillars covered with advertisements. 'Les Grands Boulevards,' 3½ miles long, extend between the Place de la Bastille and the Madeleine, and are lined by continuous rows of brilliant shops, cafés, and restaurants, graduating from the luxurious Boulevard des Italiens in the W. to the humbler Boulevards St. Denis and Beaumarchais in the E. Other beautiful streets are the Rue Rivoli, famed for its splendid arcades, the Rue Montmartre, Rue de la Paix, Avenue de Vincennes, the beautiful Avenue des Champs Élysées (1 mile long), and the Rue St. Honoré.

Public Squares, Gardens, and Monuments.—The most famous square in P. is the Place de la Concorde, 390 by 235 yards, between the garden of the Tuileries and the Champs Élysées. Here, on the 21st of January 1793, was erected the terrible guillotine, among the 2800 victims of which were Louis XVI., Marie Antoinette, Philippe Egalité, Danton, and Robespierre. The famous Obélisque de Luxor, a present from Mehemet Ali to Louis Philippe, was erected on the site of the guillotine in 1836. It is a syenite monolith, 73 feet high, covered with hieroglyphics in praise of Sesostris. On either side of the obelisk are two beautiful fountains with basins 53 feet in diameter. The square is further ornamented by eight statues, representing the largest cities of France. The Jardin des Tuileries (780 yards by 347) contains fine old trees, and is adorned with numerous statues in marble and bronze. The Place du Carrousal, between the Tuileries and the Louvre, is celebrated for its Arc de Triomphe, 47 feet high by 63 broad, erected by Napoleon I. in 1806. On the Place Vendôme, octagonal in shape, stands the famous Colonne Vendôme, erected, on the model of Trajan's column at Rome, by Napoleon I. in 1806–10. It is 144 feet high, and is covered with spiral reliefs representing scenes from the campaign of 1805. On the 15th May 1871 the column, as 'a monument of tyranny,' was pulled down by the Communists, but it was re-erected in 1875. The spacious Place de Bastille, where stood the celebrated state prison destroyed by the people 14th July 1789, is the site of a bronze Colonne de Juillet, 164 feet high, surmounted by a statue of Liberty. In the Place du Châtelet is the Fontaine de la Victoire, with its four allegorical figures, and the Colonne de Palmier, inscribed with the victories of Napoleon, and supporting a Victory by Bosio. The Porte St. Martin and Porte St. Denis, erected by Louis XIV., bear bas-reliefs of his victories in the Netherlands. To the W. of the Champs Elysées is the Arc de l'Etoile, the largest existing triumphal arch, 160 feet high by 146 broad, begun by Napoleon I. in 1806, and finished, after the design of Chalgrin, in 1836, at a cost of over £400,000. Rich in reliefs of Napoleonic victories by Rude, Lemaire, Cortot, Seurre, Marochetti, &c., it was considerably injured during the German bombardment of the city, but has been completely restored since 1875. From the Place de l'Etoile radiate twelve of the finest avenues and boulevards of P., and from the top of the arch is obtained probably the grandest view of the city. The Champs Elysées, a beautiful wooded park, intersected by avenues, was laid out in 1616 by Maria de' Medici, under the name of Cours de la Reine. Its principal avenue, leading from the Arc de Triomphe to the Place de la Concorde, is the Rotten Row of P., and is lined almost throughout by places of amusement. The adjoining Palais de l'Elysées, built in 1718, has been inhabited successively by the Marquise de Pompadour, Napoleon I. during the Hundred Days, the Duchesse de Berry, Napoleon III., and the President of the present Republic. The Avenue de l'Impératrice leads from the Arc de Triomphe to the beautiful Bois de Boulogne (see BOULOGNE). In the N. part of the Bois is the Jardin de Acclimatation, with an area of 50 acres. On the S. bank of the Seine is the Champ de Mars, a military esplanade, affording ground for the manœuvres of 30,000 men. This was the scene of the Fête de la Fédération of 14th July 1790, and of the Exposition Universelle of 1867, and here is situated the Exposition to be opened in May 1878. Other places of recreation are the Parc de Montceaux, the Bois de Vincennes, and the gardens of the Palais Royale and of the Palais de Luxembourg.

Churches.—The city has 65 parish churches, and numerous chapels, the most celebrated religious edifice being the cathedral of Notre Dame, situated at the E. end of the Cité. A noble specimen of Gothic architecture, richly storied with rich, fantastic sculpture, it dates from between the 12th and 14th centuries, and is 139 yards long by 52 broad, and 110 feet high, with towers rising to 220 feet. The main vault rests on 131 columns, and the façade is singularly beautiful, with its ornate, deeply-recessed rose windows. Ste. Chapelle, also in the Cité, and splendidly decorated with bright chromatic materials, is probably the most exquisite medieval structure in existence. It was finished under St. Louis (1245–48), and designed to receive the various relics brought from the Holy Land. The Madeleine, near the Place de la Concorde, is in the style of the Parthenon, and was founded in 1764, but not finished till the reign of Napoleon I. The structure cost upwards of £590,000. It is 350 feet long by 147 broad, has splendid bronze gates by Triquetti, and is surrounded by 55 Corinthian columns 52 feet high. The interior is magnificently ornamented with statues, coloured marbles, frescoes, gildings, &c. S. of the Seine, the principal church is the Panthéon, built by Soufflot (1764–90) in the form of a Greek cross, which has a portico of 22 Corinthian columns, 65 feet high, and a dome with paintings by Gros. The crypt contains the sarcophagi of Rousseau, Voltaire, Mirabeau, &c. The oldest church in P. is probably St. Germain des Prés, dating from 1001–1163, the lower part of which is Romanesque, the upper part Gothic. The tomb of St. Geneviève, the patron saint of P., is in St. Etienne du Mont, begun in 1517. St. Germain l'Auxerrois, the old church of the French kings, dates from the 15th c. St. Eustache (1532–1637) has an excellent organ, and many fine frescoes and statues. La Trinité, one of the most beautiful churches in P., was finished in 1860 from designs by Balla, and has a tower 200 feet high, and

many fine pictures. St. Sulpice, begun in 1646, is celebrated for its pulpit and organ, and its frescoes by Delacroix, Vinchon, Guillemot, &c. Other notable churches are Notre Dame de Lorette (1823) with its gorgeous interior; St. Vincent de Paul (1824–44) the vault of which rests on 82 polished Ionic columns; and the beautiful St. Jean Baptiste (1858), in the Rue de Belleville, the highest part of the city. Of some 18 Protestant churches, perhaps the best-known is L'Oratoire.

Public Buildings, &c.—P. is singularly rich in grand public buildings, and especially in palaces. The palace of the Tuileries (q. v.), begun by Catherine de' Medici in 1564, extends at right angles to the Seine for 348 yards, with a breadth of 36 yards. It is now the W. front of a vast quadrangular structure, the most imposing palatial edifice in the world, the E. end of which is formed by the Louvre. This immense building covers an area of 24 acres. The Tuileries, the residence of the rulers of France since 1st February 1800, was in great part destroyed by the Communists, and still (1878) stands in blackened ruins. The Council General of the Seine adopted a resolution (19th February 1878) to raze the Tuileries, the only dissentient being M. Viollet le Duc, who urged that the palace might be restored for 460,000 francs, and appropriated to a museum for popular lectures. The Louvre is one of the most interesting buildings in the city. The original building was a fort built by Philippe Auguste (1180–1223), and transformed into a palace by Charles V. (1361–80). A new structure was raised by François I. in 1541; the gallery extending to the Louvre on the side of the Seine, 1540 feet long, was begun by Catherine de' Medici, and finished by Henri IV.; the main block, enlarged by Richelieu, received its eastern façade and celebrated colonnade from design by Perrault in 1665. The gallery on the side of the Rue Rivoli, now mostly taken up by government offices, was begun under Napoleon I. and finished by Napoleon III. at a cost of seventy-five million francs. The Louvre proper has long been occupied as an art museum, and is unrivalled for its collections of paintings and sculpture, and for its Egyptian, Greek, and Roman antiquities. It suffered somewhat by the conflagration of 1871, but has since been restored. The Pavillon de la Bibliothèque, on the N. side, was injured to a greater extent, though the library, containing 90,000 costly works, and many rare MSS., escaped almost entirely. The Palais Royal (q. v.) is an interesting historical pile, comprising a theatre and many brilliant shops and cafés. The Palais de Justice, in the Cité, was the residence of the French kings till the end of the 14th c., and is a vast building, partly as old as that date. The body of the building was completely restored 1839–69. It is the seat of the Cour de Cassation, Cour d'Appel, Cour d'Assises, Tribunal de Première Instance, and Tribunal de Simple Police. The Communists fired the building in 1871, and reduced part of it to ruins. The Palais de Luxembourg, on the S. side of the Seine, built for Maria de' Medici in 1615, in imitation of the Palazzo Pitti in Florence, was a royal residence down to the Revolution, when it was first used as a prison, and after 1795 as the Palais du Directoire, and Palais du Consulat. On the Restoration it became the Chambre des Pairs, and subsequently the Palais du Sénat. Many of its magnificent rooms are employed for exhibiting modern pictures, but at present the building is mainly occupied by the Seine prefecture, till the restoration of the Hôtel de Ville. Begun under François I., the latter building was entirely destroyed by the Communists, and is now (1878) in process of rapid reconstruction on the former design. The Palais du Corps Législatif, on the left bank of the Seine, contains a splendid Salle de la Paix, decorated by Horace Vernet, and a Salle du Trône, with paintings by Delacroix. The Hôtel des Invalides, built by Libéral Bruant, 1671–75, and inhabited at present (1878) by 3000 disabled soldiers, is an imposing pile, the Église of which is crowned by a gilded dome, 394 feet high, and visible for many miles from the city. Immediately beneath the dome stands the sarcophagus of Napoleon I., hewn from a huge block of Russian granite. Other notable buildings are the Bourse, a parallelogram in classical style, surrounded by a colonnade; the Mint, with a fine façade 395 feet long; and the Halles Centrales, an immense general market, with 3200 stands, covering an area of about 20 acres. In connection with the building of the Exposition of 1878, which is of a temporary character, a magnificent permanent structure, Le Trocadero, to be used for art purposes, is now (March 1878) nearly completed.

Charities, Cemeteries, and Prisons.—No city is more amply endowed than P. for benevolent purposes. La Salpêtrière, solely for 4500 indigent old women (some 1300 insane), is perhaps the largest asylum in the world, having an area of 78 acres. Bicêtre, an hospital for men, has 3600 beds. The Hôtel Dieu, the oldest hospital in Europe (founded 660), receives annually 13,000 patients. There are in all 17 general and special hospitals, among the better known being La Charité, La Pitié, La Riboisière, and Val de Grace. Les Crèches, or public nurseries, 17 in number, provide during the day for the infants of working people at the rate of 20 centimes. In the Morgue (q. v.) the bodies found in the Seine are exposed for recognition. Of the cemeteries of P., Père-la-Chaise (see LA CHAISE) may be called, on account equally of the number of its famous dead, and of the cherished honour of interment within its precincts, the 'Westminster Abbey' of France. The southern half of the city is built over the limestone quarries which furnished the stone; and these quarries, having been made since 1786 the receptacle of the bones collected from the abolished intramural cemeteries, are the so-called catacombs. The principal prison of P. is La Force; the Nouveau Bicêtre is for convicts sentenced to life-long penal servitude; St. Pelagie, for political offenders; St. Lazare, for women exclusively; the Madelonettes, for juvenile criminals; and Clichy, for debtors.

Schools, Museums, &c.—The Quartier Latin is still the great seat of the educational institutions. Here is the Sorbonne (q. v.), founded in 1250, with faculties of theology, letters and science, and a library of 140,000 vols. The College de France, founded by François I. in 1530, has 29 chairs, and in common with the Sorbonne allows free attendance at lectures. The Université de France grants degrees in connection with the Sorbonne. P. has a celebrated École de Medecine, École Militaire (with barracks for 5000 men and 1500 horses), École Centrale des Arts et Manufactures, Conservatoire des Arts et Metiers, École Polytechnique, École des Mines, and École des Ponts et Chaussées. All these institutions are more or less supported by the State, and render P. the chief seat of technical instruction in the world. The famous Academy, or Institut de France (q. v.), holds its meetings in the Palais de l'Institut, a circular building surmounted by a dome, situated on the left bank of the Seine. Close by is the Palais des Beaux Arts, a stately edifice (1820–28) used as an exhibition of art and industrial objects. The Jardin des Plantes covers an area of 30 hectares, and contains, besides a botanical garden, anatomical and zoological collections, &c. The Bibliotheque Nationale, probably the largest library in the world, is the repository of over 2,000,000 vols., 150,000 MSS., 300,000 maps and plans, 5000 portfolios of engravings, a cabinet of 200,000 medals, antiques, &c. Other important libraries are those of Ste. Geneviève (200,000 vols.), Mazarin (160,000), l'Arsenal (300,000), and de l'Institut (100,000). P. has 640 primary schools, 120 of which are conducted by ecclesiastical superintendents. Foremost among the museums of P. stands the Louvre, of which mention has already been made. The Hôtel de Cluny, a grand medieval structure, contains a valuable collection of relics bearing on the history of France. The Conservatoire des Arts et Metiers has a grand collection of machine models, and the Palais de l'Industrie, in the Champs Elysées, is now a permanent exhibition of Algerian and other products. The Musée d'Artillerie contains 4000 specimens of armour and weapons; the Musée Technologique, part of the Musée Municipal, comprises 10,000 tools and utensils. Besides the periodical art exhibitions, of which the chief is the annual Salon, there are in P. a vast number of private and public collections.

Places of Amusement.—The splendid new Opera-house (opened 1875), was designed by Garnier and decorated by Baudry. It is one of the grandest buildings erected in P. within recent years, and has seats for 2350 persons. The Théâtre Français, founded in 1600, is the home of classical French drama, and receives from Government 240,000 francs yearly. The Odeon, near the Luxembourg, is the second classical theatre, and is greatly frequented by students. The Théâtre Italien is devoted to Italian opera, and the Opéra Comique to opera-bouffe. Other theatres are Le Gymnase, Le Vaudeville, Les Variétés, Les Bouffes-Parisiens, Le Palais Royal, L'Ambigu-Comique, Les Folies, La Porte St. Martin, &c. The Communists destroyed the beautiful Théâtre Lyrique, which has since been restored. The concerts of the Conservatoire de Musique have a European fame. Popular concerts are given in various music-halls and innumerable cafés-chantants. The chief equestrian shows are the Cirque d'Eté, in

the Champs Elysées, with 6000 seats, and Cirque d'Hiver, on the Boulevard des Filles du Calvaire. The 'Soirées Musicales et Dansantes' are characteristic of Parisian life.

Newspapers.—The principal newspapers are—Conservative, Monarchical (Bonapartist, Orléanist, and Legitimist), *Le Figaro-Le Constitutionnel, Le Français, Le Gaulois, La Gazette de France, La Gazette des Tribunaux, Le Journal de P., Le Monde, Le Moniteur, Le Soleil, Le Soir*, and the Ultramontane *Univers*;—Conservative-Republican, *Le Temps, Le Bien Public, Le Siècle, Le Journal des Débats, La Liberté, Le National*, and *Le XIX Cièle*;—Radical-Republican, *L'Opinion Nationale, L'Evènement, Le Rappel*, and *La République Française*. The chief illustrated journals are *L'Illustration, L'Univers Illustré, Le Monde Illustré, Le Journal Amusant, Le Charivari, La Vie Parisienne*, and *Le Journal Pour Rire*. There are also many high-class periodicals and 'petits-journaux.'

Industries and Commerce.—Standing in the first rank as an industrial city, P. is mainly pre-eminent for the manufacture of articles of luxury, as jewellery, watches and clocks, mirrors, gloves, perfumery, artificial flowers, bonnets, millinery, and earrings. P. is the centre of the French glove industry. The shawls, tapestry, and carpets of P. are of superior kind, excelling especially in elegance of pattern and fineness of texture. The productions of the Gobelins (q. v.) are entirely manual, and are noted for their highly artistic qualities. Indeed, a singular union of technical skill and æsthetic design is remarkable in almost all 'Articles de P.,' and is partly due to the superior training of the Parisian artisan, partly to the encouragement of the State. The Government tobacco factory employs some 1900 hands, of whom 1400 are women. P. has shared with Rouen, since 1870, the exclusive right of making printed calicoes. The ceramic and pictorial arts are here carried to a high state of perfection, while the book-trade of France is almost confined to the metropolis. On Montmartre are extensive quarries of limestone, and gypsum, or plaster of P. P. has also a large export trade, chiefly in wine, brandy, sugar, silks, woollens, and haberdashery. It is the converging point of eight main railway lines, which are connected by a circular metropolitan line. A plan for the construction of underground railways, with the central terminus in the gardens of the Palais Royal, was approved by the Minister of Public Works in February 1878.

Municipal Statistics, &c.—The jurisdiction of the city is under the Prefect of the Seine, aided by 36 councillors. The drainage system is particularly noteworthy, and has principally contributed to make P. the healthiest city on the Continent. The yearly death rate, 36 per thousand under Louis XVI., has been reduced to 22-25 per 1000 in ordinary years. The vast waterworks of P. are supplied by artesian wells, that of Grenelle yielding 200,000 gallons daily. Besides the Halles Centrales, already mentioned, there are many other *halles*, or wholesale, and *marchés*, or retail markets. The Halle aux Vins has storage for 500,000 casks. In 1876 the city budget amounted to £12,279,956, of which £390,600 was for educational purposes, £601,200 for maintenance of the poor, £285,800 for promenades and works of art, and the interest on the municipal debt £3,886,232. In 1877 the nominal debt of P. was £78,800,000 (augmented by a loan of £4,800,000 in 1876), and the amount is rapidly increasing. The pop. in 1877 was 1,988,806. The number of Protestants is estimated at 62,000, of Jews at 20,000, and of various sects at 30,000, the remainder being Roman Catholics. In 1874, 25·21 per cent. of the births were illegitimate.

Fortifications.—In consequence of recent events great interest attaches to the vast defences of the city. In 1840 Louis Philippe began the fortification of P. by the construction of ramparts, at a cost of £5,600,000. The *enciente*, with its 94 bastions, is 21 miles long. The ramparts, 32 feet high, with a parapet 19 feet wide, are environed by a moat 48 feet wide. The approaches were formerly defended by 16 *Forts Detachés*, the chief being Mont Valérien, but most of these were destroyed in 1870-71, and several are to be reconstructed at a greater distance from the ramparts. Such was the strength of these works that the Germans only reduced the city in 1871 after a four months' blockade.

History.—In the *Commentaries* of Julius Cæsar P. is first mentioned as *Lutetia*, the 'mud-city' of the Parisii, a Gaelic tribe, subdued by the Romans. Destroyed by war, it was rebuilt by Cæsar, and became the *Urbs Vectigalis* of the province of Gallia. The ruins of the Palatium Thermarum (Palais de Thermes), of ancient altars, aqueducts, &c., are found on both banks of the Seine. The name of the town was changed to *Civitas Parisiorum* or *Parisia* in 360 A.D. In 486 it was seized by the Franks, and Hlodwig (q. v.)made it the seat of the government in 508. Under the Karolings it suffered severely from the fierce raids of the Northmen (in 857 and 885); but in the 10th c. it became the capital of the modern monarchy of the Capets. By the 13th c. it had become one of the chief cities of Europe, and the seat of a famous university (see P., UNIVERSITY OF), with a population of 150,000. Among the early benefactors of the City, the most distinguished are Charles V., the founder of the Royal Library, the Bastille, and Palais de Tournelles; Louis XI., who repaired the disasters of the English occupation of 1421-22; François I., the patron of foreign artists, and founder of the Louvre and Hôtel de Ville; and Maria de' Medici and Henri IV., who inaugurated the improvements so widely extended by Louis XIV. During the reign of the latter, P. received 80 new streets, 33 churches, many monuments, &c., and the fortifications were converted into boulevards. The fair city witnessed the terrible days of the Revolution, and, as the heart of France, it contributed in no slight degree to the great outburst of national feeling. Napoleon I. expended four millions sterling in twelve years on the improvement of P., and dowered it with the treasures of art and science taken from conquered states. Louis Philippe expended 100,000,000 fr. in the construction of new streets, a vast drainage system, bridges, gardens, &c. But it may be said that Napoleon III., with the assistance of Baron Haussmann, virtually called the magnificent modern city into existence. The greatest event in the recent history of P., its siege by the Germans from 19th September 1870 to 28th January 1871, was followed by an infinitely more destructive outburst of Vandalism on the part of the Commune, the effects of which have already been traced in detail. The systematic attempt made by the Communists to fire with petroleum all the principal buildings, was only checked, after much irreparable damage, by the troops under Macmahon on the 25th of May. The cost of provisioning P. during the war was 38,807,000 fr. See Corrozet, *Les Antiquites, Chroniques et Singularites de P.* (1586), Dubreul, *Le Théâtre des Antiquites de P.* (1612); Félibien, *Histoire de P.* (5 vols. 1725); Lebeuf, *Histoire de la Ville et de tout le Diocèse de P.* (15 vols. 1754-58); Dulaure, *Histoire Physique, Civile, et Morale de P.* (7 vols. 1820-22); Lavallée, *Histoire de P.* (2 vols. 1857); Labédollière, *Le Nouveau P.* (1860); Joanne, *P. Illustré en 1870* (1871); Moriac, *P. sous la Commune* (1871); and Haussmann, *Histoire Générale de P.* (4to, vol. vii. 1871).

Paris, The University of, like its English sisters, had no authenticated record of its foundation. Remigius of Auxerre is said to have lectured at Paris about the year 900, and Stephen Harding, founder of the Cistercians, was studying there in 1070. But a continuous succession of teachers can hardly be traced beyond the opening years of the 12th c., when William of Champeaux and Abelard, the expounders of the Nominalist and Realist philosophies, drew to their lectures scholars from every part of Christendom, Beket, John of Salisbury, and Peter Lombard amongst the number. Suddenly Paris became the centre of medieval teaching, the 'fountain of knowledge and tree of life,' the arbiter to whose decision Henry II. referred his conflict with the Church. Thenceforth *Nos fuimus in Galandia* (in the Rue de Galande of the Quartier Latin) was a password with the youth of Europe. In 1200 Philippe Auguste granted the university its earliest charter, according it immunity from taxation and a jurisdiction of its own, and fifteen years later its statutes were drawn up by the Englishman Robert de Courson. Four 'nations' composed the university—the honourable nation of France, the most faithful nation of Picardy, the venerable nation of Normandy, and the most steadfast nation of England, the last replaced under Charles VI. by Germany. These four nations, with their four procurators, formed the Faculty of Arts, embracing the *trivium* (grammar, rhetoric, and dialectic) and *quadrivium* (arithmetic, geometry, astronomy, and music), and they had the right of electing the rector of the university. To the faculty of arts were added the faculties of theology (1257), law (1271), and medicine (1274), each with their separate dean. The Chancellor of Notre Dame, the university's ecclesiastical superior, alone conferred the licence to teach, a licence which the Mendicant Orders obtained with difficulty in 1257,

when the Dominican Aquinas and Franciscan Bonaventura were admitted doctors of theology. Scholastic theology was the loadstone that attracted Edmund Rich, Roger Bacon, Duns Scotus, Dante, Ockham, Bradwardin, and a crowd of students outnumbering the very citizens. It 'moralised' the grammars of Priscian and Donatus, and reduced the science of music to a smattering of plain-song. At the head of the colleges that began to arise in the 13th stood the theological college of the Sorbonne (1253), the later opponent of the Reformers and Jansenists; and Crevier enumerates fifteen others founded in the next hundred years, of which the Collège de Montaigu (1314) was to become the training-place of Erasmus, Rabelais, and Ignatius Loyola. Slowly philology and other sciences crept into the curriculum. The natural philosophy and metaphysics of Aristotle were interdicted up to 1237; mathematics, long identified with magic, were in 1290 represented by a solitary treatise on geometry in the library catalogue of the Sorbonne, where too we find a copy of Ovid, of all the Latin authors. Fifty years later the library had Horace, Virgil, Lucan, Juvenal, &c. But while theology declined, the university increased, its scholars numbering 25,000 at the death of Charles VII. (1453), and 30,000 in the student days of Scaliger. Philippe le Long consulted it on the interpretation of the Salic Law (1317); and in the great schism of the West the rival Popes appealed to its decision, Gerson, its chancellor, being the soul of the council of Pisa (1409). Greek was studied in Paris earlier than in the Italian universities, and it was there that Reuchlin acquired its rudiments from the native Greeks Tifernas and Hermonymus (1470–72). In 1507 Giles Gourmont established at Paris the first Greek press on this side the Alps; and under François I., himself a liberal patron of learning, and founder of the Collège de France, Paris could boast the profoundest Greek scholar in Europe, Budæus. At the Reformation the university, though it had constantly asserted the Gallican liberties, and though Luther called on it to arbitrate between him and Rome, never wavered in its allegiance to the Catholic faith. The conservative spirit evinced in its condemnation of Ramus' Calvinistic and anti-Aristotelian doctrines (1543) was ridiculed by Boileau a century later in his famous *Arrêt Burlesque*. The university flung itself fiercely into the struggles of the League, and through the dissensions of the Dominicans, Franciscans, and Jesuits (which last had gained admission in 1565) lost much not only of its political but scholastic influence. The despotism of Richelieu and Louis XIV. stripped it of the last vestiges of power, and Rollin's is almost the only eminent name among its teachers in the 17th and 18th centuries. The funds derived from the post-office and messageries were withdrawn before the year 1720, and were poorly compensated by a yearly grant of 150,000 livres. The expulsion of the Jesuits (1764) was followed at the Revolution by a decree of the Convention (March 20, 1794) suppressing the U. of P., along with the twenty universities of the provinces. To fill their place Napoleon I. established (March 17, 1808) the University of France, and vested in the State a monopoly of education, which, warmly contested by the clergy in the name of liberty, has been partially broken through by the National Assemblies of 1850 and 1875. See Dubarle, *Histoire de l'Université de Paris* (2 vols. Par. 1829); Jourdain, *Histoire de l'Université de Paris aux XVIIe et XVIIIe Siècle* (Par. 1864); Hallam, *Literature of Europe* (4 vols. Lond. 1837–39); and M. Arnold, *Schools and Universities on the Continent* (Lond. 1868).

Paris, in the Greek myth, was second son of Priam, king of Ilium, and Hecuba. His mother having dreamed that she brought forth a firebrand, the child was delivered to a shepherd to expose on the slopes of Ida. Here a she-bear suckled him for five days, when the shepherd, finding him still alive, carried him home, and reared him as his own son. He grew up strong and comely, and by his prowess in defence of his foster-father's flocks gained the name of Alexander ('warder of men'). At the funeral games held to commemorate his fancied death, his true parentage was revealed by Cassandra and acknowledged by Priam, shortly after which P. wedded Œnone, the daughter of the river-god Cebren. Hera, Athene, and Aphrodite called on him to award to the fairest of the three the apple of discord, the first offering him power, the second wisdom, and Aphrodite the loveliest woman on earth. He chose the last, and was aided by the goddess in his rape of Helen, false wife to Menelaus, king of Sparta. In the ten years' siege of Troy that followed on his treachery, P. did little save basely slay Achilles, and was at last himself wounded by one of the poisoned arrows of Heracles. Once more on Ida he sought Œnone, knowing her skill in leechcraft, but she would not or could not heal him, though she gladly shared his death. Comparative mythologists identify P with the Vedic Panis, who rob the cow-clouds of the dawn (Sarama or Helene), and Achilles, who dies at the western gate of Troy with Aharyus, the sun; and find in the Iliad 'the old story of the victory and death of the solar hero around the walls and battlements of the sky'—Sayce, *Comparative Philology* (Lond. 1874).

Paris, Louis Philippe Albert d'Orléans, Comte de, grandson of Louis Philippe, late king of France, was born at Paris, August 27, 1838. After the Revolution of 1848 he crossed with his mother to England, and in 1861 to America, under surveillance of the Prince de Joinville. He then served for several months along with his brother, the Duc de Chartres, on the staff of General M'Clellan of the Federal army, returning to Europe after the conclusion of the campaign in Virginia. P. married the eldest daughter of the Duc de Montpensier, May 30, 1864. In 1867 he published *Allemagne Nouvelle*, in 1869 *Les Associations Ouvrières en Angleterre*, and in 1870 *L'Esprit de Conquête*, which show an unusual watchfulness of the less obvious currents of social life. After the fall of Napoleon III., P. became (1871) a member of the National Assembly. In 1874 he published a *Histoire de la Guerre Civile en l'Amérique*, which added considerably to his reputation as a conscientious writer. P. is a man of retiring disposition, truthful and straightforward in all his dealings. His party in the French Assembly is represented by the members of the Right Centre, but since his acknowledgment of the Comte de Chambord as the head of the royal house of France (1871), its constitutional aims have been urged neither with independence nor vigour.

Paris, Matthew. See MATTHEW PARIS.

Paris Basin, in geology, is the name given to the middle Eocene (q. v.) formations which rest in the hollow of the Paris Chalk. It is the *Calcaire Grossier* of the French geologists, and is remarkable for its rich fossil contents. Molluscs, fish, crocodiles, birds, quadrupeds, and palms and other plants are represented. From these relics of a past age Cuvier and Brongniart laid the foundation of palæontological geology.

Par'ish (from the Old Fr. *paroche*, Lat. *parœcia;* in St. Augustine 'a diocese,' in Sidonius Apollinaris 'a parish;' Gr. *paroikia*, 'a dwelling together'). The early use of the word proves that it denotes sometimes the Diocese (q. v.) of a bishop, and sometimes the district assigned to a particular church. Now, however, it strictly signifies the territorial bounds connected with a particular church of the established religion, and for the support of which alone the tithes within those bounds can be allocated. The subdivision is made also by the law with the object of local self-government, and administration of the Poor Laws (q. v.). The 6 and 7 Vict. c. 37, and 7 and 8 Vict. c. 94, afford facilities for the subdivision of populous districts, and for the formation out of these of separate parishes, for the augmentation of poor livings, and for ecclesiastical purposes generally. By these Acts, the Ecclesiastical Commissioners are empowered to borrow £600,000 from the governors of Queen Anne's Bounty, on the security of the property accruing under the Cathedral Acts, to form districts for spiritual purposes in populous parishes, with consent of the bishop of the diocese. These are to be permanently endowed with not less than £100 a year, to be increased to £150 upon the district becoming a new P. The scheme for the formation of such district is to be submitted to Her Majesty in Council, previous notice of it having been given to the patron and to the incumbent of the P., and a clergyman is then to be nominated, to be licensed by the bishop. The nominee is to hold his office in the same manner as a perpetual curate, and in that capacity he may receive any grant or endowment, notwithstanding the statutes of mortmain. See MORTMAIN, STATUTES OF.

A *Vestry* is a place adjoining the church, where the vestments of the clergyman are kept. The word also denotes the meeting held in the vestry by the parishioners to consult on the affairs of the church or P. By custom, as well as by statute, there may be *select vestries*, that is, a certain number of parishioners

chosen to carry on the local government of the P., to make its rates, and to audit the accounts of the Churchwardens (q. v.). Every parishioner who has paid his rate can vote at a vestry, and all questions are decided by a majority of votes. Every inhabitant whose poor assessment is less than £50 is entitled to one vote; amounting to £50 or upwards, he is entitled to an additional vote for every £25 above that sum; but no one is entitled to more than six votes. 23 and 24 Vict. c. 30 is to facilitate local improvements for the health and comfort of parishes. In any P. whose population by last census exceeds 500, the ratepayers may hold land, or purchase or accept gifts of it, to form a public walk, exercise, or playground, or for the purpose of improving the same. 22 Vict. c. 27 grants facilities for the conveyance of lands to trustees 'for the resort and recreation of adults, and of playgrounds for children and youth.' The P. Clerk (q. v.) and Sexton (q. v.) are officers of the church. They are all usually appointed by the incumbent, but by custom may be chosen by the parishioners. A P. clerk may be suspended or removed by the archdeacon, or other ordinary, for misconduct or negligence. Every P. is bound to keep the highways passing through it in repair, unless this duty be otherwise imposed. For this purpose, surveyors are annually elected by the parishioners. They are bound to erect direction-posts at cross roads, with distinct inscriptions. See HIGHWAY.

When disputes regarding the boundaries of parishes give rise to litigation, the question is decided by proof of custom; hence the habit of *perambulation of parishes;* which is a going over and survey of the boundaries of a P. by the minister, churchwardens, and some other parishioners once a year, in or about Ascension Week. The perambulators may go over any man's land, according to usage; and, it is said, may remove all nuisances in their progress (see BOUND, or BOUNDARY). A statute of 1857 gives power to justices and poor-law boards (but see POOR-LAWS) to annex extra-parochial places, such as forest lands, to parishes. Incumbents of P. churches, who are styled rectors, vicars, or perpetual curates, are bound to reside in their P., and to administer the rights of the Church to parishioners (see NON-RESIDENCE). In Scotland, the judges of the Court of Session are empowered, with the consent of the majority in value of the Heritors (q. v.), to unite two or more parishes into one, or to divide a P.; and by 7 and 8 Vict. c. 44, any district may be erected into a P. for ecclesiastical purposes, or *quoad sacra*, as it is called, where there is an endowed church; and the Board of Supervision may combine two or more parishes for poor-law purposes. Regarding the law affecting parochial education in England and in Scotland, see EDUCATION.

Parish Clerk. This church officer, whose duty is to lead the responses during the reading of the service, must be twenty years old, and commonly holds his office *aut vita aut culpa;* but in some of the new churches built under the Church Building Acts he is appointed annually by the incumbent. His salary is payable from the church rates. See PARISH.

Parish Registers are books kept in each parish in England for the registration of baptisms, funerals, and marriages. They were instituted in 13 Henry VIII. The registration is now regulated by 6 and 7 Will. IV. c. 86. The P. R. is open to the inspection of all, on proper cause being shown; but the rector or curate cannot be required to make extracts.

Parish School. See PUBLIC SCHOOL.

Park, Mungo, a famous African traveller, was born at Fowlshiels, in the county of Selkirk, Scotland, 10th September 1771. The son of a respectable farmer, he received a good education, and was apprenticed at the age of fifteen to Mr. Thomas Anderson, surgeon at Selkirk, in accordance with his own desires. In 1789 he proceeded to Edinburgh University, where he took a three years' course in medicine, devoting himself chiefly to the study of natural history and botany. He then went to London, where, through the influence of Sir Joseph Banks, he was appointed assistant-surgeon to the East Indiaman *Worcester*, in which he made a voyage to Sumatra. On his return he was chosen by the London African Association to take charge of an exploring expedition to the River Niger, in place of Major Houghton, who had lately died in Africa. On the 22d of May 1795 he sailed from Portsmouth on board the *Endeavour*, and arrived in Gambia on the 24th of June. From this point he penetrated 1100 miles directly eastward, crossing the Niger at Sego and reaching Silla, where, however, he was forced to retrace his steps. During this journey he investigated the sources of the Senegal, Gambia, and Niger, ascertained the boundaries of the Moorish and Negro territories, and fixed a number of geographical positions. He arrived at Falmouth 22d December 1797, after an absence from England of two years and a half. Here he occupied himself in writing an account of his travels, which was published in 1799, and quickly obtained great popularity. P. now married, and settled for some time as a surgeon at Peebles. In 1804 he again took command of an expedition to the Niger, this time under Government patronage, and sailed from Portsmouth on the 30th January. On the 28th March he arrived at Goree, on the W. African coast, and engaged forty-four soldiers to attend him in his journey across the country. Long before he reached the Niger, however, the rainy season came on, and thirty-five of his men perished. Undaunted by calamity, P. built a boat, and set sail down the river. After a long time had elapsed, intelligence was brought by one of his native attendants, Amadi Fatouma, that P. and his companions had been attacked by a hostile tribe, that the boat had been overturned in a rapid, and that all the white men were drowned (towards the end of 1805). P.'s great work is entitled *Travels in the Interior Districts of Africa, 1795–97, by Mungo P., with an Appendix containing Geographical Illustrations of Africa by Major Rennell* (4to, Lond. 1799). His journal and correspondence were published in 1815, with a life prefixed by Mr. Wishaw. A monument was erected to his memory at Selkirk in 1859.

Parke, John, an English musician, born in 1745, died in 1829, was celebrated as the best oboe player of his time. His brother, William Thomas P., was an eminent performer on the same instrument.

Parker, a name celebrated in the naval annals of both England and America.—**Sir Hyde P.**, Vice-Admiral of the Blue, belonged to a Devonshire family, from whom the Earls of Morley also are descended. He commanded against the Dutch in a gallant but indecisive action off the Dogger Bank, August 5, 1781, and two years afterwards was lost in the *Cato*, which had last touched at Rio Janeiro. His second son, **Sir Hyde P.**, was born in 1739, and died Admiral of the White, March 16, 1807.—To a Kentish family belonged **Vice-Admiral Sir William P.**, who received a baronetcy for his services against the French, June 24, 1797, and died October 31, 1802; and whose son, **Sir William George P.** (born August 10, 1787, died March 24, 1848), was also Vice-Admiral of the White.—**Sir William P.**, a grandson of Lord Chief-Baron Thomas P., and a kinsman of the Earls of Macclesfield, was born in 1781, rose to be captain (1801), and captured the citadel of Ferrol (1809). He served with distinction in the first Chinese war (1841), was created baronet (1844), blockaded the Greek ports (1851), and died Rear-Admiral of the United Kingdom, November 13, 1866.—Two other English admirals of the same name were **Sir Peter P.** (born 1716, died December 21, 1811), and his nephew, **Sir George P.** (born 1766, died December 24, 1847).—**Foxhall P.**, born in New York, August 5, 1821, entered the U.S. navy (1837), and after serving against the Indians of Florida, on the Coast Survey, and in the Mediterranean, obtained his lieutenancy (1850). In the Civil War he commanded the Potomac flotilla, was promoted captain (1866), and in 1872 became chief signal officer of the navy, a post which he still (1788) retains. He has written *Fleet Tactics* (1863); *The Naval Howitzer Afloat* (1865); and *The Naval Howitzer Ashore* (1866); was long a contributor to the *Knickerbocker Magazine*, and was one of the founders of the Naval Institute at Annapolis (1873).

Parker, John Henry, C.B., F.S.A., son of a London merchant, was born in 1806. After being educated at Dr. Haines' school, Chiswick, he entered the book trade in 1821, and in 1832 succeeded to the business of his uncle, Mr. Joseph P., at Oxford. He has devoted himself chiefly to the study of architecture, on which subject he has published some important works. In 1869 he was appointed by the University of Oxford keeper of the Ashmolean Museum, with a salary of £250, further supplemented by a grant of £200, to assist him in prosecuting the excavations which are (1878) being carried out at Rome under his superintendence. He has also been created an honorary M.A. of Oxford. His principal works are *Glossary of Architec-*

ture (3 vols. 1836); *Introduction to the Study of Gothic Architecture* (1849); *Domestic Architecture of the Middle Ages* (3 vols. 1853–59); *Archæology of Rome* (Parts i.–xi., 1874–77).

Parker, Matthew, son of a calenderer, was born at Norwich, 6th August 1504, educated at Corpus Christi College, Cambridge, where he applied himself with zeal to the study of ecclesiastical history and scripture, and admitted to the priesthood in 1527. In 1533 he became chaplain to Anne Boleyn; two years later he was appointed Dean of the Catholic College of Stoke Clare in Suffolk; in 1538 he was inscribed D.D.; in 1537 he became chaplain to Henry VIII.; in 1544 he was made master of Benet College, Cambridge; in 1547 he married. The last step was the culmination of convictions long developing, whereby he broke with Catholicism and passed over to the side of the Protestant Reformation. Under Edward VI. he became Canon of Covingham, but was careful to conceal himself during the reign of Mary, a period which he utilised in the elaboration of his already composed treatise *De Conjugio Sacerdotum*, and in making a rhythmical translation of the Psalms. Queen Elizabeth recalled him from obscurity to the Archbishopric of Canterbury, December 17, 1559. Though thoroughly imbued with the Reformation spirit, P. resisted the extreme forms of Protestantism as much as he curbed the reactionary tendencies of the clergy who were still Catholic at heart. His chief aim was directed towards the re-establishment of discipline and the observance of conformity in worship, and to this end he presided over a commission which sat at Lambeth, and administered to non-conformity many severe chastisements. Nor was his relationship to the Queen an easy one, for she never forgave him his matrimonial connection, and once rebuked Mrs. P., who had received her generously, with the speech, 'Madam I may not call you, and mistress I am loth to call you; however, I thank you for your good cheer.' In 1568 P. published at his own expense the *Bishops' Bible*, and in 1572 the *De Antiquitate Britannicæ Ecclesiæ*, while to his generosity Corpus Christi College owed a substantial endowment in money, and a valuable gift of ancient manuscripts reaching over nine centuries. He died 17th May 1575. P. was one of the first to revive the study of Old English literature, and besides editing Matthew Paris and Matthew of Westminster, he originated the 'Society of Antiquaries.' He was a man of great moderation of character, but circumstances developed in him a firmness and resolution which sometimes amounted to harshness. See Strype's *Life of Archbishop P.* (3 vols. Oxf. Clar. Press, 1711), and vol. ix. of Hook's *Lives of the Archbishops of Canterbury* (Lond. 1872). The 'P. Society,' named in his honour, published (1841–55) a series of 55 vols. of English ecclesiastical writings of the Elizabethan age.

Parker, Theodore, was born near Lexington, Massachusetts, U.S., 24th August 1810. From childhood he was a laborious student, and from early boyhood '*felt* he was to be a minister.' In 1837 he was ordained to the Unitarian Church of West Roxbury, near Boston, and soon became distinguished for the free expression he gave to the freedom of thought he had always sought. A crisis was reached in 1841, when he preached a 'Discourse of the Transient and Permanent in Christianity.' He was in consequence ostracised by both Trinitarian and Unitarian ministers. In 1843–44, P. travelled for a year in Europe, and on his return home became (February 1845) pastor of the 28th Congregational Society, which he served till January 1859, when he burst a blood-vessel in his lungs. He died at Florence, 10th May 1860. His library of 13,000 vols. he bequeathed to the Boston Free Library. P.'s great natural gifts and daring originality of thought were balanced with varied and profound learning. But he was even more distinguished for an intense warmth of heart, exhibited in a womanly devotion to his friends and an immense power of human sympathy, which led him to make almost superhuman exertions for every philanthropic object, and notably in behalf of the slaves. The chief published writings of P., besides a number of sermons, and critical and miscellaneous pieces, are Discourses of Religion, of Theology, of Politics, of Social Science, and of Slavery. He is generally regarded as the great modern apostle of Theism; but it has also been pointed out that his theology is a form of spiritual Pantheism. A complete edition of P.'s works by F. P. Cobbe was published at London in 12 vols. 1863–67, and by H. B. Fuller in 10 vols. Boston, 1870. There are biographies of P. by the Rev. J. Weiss (2 vols. New York, 1864); Réville (Par. 1865); the Rev. O. B. Frothingham (New York, 1874); and P. Dean (Lond. 1877). See also Hunt's *Essay on Pantheism* (Lond. 1866).

Parker'ia, a genus of *Foraminifera* (q. v.), found in a fossil state in the Upper Green Sand of the Chalk series. It is interesting from its large relative size, a diameter of two inches being common. Its shell was *arenaceous*, that is, it contained sandy particles as elements in its formation.

Park'esine (named after the inventor, Mr. A. Parkes of Birmingham), a factitious material, fluid, plastic, or perfectly hard, procured originally from a solution of gun-cotton, and afterwards from cotton, tow, and similar waste substances, by an undivulged process. As it resists the action of the atmosphere or acids, it was proposed to employ P. as a substitute for guttapercha in its various applications in telegraphy and otherwise, and for ebonite in making combs, knife-handles, &c., but it has never come into commercial competition with either of these substances.

Park'hurst, John, a biblical scholar, born at Catesby, Northamptonshire, in June 1728, was educated at Rugby and Cambridge, where he obtained a fellowship and took the degree of M.A. in 1752. He studied for the Church and entered holy orders, but on inheriting his father's large fortune, retired to his private estate in Surrey, where he devoted himself to his favourite pursuit of biblical philology. He died there 21st March 1797. His principal works, which have now, however, quite fallen into disuse, are *A Hebrew and English Lexicon without Points* (1762), *A Greek and English Lexicon to the New Testament* (1769).

Parkinso'nia is a small genus of the *Cæsalpiniæ*, sub-order of *Leguminosæ*, consisting of spiny shrubs or small trees with bipinnate leaves. *P. aculeata*, indigenous in the W. Indies and tropical America, is now cultivated in most tropical countries, and has become almost naturalised in India, where it is grown as a hedge plant, both for ornament and service. The wood is whitish, light, and soft, but is close grained, and polishes fairly. In Mexico the Indians use it as a febrifuge and sodorific, also as a remedy in epilepsy. The name commemorates John Parkinson, a good English botanist of the early part of the 17th c.

Park of Artillery, the military term for the *materiel* used by artillery forces in war, and everything appertaining thereto. The park is placed in a central and convenient position in the field. See ARTILLERY.

Parks, in law. See FORESTS, CHASES, WARRENS, and PARKS.

Parliament, the highest legislative body of the United Kingdom, is composed of the sovereign, the House of Lords, and the House of Commons. A national assembly of some kind is as old as English history, though its composition and powers have varied at different epochs. From the description given of the Germans by Tacitus it has been judged that in his time their political system was that of a free commonwealth of warriors, every freeman having a place in the state and a vote for the council, hereditary descent and elective office being held in high esteem. While England was still a cluster of separate states, the assembly of each was called the *witenagemot* ('meeting of the wise'), at which every ordinary freeman had the right of attendance and vote. It gradually ceased, however, to be representative, since men of means could alone afford to obey the summons to it. It was never very largely attended; a witenagemot of Eadgar's, for example, held A.D. 996, contained his mother, two archbishops, seven bishops, five ealdormen, and fifteen ministri. The legislative authority of the witan was complete and binding and extended to ecclesiastical as well as secular affairs. It busied itself with transfers of land, revived monastic charters of confirmation, and acted in the last resort as a court of justice. It imposed extraordinary taxation, and had a consultative voice in the determination of peace or war. Above all, in theory it elected the king, though 'the rule of hereditary succession was never, except in great emergencies and in the most trying times, set aside.' By the time of the Norman Conquest, the constitution of the witenagemot had become fluctuating and anomalous, and though it retained much of its earliest character under the Conqueror, it was less of a free gathering than a royal court of feudal vassals. Representation was based upon land tenure, which consequently excluded freeholders in general. It now took the name of Great Council, but it was a council of courtiers—bishops, abbots, earls, barons

and knights—who held their lands from the king, and was chiefly valuable as upholding the theory and form of a national assembly. 'The number of persons,' writes Mr. Stubbs, 'who were really consulted on business, or to whom the share of such attention was paid, must have been always very limited.' Once or twice leading men from London and Yorkshire were summoned to deliberate. Though there was little initiative in the council, their legislative authority was to a certain extent admitted. Judicial sentences, too, were passed, and matters of civil jurisdiction were discussed; but there is no trace of the power to join in taxation. Under the head of 'general business,' earldoms and knighthoods were conferred, homage to the king was witnessed, questions of foreign and ecclesiastical policy, of war and peace were considered, and royal marriages talked over. The Conqueror held his council at Winchester, Westminster, and Gloucester; under Henry I. they were held at the forest palaces and in different midland towns as well. But it was not till the reign of Henry II. that they were summoned with regularity and their functions enlarged to the discussion of taxation. 'The name,' says Mr. Stubbs, 'given to these sessions of council was often expressed by the Latin *colloqium;* and it is by no means unlikely that the name of P., which is used as early as 1175 by Jordan Fantosme, may have been in common use.' The power of taxation was definitely fixed when it was announced in the Great Charter that no burthens beyond the customary feudal aids might be imposed 'save by the Common Council of the realm.' Up to this time though the assembly in theory included 'lesser barons,' who were knights and freeholders holding in chief of the crown, they but seldom attended owing to the personal expense it involved. It was enacted in an extraordinary provision of the Great Charter that whilst the greater barons were to be summoned personally, a general writ should call together the lesser barons. 'Here,' says Mr. Freeman, 'we have the beginning of our county members, and of the title which they still bear of knights of the shire. Here is the beginning of popular representation, as distinct from the gathering of the people in their own person.' The year 1265 marks an important epoch in the history of the English assembly. Simon de Montfort (q. v.), who was then master of the kingdom with Henry III. in his keeping, summoned a P. for the 20th of January, in which provision was for the first time made for the representation of the shires, cities, and boroughs. Two knights from every county, two citizens from every city, and two burgesses from every borough were called for consultation at Westminster. 'Then,' says Mr. Freeman, 'was formed that newly developed Estate of the Realm which was, step by step, to grow into the most powerful of all, the Commons' House of P.' Representation was not, however, coveted by the classes in question, so that thirty years elapsed before the Great Council passed into the P. of the realm. On the 27th November 1295, there met at the request of Edward I. a P. which he intended to be a model assembly, 'bearing in its constitution evidence of the principle by which the summons was dictated, and serving as a pattern for all future assemblies of the nation.' By his summons to the burgesses and knights of the shire P. was constructed to represent three bodies, the clergy, the baronage, and the commons.

Each order of the state was now represented, and shared in legislation, control of government, and grant of supplies. At the same time Westminster was fixed upon as the permanent seat of the assembly. But though Edward I. concentrated the three estates of his people, it is not until the opening of the reign of Edward III. that the division into a House of Lords and House of Commons becomes apparent. The House of Lords is simply the witenagemot and the great council, 'by the force of circumstances, step by step, without any one moment of sudden change, shrunk up into an assembly wholly hereditary and official.' The third estate, by the union of the knights of the shire with the burgesses, got marked off as 'the Commons.' During the 15th c. P. once more ceased to represent the nation, for though the House of Commons still controlled subsidies, passed statutes, and impeached ministers, by an act of 1430 which ordained that those only who held land worth 40s. a year—equal to £40 now—were entitled to vote, the majority of householders and copyholders were shut out from the franchise. Yet a sign of advancing power is visible in the change of practice which introduced bills in the form of statutes instead of as petitions liable to fraudulent modification. The 16th c. witnessed the subjugation of P. to the sovereign will of the Tudors. The royal council usurped its legislative powers, taxation became arbitrary through forced loans, and representation corrupt because of the creation of boroughs subservient to the court. Even under Henry VIII., owing to the outward respect shown towards the forms of P., acknowledgment was made of the right to grant subsidies, enact laws, and redress grievances. But under Elizabeth members protected themselves from arrest during session, and had the right of protecting each other for crimes committed within the House. The 17th c. was a long and successful struggle for securing against the encroachments of the Stewarts the rights which had become historical. By the Revolution of 1688 sovereignty was finally transferred from the king to the House of Commons. 'From the moment,' says Mr. Green, 'when the sole right to tax the nation was established by the Bill of Rights, and where its own resolve settled the practice of granting none but annual supplies to the crown, the House of Commons became the supreme power in the state.' From the same period dates the government by party as it now exists, William III. having adopted the expedient of creating a Ministry (q. v.) from among the majority in the Lower House, instead of having a permanent cabinet immediately responsible to himself. The internal history of P., which during the 18th c. assimilated the Scotch assembly, reveals the growth to an inordinate extent of bribery and corruption. Every man had his price. Seats were openly bought and sold. P. miserably represented the country, for out of a population of 8,000,000, there were but 160,000 electors. The only reforms which had been made in the past were those of the Long P., and they had been swept aside on the recall of Charles II. In 1785 an ineffectual effort to rescue the House from the possessors of rotten boroughs was made by William Pitt, who brought in a Bill for the gradual extinction of all decayed boroughs, the immediate disfranchisement of thirty-six, and the apportionment of their members to counties. In 1800 the Irish P. was transferred to Westminster. The question of Reform was again revived in 1809 by Sir Francis Burdett, but only to be shelved. It was not till 1832 that a Reform Bill deprived fifty-six rotten boroughs of power to represent, distributed the 173 members taken from them among constituencies hitherto unrepresented in England, Scotland, and Ireland, gave the right of voting to householders paying rates in boroughs for houses of the yearly value of £10, and extended the franchise for counties to all copyholders to the value of £10 a year, and to leaseholders for not less than twenty-one years with an annual rental of not less than £50. In 1852, '54, '58, '59, '60, '66 successive Governments brought in Reform Bills without passing them, but in 1867 a measure more sweeping than any of its predecessors was added to the statute book. It extended the borough franchise to all ratepayers and to lodgers having rooms of the annual value of £10. It reduced the county franchise to £12. It withdrew thirty-three seats from English boroughs, giving twenty-five of them to the counties, and the remainder to Scotland and Ireland.

In numbers the Upper House is subject to slight fluctuation, which is due to the fact that the sovereign can create at pleasure new members of the caste from among favoured or distinguished commoners. It is composed of Lords Spiritual and Lords Temporal. For the present year (1878) there are available for attendance and vote 478 peers. These include (counting minors) 5 princes of the blood-royal, 2 archbishops, 21 dukes, 18 marquesses, 111 earls, 24 viscounts, 24 bishops, 298 barons, 16 Scottish representative peers, and 28 Irish representative peers.

The Lords Spiritual have seats on account of their temporal baronies, but they have separate benches from the Lords Temporal, at the upper part of the House, on the right hand of the throne. They are not regarded as peers, but simply as Lords of P. The Bishop of Sodor and Man does not sit at all, and with the three exceptions of London, Durham, and Winchester, the English bishoprics have, in rotation, been similarly situated since the proclamation of Manchester as a see in 1847. The representative peers of Scotland are elected for each P. by a periodical arrangement among themselves. In 1708 the Scotch titles were added to the peerage-roll of the House of Lords, and all subsequent claims have been inserted there. But no titles on the roll in representation of which votes have not been rendered in the House of Lords since 1800, can be called over at the elections without a special order of P. The Irish representative peers are elected for life. All peerages are annulled on conviction of high treason, and only the removal

of the attainder entitles a descendant to retake the original title. Conviction of felony annuls a peerage by writ; it does not affect a peerage by patent. Peers may have in attendance at the House of Lords the judges of the Courts of Queen's Bench and Common Pleas, the Barons of the Exchequer, who are serjeants-at-law, and have the degree of the coif, and Queen's Counsel, who are serjeants.

The House of Commons, though in the course of its history its numerical proportions have repeatedly changed, has now a fixed maximum of 652 members. The following table shows the relationship of constituencies, representatives, and electors, prepared in the case of England, Ireland, and Wales, from statistics for 1876–77, and of Scotland for 1877–78.

	No. of Constituencies.	No. of Representatives.	No. of Electors.
England and Wales.			
Counties	53	187	850,587
Cities, Boroughs, and Groups	198	297	1,514,716
Universities	3	5	12,458
Total of England and Wales	254	489	2,377,761
Scotland.			
Counties	32	32	88,549
Cities, Boroughs, and Groups	22	26	203,786
Universities	2	2	10,916
Total of Scotland	56	60	303,251
Ireland.			
Counties	32	64	173,919
Cities and Boroughs	31	37	53,953
Universities	1	2	3,393
Total of Ireland	64	103	231,265
United Kingdom.			
Counties	117	283	1,113,055
Cities, Boroughs, and Groups	251	360	1,772,455
Universities	6	9	26,767
Total of United Kingdom	374	652	2,912,277

Representatives in the House of Commons previous to the statutes 21 and 22 Vict. c. 26, required to show a property qualification of £600 a year before being returned for counties, and £300 for boroughs. Except the Master of the Rolls, no judge can stand for P. Roman Catholic priests and clergymen of the Established Church are disqualified. A sheriff may not sit for his own county. Revenue officers, and men holding Government contracts, other than negotiations for loan, cannot represent. Felons, traitors, and bankrupts are incapacitated. By the acceptance of office an M.P. annuls his own election until under a new writ he is returned, but he may shift from one official position to another without a second appeal to his constituency. Members who resign do so by an application for the stewardship of the Chiltern Hundreds. A P. composed of new representatives is called by the issue of writs to the sheriffs of counties from the Clerk of the Crown, directed by the Lord Chancellor, who takes the initiative from the sovereign. A day is set apart for the elections, and in accordance with the Ballot Act of 1872 candidates are nominated by a document having the signatures of a proposer and seconder and eight other electors. This is handed over to a returning officer. Should the candidates be more numerous than the vacancies, an adjournment of the election occurs, and a poll is taken under the secrecy of the ballot. The result is announced by the returning officer, and sent back to the Clerk of the Crown.

The separate functions of the three constituent parts of P. are marked off with perfect definiteness. The sovereign is held to be personally above the law, irresponsible and incapable of doing wrong, the sole fountain of all honour, the original grantor of all property, the source from which all authority of every kind, in the first instance, issues. 'Our system,' writes Mr. Freeman, 'gives the state a personal chief, a personal embodiment of the national being, which draws to itself those feelings of personal homage and personal duty which a large class of mankind find it hard to look upon as due to the more abstract ideas of law and commonwealth.' From the ascension of Edward I. hereditary succession became the rule. But the dates 1399, 1660, and 1688 establish revolutionary precedents which take no account of those sovereign attributes which have been proved to be derived by the subtlety of lawyers. It was the Act of Settlement which made the crown permanently hereditary. To it, through the ministry, is intrusted the duties of summoning, proroguing, and dissolving P. The summons must be annual because an annual consent of the Commons is required in order to obtain money for the spending departments. A prorogation annihilates all business except impeachments in the Lower and appeals and writs of error in the Upper. It is enforced by the Lord Chancellor announcing it in the presence of the sovereign, by proclamation, by commission, or by writ under the Great Seal. Dissolution is announced either by the sovereign or a representative, after which a proclamation states that the Chancellors of Great Britain and Ireland have been ordered to issue new writs. P., which, during its earlier history, had no limits to its duration apart from the will of the sovereign, was by 1 Geo. I. c. 38 enacted to last at its longest for seven years. The sovereign must concur in every measure before it can become a legislative enactment. The public expenditure is his responsibility. He nominates judges, governors of colonies, officers of the army and navy, bishops and deans; despatches and receives ambassadors; treats with foreign Powers; and declares peace or war. By Coronation Oath he is bound to govern according to the statutes in P. agreed on, and the laws and customs of the same. By the Act of Settlement he may not be either a Papist himself or marry one, and he is bound over besides to uphold Protestantism, and in Scotland the government of the Presbyterian Church.

The House of Lords, in addition to its right of originating every sort of measure which is not a money bill, forms an ultimate court of appeal. Appeals from the Court of Chancery and the Court of Session, and writs of error to review judgments in the Queen's Bench, are revised for final settlement. Disputes in the election of representative peers for Scotland and Ireland are decided. Claims of peerage are adjusted, and lords indicted by a grand jury are tried. Peers are permanently free from arrest in civil affairs. The House of Commons has a similar right of introducing legislative measures, with the immensely important addition that it alone may levy taxes and regulate the expenditure of the public income. It has the power of committing its own members and others who have perpetrated a breach of privilege to the Tower or Newgate for contempt. It may also decree punishment for libels upon its own proceedings, for the premature publication of evidence given before a select committee, for threat, assault, or wilful disobedience of the orders of the House, for offering bribes, interfering with its officials, or tampering with witnesses.

The aggregate power of P. is absolutely without limit, and there is no public or private interest which may not come under its cognisance. The succession to the throne, its own and the national constitutions, may all upon occasion be altered. It has the power of repeal and amendment of all laws passed in the colonial legislatures. Over the House of Lords presides the Lord Chancellor or Lord Keeper of the Great Seal, or in their absence a deputy-speaker, who is chairman of the Lords' committee. His authority is not greater than any of his brother peers, and he has the privilege both of vote and speech. In the House of Commons the Speaker can neither speak nor vote on a question except in an equality of voices, when he has a casting vote. His duties consist in applying the rules of order, in determining the precedence of members rising to address the House, in putting questions and explaining the will of the House concerning them, in notifying its resolutions to others, in conveying thanks or censure, in issuing warrants and writs, and in directing the printing of votes and proceedings. The deputy-speaker is the Chairman of the Committee of Ways and Means. Other officers of the Houses, not members, are, in the Upper, Clerk of the P., Gentleman Usher of the Black Rod, Yeoman Usher, Clerk Assistant, Serjeant-at-Arms; and, in the Lower, Clerk of the House, Serjeant-at-Arms, Clerk-Assistant, second Clerk-Assistant. On the assembling of a new P., the Clerk acts as Speaker of the Commons, until the election takes place of a member duly sanctioned by a majority of the House, after which, on the invitation of Black Rod, he, accompanied by the Commons, enters the House of Lords to have his appointment approved. The ancient rights and privileges of the Commons are then asserted and confirmed, and both Houses proceed to the oaths and introductions. Either in person or by commission the sovereign then declares the causes for summoning P., and the Commons having once more appeared at the bar of the

House of Lords, the sovereign either reads a speech, or it is read by the Lord Chancellor. The same afternoon an address is made in reply to it, two members in either House being previously chosen by the Ministry to move and second it. Business may be proceeded to in the Upper House if three peers are present. Forty members are required to make up a house in the Lower. In both, prayers are read before proceedings commence. Questions affecting internal order and the formalities of introducing bills and promulgating statutes are regulated by 'standing orders,' or 'resolutions' declaring the practice of P. for a limited period. 'Orders of the day' consist of business already pre-arranged for consideration. They are taken on Mondays, Wednesdays, Thursdays, and Fridays. 'Motions' are taken on Tuesday. Wednesday is understood to belong more particularly to the orders of private members, Government orders being first on the list during the remainder of the week. Except in the case of merely formal motions a motion must be seconded in the House of Commons. The same rule does not hold in the House of Lords. If an amendment has been proposed the question cannot be withdrawn till the amendment has been withdrawn. Members may endeavour to set questions aside by the use of four forms of the House. A motion may be made 'that the House do now adjourn,' or that 'the orders of the day be now read,' or 'the previous question' may be moved, or an alteration upon the original motion amounting to an amendment may be suggested. 'Content' or 'non-content' are the party responses made to the speeches on putting a question in the Lords, 'aye' or 'no' in the Commons. The question is settled by the House 'dividing,' that is the affirmative party go into the right lobby and the negative into the left, two clerks counting them one by one. P. is in the habit of facilitating progress in business by resolving itself into committees, which are either 'of the whole House' or 'select.' Select committees never consist of more than fifteen members, and their aim is to prosecute inquiries on some specified question. They have power to send for persons, papers, and records, and they may adjourn from time to time and from place to place. Committees of the whole House simply mean the House under the presidency of the Chairman of Committees of Ways and Means. Great latitude is then allowed in debate. Motions need not be seconded. 'The previous question' is disused. Unlimited speech is allowed on the same question. During the session of 1877, however, the leader of the House of Commons, owing to the continued abuse of the forms of the House in committee for the purposes of legislative obstruction by some Irish Home Rulers, was compelled to submit two resolutions forfeiting the privilege of more than one speech during a sitting, and depriving members of the right of moving oftener than once 'to report progress,' or to vacate the chair. The arrangement was only temporary. The chief work of P. is devoted to the passing of bills, which are of two kinds, public or private; and most of these originate with the House of Commons, owing to the fact of its control over all taxes and supplies. Bills are read three times before becoming law. The first reading is rarely opposed, an interval being allowed for printing and circulation. Opposition is offered on the second reading, but if it be accepted by the House, it is sent into committee for consideration, after which it is reported with amendments and ordered to be read a third time. When both Houses have agreed to its provisions, it is left in the House of Lords for the royal assent. In the case of private bills, four 'examiners' first of all take them in hand, and, according to their report, they are delegated to a Committee of Standing Orders, who again report to the House. This second reading is conducted just like public bills, after which they are referred to a Committee of Selection, who classify them, and nominate for the committees on them. Railway and canal bills are considered by a 'General Committee of Railway and Canal Bills.' Supplies are exclusively granted by the House of Commons, which on a given day resolves itself into a Committee of Supply for the consideration of the different estimates and the specific grants which are to be voted. On the first report of the Committee of Supply the House appoints a day for resolving itself into a Committee of Ways and Means to determine how the voted funds are to be raised and applied. It is one of the duties of P. to receive petitions which are presented by a member. It is one of its powers to be able to order returns from all the public departments. See Stubbs's *Constitutional History of England* (vols. i. ii. 1875, vol. iii. 1878); Freeman's *Growth of the English Constitution* (1876); Sir T. Erskine May's *Laws, Privileges, Proceedings, and Usages of P.* (6th ed. 1868); Hallam's *Constitutional History of England;* Irving's *Annals of Our Time, A Complete Collection of the Protests of the Lords, with Historical Introductions*, edited by Professor E. Thorold Rogers (3 vols. Oxf. 1875); and Burton's *History of Scotland* (new ed. 1873).

Par'ma and Piacen'za, a former duchy of N. Italy, comprising the territory of the present provinces of P. and Piacenza, and bounded N. by Lombardy, S. by Genoa and Tuscany, W. by Piedmont, and E. by Modena. Area, 2268 sq. miles; pop. 490,000. The natural boundaries are the Apennines in the S. and the Po in the N. The northern plain is watered by the Enza, Parma, Taro, and many other streams, all flowing from the upland valleys of the great range to swell the volume of the Po. Forests of oak and chestnut trees clothe the mountain spurs, and the plain produces abundantly wheat, rice, olives, grapes, and southern fruits. Other products are salt, petroleum, marble, and alabaster, and there is much silk-culture, cattle-rearing, and cheese-making.

History.—The duchy was formed out of the Papal property by Pope Paul III. of the Farnese Family (q. v.), and conferred on his natural son Pietro Luigi Farnese in 1545. It became the patrimony of the Farnese, and the dukes, who were for the most part popular with the middle and lower classes, gained an evil reputation among the other princes of Italy, with one or other of whom they were usually quarrelling. On the expiry of the direct Farnese line, and in accordance with the Treaty of the Hague, the duchy passed in 1731 to Don Carlos, the son of Elizabeth of Spain, who gave it up to Austria in exchange for the throne of the Two Sicilies in 1735. In 1748 it was restored conditionally to Spain, and after the death of the enlightened Ferdinand in 1802, was seized by France and incorporated as the department of Taro. By the Treaty of Paris it was conferred on the ex-Empress Maria Luise of Austria, and this settlement was confirmed in 1817, subject to the condition that on her death the duchy should pass to the rightful heir, Ferdinand Carlo, Duke of Lucca, the son of Maria Louisa, sister of the King of Spain. The duke, who succeeded as Carlo II. in 1847, ruled with great severity, and on the outbreak of a revolution was forced to leave his dominions in 1848. After the triumph of Austria over Sardinia, in the war of 1848–49, Carlo III. ascended the throne which his father had abdicated, and inaugurated a rule more tyrannical than ever, in which he was strongly seconded by an Englishman named Ward, his chief minister. Carlo was assassinated in 1854, and his widow, Louise-Marie-Therese de Bourbon, daughter of the last Duc de Berry, after an ineffectual attempt to appease the popular demand for reform, was obliged to leave the country in 1859, on the beginning of another war between Austria and Sardinia. In March 1860 P. was finally annexed to the latter power.

Par'ma, capital of the province and formerly of the duchy of the same name, in N. Italy, on both banks of the river P., 12 miles S. of the Po, and 75 S.E. of Milan by rail. It is circular in form, surrounded by bastions, and is divided into an E. and W. part by the small river, which is crossed by several bridges. Though an ancient town, it has an entirely modern appearance. The chief street, part of the ancient Via Æmilia, intersects it from the Porta S. Michéle in the E. to the Porta S. Croce in the W., and crosses the Piazzo Grande, in which are the Palazzo del Comune, and a statue of Correggio, erected in 1872. In the S.E. is the strong Castello, and adjoining it the Campo di Marte, while in the N.W. are the old ducal gardens *Giardino Pubblico*, containing the Palazzo del Giardino, now a military school. The Stradone, a promenade encircling the town, is laid out on the site of the old fortifications. The Cathedral (Duomo), a rare example of the Lombardo-Romanesque style, was begun in 1117, but not finished till the 13th c. Its beautiful dome is adorned with an exquisite 'Assumption' by Correggio, one of the last works of the master (1526–30), now somewhat injured by damp. It is also rich in older frescoes. Other notable buildings are the Battisterio Church (1196–1270), designed by Benedetto Antelami, containing fine sculptures and frescoes; that of St. Giovanni Evangelista (1510), with dome-frescoes by Correggio; the Madonna della Steccata (1521) an imitation of St Peter's, in which are tombs of the Farnese and Bourbon rulers; the Palazzo della Pilotta, begun in 1597, and now comprising the Museo di

Antichita, rich in Roman antiquities, the Picture Gallery, with works of Correggio, Parmegiano, Anselmi, Raphael, Titian, Tintoretto, the Caracci, &c., and a library of 80,000 volumes and 4000 MSS.; the Convento di St. Paoli, now a school, famed for the beautiful and well-preserved frescoes by Correggio; and the Teatro, one of the largest theatres in Europe. The University, founded in 1422, is attended by about 400 students. P. has some manufactures of silk, woollens, lace, hosiery, glass, and porcelain, and a trade in grain, cheese, and cattle. Pop. (1874) 44,915. Though believed to be an old Etruscan town, P. first appears in history as a thriving Roman colony, founded B.C. 183, after the conquest of Cisalpine Gaul. It was subsequently called *Colonia Julia Augusta P.*, and became celebrated for its woollen industries. Narses took it, and called it *Chrysopolis*, or the 'golden city.' It participated in the general development of the upper Italian towns, zealously espoused the cause of the Guelphs, and endured a long and ineffectual siege by the Emperor Friedrich II. in 1247. In 1303 it ceased to be a republic, and after various vicissitudes fell to the Visconti in 1341, from that period till 1512 belonging to the duchy of Milan. Later it was annexed to the States of the Church, and became capital of the duchy formed in 1545. P. was the residence of Correggio and the birthplace of Parmegiano. See Affo's *Storia della Città di P.* (Parma, 4 vols. 1792–95).

Parmegia'no, whose real name was **Francesco Mazzuolli** or **Mazzola**, an artist of the Lombard school, son of the painter Filippo Mazzuolli, was born at Parma in 1503, and went to Rome, where he modelled his style on that of Correggio, and received commissions from Clement VII. After the sack of Rome by 'Bourbon's black banditti' in 1527, he removed to Bologna, and subsequently resided in his native town and in Casalmaggiore, where he died in misfortune, 1540. His works are extremely rare, and the best are two portraits in the Museo of Naples, and an altar-piece, 'The Vision of St. Jerome,' now in the National Gallery, London. Among others, P. has been credited with the introduction of etching, already practised by Dürer, into Italy.

Parme'lia is the type genus of *Parmeliaceæ*, an important and very extensive natural order of lichens, containing almost all the species that are useful either as esculents, medicines, or dye-weeds. It is divided into three groups—*Peltigeri*, *Euparmeliacei*, and *Usneacei*. A great number of the lichens that abound on rocks and trees belong to the second of these, and in the genus P. itself we have the yellow *P. parietina* and the grey *P. saxatilis*, occurring on almost every tree. *P. perlata* is a valuable and costly dye.

Parmen'ides, an ancient philosopher, was a native of Elea, a Greek colony in Southern Italy, and lived in the 5th c. B.C. Hardly anything is known regarding his life, unless we accept a doubtful story related by Plato to the effect that he visited Athens along with Zeno, one of his scholars, and there had some intercourse with Socrates. P., who has been recognised as the head of the Eleatic School (q. v.), embodied his philosophy in a didatic poem entitled *On Nature*, in which he argues that Being is absolute and imperishable, compactly contained within itself like a well-rounded ball; the apparent change which goes on around us being a mere illusion. He postulates two primordial and opposite elements, the 'ætherial fire of flame' and the 'dark night,' by the various combinations of which he conceives the world to have been formed. The fragments of his poem which remain have been published by Fülleborn (Züllichau, 1795), Peyron (Leipz. 1810), and Karsten, in his *Philosophorum Græcorum veterum Reliquiæ* (Brus. 1835).

Parnahy'ba, or **Paranahy'ba** ('bad water'), a river in N.E. Brazil, divides the provinces of Piauhi and Maranhão throughout its course of 770 miles, and enters the Atlantic by several shallow mouths in 3° S. lat., 41° 40′ W. long.

Parnass'us (mod. *Liakura* or *Lykeri*), the most important mountain mass in Middle Greece, lies 10 miles N. of the Gulf of Corinth. It is isolated on three sides, but is connected on the W. by a wooded chain (Iona), with the border ranges of Ætolia and Doris. Its higher slopes are still densely clothed with pines, and several of its rocky summits are covered with snow for a great part of the year. The loftiest peak, called by the ancients *Lykoreia* (whence the modern name), is 8068 feet above the sea, and commands a magnificent view, reaching N. as far as Thessaly, and S. to the mountains of Arcadia in the Peloponnesus. On its southern side lay Delphi (q. v.), the seat of the famous oracle of Apollo, and the fountain of Castalia (q. v.). On the approach of spring, the Thyades, votaresses of Dionysos (Bacchus), held their orgies in honour of the god on the heights of P., but the whole mountain was peculiarly sacred to Apollo and the Muses; hence the phrase 'to climb P.' came to mean 'to write poetry.'

Par'nell, Thomas, an English poet whose reputation surpasses his merit, was born in Dublin in 1679, studied at Trinity College, took holy orders in 1700, and was made Archdeacon of Clogher in 1705. At first a Whig, he ratted to the Tories towards the close of Queen Anne's reign, obtained a prebend by the help of Swift, and in 1716 was made vicar of Finglass. The death of a charming wife induced habits of intemperance, and P. died at Chester, July 1717, at the early age of 38. In 1722 his friend Pope published a collected edition of his *Poems*, not one of which except the *Hermit* now survives in any human memory, and it is amazing that *it* should survive.

Paro'chial Board is in Scotland the board in each parish intrusted with the relief of the poor; for which purpose it is authorised to impose assessments. See POOR-LAWS.

Par'ody (Gr. *para*, 'beside,' and *ōdē*, 'a song'), a species of burlesque, the invention of which is ascribed by Aristotle to Hegemon, an Athenian comic poet. It takes a serious composition, and while closely preserving its outward form, wholly changes its inner character by substituting the ridiculous for the sublime—a Cockney fireman for a Norman baron. The parodist, in fact, is like a caricaturist who fits the heads of living characters to the 'Laocoon' or 'Order of Release.' Homer was parodied in the *Batrachomyomachia* ('Battle of Frogs and Mice'), Euripides by Aristophanes, Nero by Persius, Chapelain by Boileau and Racine, Voltaire by Dominique, and Kotzebue by Mahlmann. In English we have the *Rejected Addresses* (1812) of James and Horace Smith, the *Bon Gaultier Ballads* (1854) of Theodore Martin and Professor Aytoun, the latter's *Firmilian, a Spasmodic Tragedy* (1854), and the parodies contained in Lewis Carroll's *Phantasmagoria* (1869) and Calverley's *Fly Leaves* (1874). The best prose parodies are Thackeray's *Novels by Eminent Hands* and Bret Hart's *Condensed Novels* (1867). See Delepierre's *La Parodie chez les Grecs, chez le Romains, et chez les Modernes* (Lond. 1870); and *P. and Parodists* in the *British Quarterly Review* (January 1878).

Parole' (1) The countersign or pass word required to be given to guards and sentinels in camp and garrisons by all who approach their posts before they can be allowed to pass. (2) The promise made by a prisoner of war upon his honour that he will not go beyond certain limits, or take up arms against his capturers, if liberated. Officers are frequently released in modern warfare simply on their parole, the breaking of which would be considered utterly disgraceful and unpardonable.

Parole. See PRISONERS OF WAR, LAW REGARDING.

Parole Proof is in law evidence by the oath or Affirmation (q. v.) of a witness, in contradistinction to evidence by writing. In England, any agreement not under seal is called a P. agreement.

Pa'ros, an island of Greece, and one of the largest of the Cyclades, 6 miles W. of Naxos, has an area of over 80 sq. miles, and a pop. of 6000. It is mountainous, and abounds in white Parian marble, reckoned by the Hellenic artist only inferior to that of Mt. Pentelicus. Two quarries were opened in 1844 in the N. on Mount Elias or Marpesus. Other products are cotton, wax, honey, and wild pigeons. On the W. coast is the town of Parikia (*Paros*), with 1917 inhabitants. P. was colonised by the Ionians, and prospered so rapidly as to send colonies to Thasus, to Parium on the Propontis, and to Pharus on the Illyrian coast: After the battle of Marathon, Miltiades failed to subdue the island with 70 ships, but eventually it became subject to Athens: The 'Parian Chronicle' (see ARUNDEL MARBLES) was found here in 1627.

Paroti'tis. See MUMPS.

Par'quetry (Fr. *parquet*, 'an inlaid floor') is a kind of marquetry used for floors. Oak is commonly employed for the groundwork, and in it ornamental coloured woods are so inserted as to produce a rich and beautiful pattern. 'Solid parquet floors' are the most durable, and consist of pieces of wood, one inch thick, grooved and tongued together.

Parr. See SALMON.

Parr, Samuel, LL.D., a learned English divine, was born at Harrow, 15th January 1747, educated at Harrow School and Emmanuel College, Cambridge, and afterwards filled the situation of assistant-master at Harrow for five years. He then opened a school of his own at Stanmore. In 1777 he was appointed master of Colchester School, and afterwards at Norwich. Having taken orders, he became rector of Asterby (1780), curate of Hatton (1783), rector of Wadenhoe (1790), and rector of Graffam (1802). He died 6th March 1825. P. was a man of extensive acquisitions, particularly in classical learning, but lacked the originality of intellect necessary to make use of them. Though famed among his contemporaries as a brilliant conversationalist, none of his voluminous writings sustain his reputation, and it is impossible that he can be permanently remembered. An edition of his works was published by Dr. Johnstone, in 8 vols., 1828.

Parra. See JACANA.

Parrakeet', or **Parroquet**, a name given to various genera of Scansorial birds of the family *Psittacidæ* or Parrots (q. v.), from which, however, they differ in certain important particulars. The parrakeets are smaller than the parrots. They are included in the sub-family *Pesophorinæ*, in which the legs are somewhat longer than in the parrots, and thus fit their possessors for a terrestrial life. The bill is of moderate size, and its tip may be toothed. The tail is broad and long, and its feathers are narrowed at the tip. A typical example of the P. is found in the P.-Cockatoo of Australia, a continent which may be regarded as the headquarters of this bird. The P. runs on the ground with great ease and swiftness. It attains a length averaging that of a small crow, and is of a yellow colour on the head and throat, the head bearing a crest. The back is brown and the wings white. The female has a greenish tinge on the head and throat. The yellow-bellied P. (*Platycerus Caldonicus*) is found in Van Diemen's Land and the islands of Bass's Straits. To the genus of *Platycerus* belong the great majority of the parrakeets. The back of the species just named is of a mottled green, the forehead crimson, the throat and part of the wings blue, and the belly yellow. Another species of this genus is the rose-bill P. (*P. eximius*), found in New South Wales and Van Diemen's Land, and exhibiting the most gorgeous hues. The back is of dark glossy green, and the chin and throat are white, the head and face scarlet, and the under parts light green. The ground P. (*Pesophorus formosus*) is a very typical member of the group, and occurs in S. Australia. It runs actively on the ground, while its flight is low and feeble. The colour is dark green above and yellow below, and the tail is long and slender. The ringed P. (*Palæornis torquatus*) is a native of Africa and Asia, another species being the Alexandrine ringed P. (*P. Alexandri*). The colour is grass-green, the neck being encircled with a ring of black colour, and rings of purple and rose as well. The zebra or grass P. (*Melopsittacus undulatus*) inhabits Australia, and is of a dark green colour, varied with brown and yellow. The blue-banded grass P. (*Euphemia Chrysostoma*) is found in summer in Van Diemen's Land. Its colour is green tinted with brown.

Parramatt'a is the second oldest town in New South Wales, having been founded in November 1788. It is beautifully situated on the P. River, which is virtually an elongation of Port Jackson (q. v.), 14 miles W. of Sydney, with which P. has communication by both railway and steamers. It contains many public buildings, including the Government House, Benevolent Asylum, two large lunatic asylums, an extensive penal establishment, and five important public schools. Orange-growing and the manufacture of tweeds are the principal industries. The largest orange trees in the world are believed to be at P. Pop. (1875) 6103.

Parrha'sius, according to Pliny, the most insolent and arrogant, but also the most gifted painter of his age, was born at Ephesus in the 5th c. B.C., became afterwards a citizen of Athens, where he lived as a contemporary of Socrates, and painted a number of works, in which he carried high art to perfection in all essential particulars. P. is said to have combined the respective merits of his great predecessors, Polygnotus, Apollodorus, and Zeuxis. So skilled was he in the theory of his art, that he was named the Legislator. Among his chief works were his allegorical representation of the Athenian people or 'Demos,' in which the contradictory qualities of Athenian society were indicated; the 'Theseus,' which was subsequently placed in the capitol of Rome; 'Ulysses feigning Insanity,' and the 'Hoplites,' or heavy-armed warriors. The subjects of his works were not always unexceptionable. His 'Archigallus,' and his 'Meleager and Atalanta' prove that the production of licentious works was not confined to the period of the decline of Grecian art.

Parr'icide (Lat. *parricida*, prob. from *pater*, 'father,' and *cædo*, 'I slay') is hardly a legal term in England, the murderer of a father being punishable in the same measure as the murderer of a stranger. In the Roman law the crime was punished with extra severity.

Parr'ot, a name applied to various genera of *Scansorial* birds belonging to the family *Psittacidæ*. In the sub-family *Psittacinæ*, to which the typical P. belongs, the upper mandible is deeply arched and hollowed, and the edges of the lower mandible are wavy and curved. The wings have their first and second quills longest. No crest is borne upon the head in the true P. The best known species of P. is the grey P. (*Psittacus erythacus*), which has so long been celebrated for its talking powers. This bird inhabits W. Africa. The general colour is ashen grey, the tail being scarlet. Both sexes are capable of talking, although the males are perhaps more loquacious than the females. Very rarely has this bird bred in Europe. The attachment exhibited by parrots to their master and mistress is by no means the least noticeable trait in their character. The faculty or power of imitation is strongly developed, the most unusual noises and sounds being mimicked with a faithfulness that almost exceeds belief. The green P. (*Chrysotis festivus*) is a native of S. America; another American species, the Amazon green P. (*C. Amasonicus*), is also well known in Britain. The first is the larger of the two. It is of a bright green colour, the top and back part of the head being of cobalt-blue colour. The back in its lower portion and the wing-coverts are crimson, and the tail, which is short and square, is green. The Amazon green P. learns to talk more readily than the green P., and attains a length of 12 inches. The cheeks and chin are yellow, the forehead purple, and the general body-plumage green. The tail-feathers are marked with green, red, and yellow. The name of Philip Island P. is applied to a species of cockatoo (*Nestor productus*), and the owl P., is the *Strigops habroptilus* of New Zealand, a species widely different from the true P. The Carolina P. (*Conurus Carolinensis*) is a macaw, attains a length of about 21 inches, and has the bold colours of the latter bird.

Parrot-Fish, the name given to various *Teleostean* fishes of the genus *Scarus*, and which are included in the family of the Wrasses (q. v.) or *Labridæ*. In the genus Scarus the head is convex, and the jaws are covered with minute scale-like teeth, adapting these fishes for browsing on the coral-polypes, and for crushing the hard substances on which they feed. They inhabit tropical seas. A well-known species is the *Scarus harrid*, or tesselated P.-F., inhabiting the coasts of Ceylon. Another species (*S. creticus*) occurs in the Mediterranean. The former is of a bluish tint, marked with bright yellow, the fins being brown. The name P.-F. is derived from the appearance of the jaws, which somewhat resemble the beak of a parrot in shape.

Parr'y, Sir William Edward, a celebrated explorer, was born December 19, 1790, at Bath. At thirteen he entered the navy, and in January 1810 received a lieutenant's commission, after which he was employed for three years in protecting the British whale-fishery in the northern seas. Ordered in 1813 to proceed to Halifax, in Nova Scotia, he in the following year took part in the war between England and America. After the Peace of 1814 P. remained on the N. American station without preferment till 1817, when he returned to England, too late to join the expedition to the Congo sent in that year. In April 1818, through the influence of Mr. Barrow, Secretary to the Admiralty, he was appointed to the command of the *Alexander*, which was to sail under Commander John Ross in the *Isabella* to seek a N.-W. Passage (q. v.). The ships returned in November without having made any discoveries. P. represented that this was due to a mistake of his commander, and was in consequence appointed to lead a second expedition for the same purpose with two ships, the *Hecla* and *Griper*. Leaving the Thames,

11th May 1819, they crossed on the 4th September the meridian of 110° W. long., in 74° 44′ 20″ N. lat., by which they became entitled to a reward of £5000, and discovered Barrow's Strait, Melville Island, Baring Island, Prince Regent's Island, and Wellington Channel. After wintering on Melville Island from the 20th September to the beginning of August 1820, they returned, and reached the Thames in November 1820. P. immediately received the rank of commander. In a third expedition in the *Hecla* and *Fury* (May 1821 to October 1823) he was less successful. After being frozen in at Winter Island from the 8th October to the 2d July 1822, he discovered the Fury and Hecla Strait, and returned to the Thames in October 1823. In his fourth expedition (May 1824–October 1826), he lost the *Fury*, and was forced to return prematurely. After his return, P., who had been made a post-captain in 1821, was appointed hydrographer to the Admiralty. On the 3d April 1827 he led yet another expedition, this time to seek the North Pole by way of Spitzbergen. On the 22d June he left his ship, the *Hecla*, and proceeded with twenty-four men in two flat-bottomed boats, which they had often to drag over the ice, as far as 82° 45′ N. lat., when, stopped by a current, they returned to the *Hecla* on the 21st August. From this, his last voyage of exploration, P. returned to London at the end of September. Accepting the office of agricultural commissioner in New South Wales, he remained there from 1829 to 1834, in the latter year returning to England. In 1852 he became Rear-Admiral of the White. P. died at Ems, in Germany, 7th July 1855. See his *Journal of a Voyage for the Discovery of a N.-W. Passage* (Lond. 1821); *Journal of a Second Voyage for the Discovery of a N.-W. Passage from the Atlantic to the Pacific, performed in the years* 1821–22–23 (*ib.* 1824); *Journal of a Third Voyage for the Discovery of a N.-W. Passage* (*ib.* 1826); and *Narrative of an Attempt to Reach the North Pole* (*ib.* 1827); also *Memoirs of Rear-Admiral Sir W. E. P., Knt., F.R.S.*, &c., by his son, the Right Rev. Edward P., Suffragan Bishop of Dover (Lond. 1857).

Par'sees ('inhabitants of Pars' or Persia) is the name given to the adherents of the ancient religion of Persia, or Zoroastrianism. Coming originally from the great home of the Aryan Race (q. v.) in Central Asia, the Zoroastrians seem to have entered the Punjaub with the ancestors of the Hindus, whence after a time they migrated westward to Bactria, Media, and Persia. These facts are deduced from (1) the great affinity between the Sanskrit (q. v.) or ancient Indian, and the Zend or ancient Bactrian languages; (2) from the fact that the Indians and the Persians, in their earliest written records, both apply to themselves the name of Aryas; and (3) from the resemblances between the mythologies of the Vedas (q. v.) or primitive Hindu Scriptures, and the Zend Avesta (q. v.) or Scriptures of the P. A number of personages mentioned in the Veda correspond in name with others in the Avesta, *e.g.*, the Indian Yama, the king of the dead or at least of the blessed, and the PersianYima, a fortunate monarch with whom the blessed live; the Persian Thraêtaono, 'who destroys a pestilent serpent with three heads, three girdles, six tails, and a thousand powers,' and the Indian Trita, 'who fights with a serpent and smites a three-headed dragon with seven tails, and liberates the cattle;' the Persian hero Sama Keresaspa, and the Indian warrior Krisasa named in the Puranas; the Indian Kavya Usanas, and the Kaus of the later Persian legends. Besides this identity of person, the Hindus and P. have some important ceremonies in common: (1) the Soma, Persian Homa (which is identical), offering. This is a plant, the juice of which is pressed out and drunk with certain religious ceremonies. (2) In both religions the reception of neophytes is performed by investing them with a girdle or thread. The two have also at least two of their deities in common—Mitta and Sorna or Horna (the plant), to the latter of whom there are applied in both a great number of epithets, which clearly show how short a period had elapsed since the Persian and Indian adherents of this worship had become separated from each other. There are also certain indications that the separation of the two nations was occasioned in part at least by religious causes, in the fact that deities which are good in the one religion are evil in the other. Thus Ahura (see ORMUZD), the highest god of the Persians, as Asura was reckoned among evil spirits by the later Indians; *vice versa*, the good Devas of the Indians, and Siva (q. v.), a member of the later trinity, were in Persia transformed into evil spirits—Daevas (the allies of Ahriman (q. v.) and S'arva); and Indra, the highest god of the earliest Hinduism, is by the Persians banished to hell. Some scholars, however, are doubtful whether these opposing conceptions regarding the deities necessarily imply a religious schism, as the same effect might have been produced by the reformation of Zoroaster, when 'the deities of the old nature-worship may have shared the fate of so many heathen divinities, which Christianity thrust down to hell.'

When the reformation of Zoroaster (q. v.) took place is unknown. His date has been fixed as early as 3000 B.C. (Bunsen: Aristotle puts it as high as about 6360 B.C.), and as late as 1500 B.C. The first authentic records of Persian history date from the reign of Cyrus (B.C. 550), the first of the Achæmenian dynasty. The history of the period during which this dynasty held sway (about 200 years) is recorded in Cuneiform Inscriptions (q. v.); but although so much of the Chaldean religion is preserved in these, the Persian inscriptions are all historical, and give no information regarding the Zoroastrianism of the day. After the conquest of Alexander (B.C. 331), the history of Persia as an independent nation is a blank for 500 years. The Sassanian dynasty was then founded (A.D. 226) by Ardeshir Babegan, who endeavoured to restore the national religion to its primitive splendour, and in whose reign, or that of one of his immediate successors, the Avesta was reduced to writing, having hitherto been preserved by oral tradition. The vernacular of the time was the Huzvaresh or Pehlevi (q. v.), into which translations of the Avesta were made from the Zend, and under the later Sassanians into another dialect, the Parsi. The Sassanian dynasty was overthrown and the ancient empire of Persia for ever swept away by the Mohammedan invasion (A.D. 637), and the Zoroastrian religion all but rooted out of Persia. There lingered for some years a fond but secret attachment to the old religion in the eastern provinces; indeed 'the old Persian creed and moral system exercised a greater influence on Mohammedan writers than is generally supposed.' The open adherents, or P., withdrew to the mountainous region of Khorassan, where a few thousands are found to this day. (See GUEBRES.) About the middle of the 7th c. a number emigrated to India, and were followed by others at different times. Settling first at Guzerat, and then passing on to Surat (after 1668), they finally arrived at Bombay, which has owed much of its prosperity to their industry and enterprise. Like the Jews, whom they resemble in other respects, as well as in commercial enterprise, they have preserved throughout centuries of subjugation both the purity of their blood, and the exactitude of their ceremonial observances.

Besides some 5500 in Persia, the number of P. throughout all India, according to the census of 1868–72, was 69,000, of whom 44,000 were found in the island of Bombay, and 23,500 in other parts of that Presidency. The influence of English ideas is working a great change among the Indian P. It has already divided them into two classes, the 'old' and the 'young,' the Conservatives and the Liberals, the latter of whom 'desire to throw off the abuses of former ages (*e.g.*, the filthy purifications by means of Nirang, the large number of obligatory prayers, which are in Zend, of which no one understands a word, &c.), and to avail themselves, as much as is consistent with their religion and their Oriental character, of the advantages of European civilisation.'

The name of Fire-worshippers, which is applied to the P., they repudiate. All they admit is that they are taught to face some luminous object while worshipping God, that they regard fire as an emblem of the Divine power, and that there is a kind of national instinct or indescribable awe felt by P. towards light and fire, a feeling which has been compared to that with which many Christians regard the Cross.

The creed of the modern P., which is embodied in a catechism published about 1840, is a very short one. 'They believe in one God, to whom they address their prayers. Their morality is comprised in these words—pure thoughts, pure words, pure deeds. Believing in the punishment of vice and the reward of virtue, they trust for pardon to the mercy of God.' See Max Müller's *Chips, &c.* vol. i. (2d ed. Lond. 1868); Muir's *Sanskrit Texts*, vol. ii. (2d ed. Lond. 1871); Haug's *Essays on the Sacred Language, &c., of the Parsees* (Bomb. 1862); Dosabhoy Framjee's *Parsees* (Lond. and Bomb. 1858); Dadabhai Naoroji's *Manners and Customs of the Parsees and the Parsee Religion* (Liverp. 1861).

Parsley, a name of doubtful origin, applied to the well-known culinary vegetable long in cultivation for seasoning and garnishing purposes. Botanically the name has varied from *Petroselinum* as a genus to this as a specific name under the genera *Apium* and *Carum*. Its native country cannot now be ascertained, but the plant has established itself (as an escape from gardens) on old walls and in waste places in various European countries. In domestic use it is much valued for communicating flavour to soups and stews. Where it is used for garnishing, the varieties with much-curled leaves have the preference. To meet a constant demand three or four successive sowings should be made from February to May. What is called celery-leaved P. is sometimes grown for its leaf-stalks, which are blanched and used the same as celery; and Hamburgh P. is a variety occasionally cultivated for its rootstock, which is eaten like parsnips. Much superstition is connected with P., and very strange notions concerning it remain current in England and Scotland to the present day. It is usual to sow a small quantity of P. in sheep pastures. See FOOL'S P.

Par'snip, or **Pastinaca**, the name given to an esculent root introduced into use at an early period, and known to be the produce of *P. sativa*, a plant found wild in Europe and W. Asia. The genus is now botanically reduced to a section of *Peucedanum*, from which it differs chiefly in having no bracts or braccoles and by the absence of calyx-teeth. In England the P. is not uncommon in calcareous districts, but probably exists in Scotland as an escape from gardens only, and is certainly an introduction in America. As in the case of the carrot, the root of the wild plant is hard, stringy, and of no use as a vegetable until modified by continuous careful growth. Its use dates back historically to the time when Pliny wrote. During the period of Roman Catholic supremacy it was a favourite accompaniment to dried fish in Lent. Latterly it has been recommended as a substitute for potato, but it does not contain an equal amount of nourishment; the flavour, moreover, not being agreeable to some. For cow-feeding it is reported to be excellent, inducing milk of a very rich quality. A sort of beer and wine can be made from the mashed and boiled root after fermentation, as also a powerful spirit, and it is sometimes manufactured into a marmalade. Only a few varieties have been established by cultivation, of which those termed 'the Guernsey,' 'the hollow-crowned,' and 'the student,' are the best. The routine culture is similar to that of the carrot. The root is seldom attacked by diseases or insect vermin. A large coarse plant called Cow-P., is *Heracleum Sphondylium*, and the Americans give the name meadow P. to other umbelliferous plants belonging to the genus *Thaspium*.

Par'son (Lat. *persona*, the 'representative' in a parish of the Church), in the ecclesiastical law of England, is one that has full possession of all the rights of a parochial church. He has the freehold of the parsonage, the glebe, the tithes, and other dues. The distinction between a P. and a vicar is this—the P. has usually the sole right to all ecclesiastical dues in his parish; but the vicar has generally an impropriator over him entitled to the larger part of the profits. There were no vicars till the reign of Henry III., before which time the rector provided a curate, and maintained him on an arbitrary stipend. The method of becoming a P. and of becoming a vicar is the same. In both cases, holy orders, presentation, institution, and induction are necessary. No person is eligible to any benefice unless he has first been ordained a priest, and he is then called a clerk in orders. No one can be a priest till he is twenty-four years old.

Par'sons, Robert, born at Nether Stowey in Somersetshire, June 24, 1546, passed from Taunton free-school to St. Mary's Hall, Oxford, and became a fellow and tutor of Balliol College. In 1574 he studied law and medicine at Louvain and Padua, at Rome became a convert to Catholicism, and entered the Society of Jesus, July 4, 1575. He came with Campian to England in 1580, and, after a year of infinite perils, only escaped that martyr's fate by taking refuge in Normandy, where he founded an English School at Eu (1582). As rector of the English College at Rome (1587) P. laboured from afar for England's conversion, pouring forth a flood of controversial tracts, and making several journeys to the Spanish Peninsula, where he founded the colleges of Valladolid (1589), Lucar (1591), Lisbon and Seville (1592), besides St. Omer's in France (1593). He died at Rome, April 15, 1610. Among the pseudonymous writings ascribed to P. are *A Brief Discourse containing the Reasons why Catholics refuse to go to Church* (Douai, 1580), *The Book of Resolution, or Christian Directory* (Rouen, 1581), *Treatise of the Three Conversions of Paganism to the Christian Religion* (3 vols. St. Omer, 1603–4), &c.

Parsons, Theophilus, born at Newburyport, Massachusetts, February 24, 1750, graduated at Harvard (1769), was called to the bar (1774), and commenced legal practice at Newburyport (1777). As a member of the 'Essex Junto,' he published the famous *Essex Result* (1778), a pamphlet upholding the constitutional doctrines of the New Englanders, and he was one of the framers of the Constitution of 1779. He removed to Boston (1800), became chief-justice of the supreme judicial court (1806), and died October 30, 1813. A Memoir of him has been published (Bost. 1859) by his son, **Theophilus P.**, who was born at Newburyport, Massachusetts, May 17, 1797, graduated at Harvard (1815), and after a tour in Europe and some years' legal practice at Taunton and Boston, was appointed Dane Professor of Law in Harvard College (1847). He is author of treatises on mercantile and maritime law, on marine insurance, and on promissory notes, of *Deus Homo* (1867), *The Infinite and the Finite* (1872), and other theological works in support of Swedenborgianism, and *The Political, Personal, and Property Rights of a Citizen of the United States* (1875).

Par'sonstown, or **Birr**, a town of Ireland, in King's County, on the Brosna, 89 miles S.W. of Dublin by rail. It is said to have grown up around a monastery founded by St. Brendan in the 6th c., and its castle, the ancient seat of the O'Carrols, after frequently changing hands, was granted by James I. to Lawrence Parsons, ancestor of the Earl of Rosse, the present proprietor. The modern Birr castle, which incorporates parts of the old structure, is the residence of the Earls of Rosse, and the late earl's famous telescope is kept here. The town, an important military station, is one of the handsomest of Irish inland towns, and has several large breweries and distilleries, and a considerable trade in agricultural produce. Pop. (1870) 4939.

Part and Per'tinent is a term of Scotch law used in conveying land. It denotes that the land is conveyed with all privileges and adjuncts, such as a church pew, right in burying ground, or right of Servitude (q. v.) attached to it.

Par'thenogen'esis, the name given to some curious phenomena observed in the reproductive history of certain insects especially. The term P. (from the Gr. *parthenos*, 'a virgin,' and *genesis*, 'the act of production') literally means the production of young by the virgin or unimpregnated female. The contact of the male with the female element appears to be absolutely necessary for the performance of true or sexual reproduction. The *Ovum* (q. v.) or egg of the female requires to be fertilised by contact with the seminal fluid of the male before the Development (q. v.) of the embryo or young animal can be inaugurated. But it appears that in the case of the aphides or plant-lice and of the wasps and bees, the female may lay eggs from which young are produced—the eggs being kept entirely separate and apart from the influence of the male.

In the case of the bees, those eggs laid by the queen bee, and which are duly fertilised by contact with the male fluid stored up in her seminal receptacle, give birth to female bees or to neuters; those which are allowed to pass from her body unfertilised give birth to drones or males. Thus the drones are said to be produced by P. The explanation of P. rests upon the fact that probably the so-called eggs or ova are hardly analogous to true eggs, but are peculiarly modified reproductive bodies capable of being developed into new beings without fertilisation. Some naturalists term them *pseud-ova* under this idea. Other authorities maintain that the influence of one impregnation of the males extends through all the generations of females in the case of the aphides.

Par'thenon (Gr. *parthenôn*, from *parthenos*, 'a virgin'), the temple of Athena in the Acropolis of Athens, the finest specimen of Greek architecture. It was a peripteral octostyle of the Doric order, with 17 columns on the sides, each 6 feet 2 inches in diameter at the base, and 34 feet in height, elevated on three steps. From the base of the pediments, its height was 63 feet, and its area 233 feet by 102. It was built under Pericles in 438 B.C., at a cost which has been estimated at £1,500,000 sterling;

its architects were Ictinus and Callicrates, while its sculptures were executed by Phidias. The P. was used late in the Middle Ages as a Christian Church, but during the siege of Athens by the Venetians under Morosini in 1687, by the explosion of some powder stored in it by the Turks, it was almost entirely destroyed. Still its magnificent ruins are sufficient to show what must have been the former splendour of the building, and its main plan has been reproduced from extensive investigations and excavations, and does not now seem doubtful. The chief remains of the sculptures were carried to England with the consent of the Turks by Lord Elgin. Known as the 'Elgin Marbles' (q. v.), they are among the choicest treasures of the British Museum.

Par'thia, anciently a country of Asia, at the S.E. end of the Caspian Sea, and including the N.W. portion of the modern province of Khorassan, besides a part of Irak-Ajami. The rugged, mountainous character of the country made it a suitable home for the wild Scythian tribes, who, according to an ancient tradition, sought a refuge here as outcasts from their own race, and who afterwards founded a monarchy which made the name *parthe*, or exile, famed and feared. The early history of P. is wrapped in obscurity, but it probably formed at first a province of the Persian Empire, and it was afterwards subject to the Syro-Macedonian rule under the successors of Alexander. In 256 B.C., however, the first of the Arsacidæ (q. v.) succeeded in freeing his country, and founded a native dynasty which lasted 500 years, and under which, on the fall of the Seleucidan power, the rule of P. was extended over the greater part of Western Asia. Ancient history describes the Parthians as a wild and warlike nation, who cherished a slavish devotion to their despotic rulers, but feared nothing else. With a contempt for commerce and agriculture they united an insatiable thirst for rapine and war, in which they distinguished themselves not less by their indomitable courage than by their cunning manœuvres. Their favourite weapon being the bow and arrow, they were accustomed to approach on horseback within a short distance of their foes and discharge a well-directed volley, then, wheeling about in feigned discomfiture, they drew their enemies into the confusion of a pursuit, until they had time to fit a second arrow to their bows, which they were trained to discharge over their shoulders, without turning their horses. After having successfully resisted repeated attempts of the Romans to subjugate its territories, P. at last fell a prey to internal dissension in 214 A.D., when a revolt headed by Ardshir broke out in Persia under Artabanus IV., the last of the Arsacidæ, in attempting to suppress which that monarch was defeated and slain. This event marked the downfall of the Parthian Empire, which was supplanted by the native Persian dynasty of the Sassanidæ (q. v.), under Artaxerxes I. The religion of the Parthians was a kind of Nature-worship, in which special reverence was paid to the heavenly bodies. From this, as well as from other particulars, modern research has conclusively proved them to have been connected in their origin with the ancient Persians.

Par'tial Loss. See AVERAGE, and under INSURANCE, *Marine Insurance.*

Partial Payment. No one is bound to accept P. P. of a debt. But a creditor in two or more separate debts, cannot refuse to accept payment of one of these, though the creditor decline to pay even the interest of the others. The holder of a bill is not bound to take payment of a smaller sum than the bill carries; but he is entitled to take a P. P. from the acceptor without cutting off his recourse against the other parties, provided he protest the bill, in so far as it is not paid, and in other respects duly negotiate the bill.

Par'ticiple (from Lat. *particeps*, 'taking part') is the name said to have been given to a class of words because they 'partake' of the nature of a verb and of an adjective. This is by no means certain, however. The P. is in strictness only part of the conjugation of the verb, but it is true that both adjectives and nouns can be expressed by participial forms. In such cases, however, nouns and adjectives are *not* participles. '*Dwelling* in light that is inaccessible' illustrates the verbal use of 'dwelling;' while 'his *dwelling* stood full fair upon a heath,' shows its employment as a noun. In the former case, it denotes an *act;* in the latter, a *subject* or *thing*. Though these forms are now identical, they were originally distinct in English, as they still are in German. The P. 'dwelling' was 'wuni-*ende*' (comp. Ger. 'wohn-*end*'); the noun 'dwelling' was 'wun-*ung*' (comp. Ger. 'wohn-*ung*'). The P. proper has two forms, a present ending in '*ing*,' and a past in '*d*' or '*ed*' (also '*t*'), with a few survivals of an old and beautiful termination in '*en*.' The P. is distinguished (says Prof. Bain) by three marks: (1) It cannot affirm or deny; (2) it may take an object; (3) it may be qualified by an adverb. In these respects it agrees with the Infinitive. In the three following it differs: (1) It has a subject; (2) it cannot be qualified by an adjective or a possessive; (3) it tends to become an adjective as it drops the peculiarities of the verb. Its skilful use gives a peculiar plasticity to the structure of English sentences. See Bain's *Companion to the Higher English Grammar* (Lond. 1874).

Par'tick, a N.-W. suburb of Glasgow, situated on the rising ground about the Kelvin, and at the entrance of that stream into the Clyde. It has large iron shipbuilding yards, foundries, flour-mills, bleachfields, &c. P. was formed into a burgh under the Police Act of 1850, and is governed by twelve commissioners, three of whom are police magistrates. The working population are chiefly employed in the iron shipbuilding, which is about the most extensive on the Clyde. The extensive rows of handsome villas on the N. side of the burgh are chiefly occupied by business people engaged in the city. Pop. (1851) 3131; (1861) 8183; (1871) 17,000; (1877) 26,000, as ascertained by the School Board Census.

Partin'ico (*Locanda della Bambina*), a town of Sicily, province of Palermo, 19 miles S.W. of Palermo, and near the line of the projected railway to Mazzara. It has some linen and woollen industries, and a considerable trade in wine, olive oil, sumach, and fruits, which are abundantly produced in the vicinity. The valley in which it lies is surrounded by calcareous mountains, rising in isolated pyramids. To the N. is Carini (*Hyccara*), whence the Athenians are said to have carried off the young Lais. Pop. (1874) 20,154.

Parti'tion Lines, in Heraldry, lines (sometimes plain, sometimes irregular) crossing the shield in directions that correspond to the Ordinaries (q. v.). Thus *party per bend* means 'parted' or divided by a line drawn in the direction of a Bend (q. v.); *party per fesse*, by one in the direction of a Fesse (q. v.).

Par'tizan (Fr. *pertuisane*), a kind of Halberd (q. v.), introduced into warfare during the reign of Edward IV., and restricted to the use of body-guards about the close of the 16th c., when it was usually richly engraved. The blade was long and double-edged, with two lateral projections curving upwards instead of the axe.



Partizan.

Part-Music, music requiring more than one performer.

Part'nership (in Law). The object of a P. may be any that is lawful. To make any one liable as the partner of another, there must be an agreement between him and his colleague to share in profit or loss; or the individual must have permitted himself to be *held out* as jointly liable. Usually the partners in a business are known to the world, constituting what is called the *house* or firm; but men sometimes embark capital in a business without letting their names appear, and without sharing in the management. Those who do so are called *dormant* or *sleeping* partners. No partner, without consent of his colleagues, can transfer his share to another, nor introduce a new member into the firm. Persons agreeing to subscribe money for a specific undertaking, as to obtain or oppose a bill in parliament, are partners in the undertaking, and liable as such. A written agreement is not necessary to constitute P. It may be inferred from the acts of the parties. In partnerships, each member is liable for the joint debt, without limitation, unless the concern is incorporated. (See JOINT-STOCK COMPANIES, LAW REGARDING.) The acts of one partner in business when done without collusion and in violation of no public law, are generally binding on all the others; and this responsibility of parties cannot be limited by any agreement or stipulation in the articles of association. This general rule of law is, however, subject to modification, its object being to protect the public. Thus, if a partner give distinct notice to any one

with whom his firm is about to do business, that he disapproves of the proposed transaction, and that he will not be liable for it, proof of this notice will free him from liability. The general rule that a share of the profit and loss of a business makes the shareholder a partner, does not hold where the share is in a specific object, as in a ship or in the copyright of a book, the responsibility in such cases being limited to the risk connected with the object. The principle of common law that any one sharing in the profit or loss of a firm is thereby a partner and liable for its debt, has been modified by the statute of 1865, under which a loan may be made to a person engaged or about to engage in trade, the lender receiving a rate of interest varying according to the profit of the business without the lender becoming responsible as a partner. A P. may be dissolved by the expiration of the time for which it was constituted, or upon decree of court, which will be given on ground of equity. An advertisement in the *London Gazette* is not sufficient announcement of the dissolution of P. Notice should be sent to every one with whom the firm has had dealings. The laws of England and of Scotland are essentially the same as regards P., but there are minor points in which there is some difference; the legal theory in the latter country being that the P. has an individual existence apart from its constituent members, who are regarded as securities or *cautioners* (see CAUTION; English law, GUARANTY) for its debts. In both countries, but especially in Scotland, difficult questions occur respecting the rights of members of associations for religious purposes. It has been decided in a case in which a schism took place in such an association, that the use of the meeting-house remains with the members holding the religious principles of those by whom it was created. But there might obviously remain the further and greater difficulty to dispose of, in the question of which side *did* adhere to those principles. A religious association, or *church*, is in exactly the same position with regard to the civil courts as a mercantile association or partnership. That is, both kinds of association are, and in every free country ever must be, subject to the law of the land—freedom consisting in effect being given to the maxim—*Lex suprema, Salus populi.*

Par'tridge, a well-known genus of *Rasorial* or *Gallinaceous* birds, forming the type of the sub-family *Perdicinæ*, in which the edges of the bill are entire, and the nostrils covered with a scale. The tarsi are long and have divided scales in front. The bill in the genus *Perdix* itself is short, and the quills from the second to the fifth are the largest. The tail is short, and the outer toe is longer than the inner. The common P. (*Perdix cinerea*) is a well-known game bird, occurring generally throughout Europe. It attains a length of about twelve inches, the females being somewhat smaller. The general colour is a brown of varying shades, tinted with grey. The latter colour is also found on the breast, and a crescentic patch of brown exists on the lower part of this region. The P. is much tamer than the Grouse (q. v.), and appears to prefer the neighbourhood of cultivated land. Its food consists largely of grain, but it also feeds on insects, slugs, &c. The nest is a loose collection of sticks, in which from twelve to twenty eggs of an olive-brown hue are deposited about the end of April. The female sits most pertinaciously upon the eggs, and the young are able to run about as soon as they are born. The brood forms what is known as a 'covey,' and a highly characteristic feature of partridges is their habit of associating together, and of affecting their native locality. The birds pair about the middle of February, or in some seasons a little later. As in other Gallinaceous birds, the males display their plumage before the females, and engage in battles for the latter. The 'French' or red-legged P. (*Caccabis rufa*) is larger than the species just described. It may be known by the black mark or bar on the forehead, and by the markings of similar colour on the back and flanks. The red-legged P. is a native of S. Europe. It is common in France and Italy, and in the eastern English counties, where it has almost driven out the English bird. The eggs number sixteen or seventeen, and are of a yellowish-white marked with brown. The upper parts are of a warm brown colour. The eye is marked in front and behind by a white line; the breast is grey, and the abdomen is of a fawn tint. The beak and legs are of a reddish hue. The French partridges do not fly in coveys like the English, and are much stronger on the wing.

Partridge Berry. See GAULTHERIA.

Partridge Pigeon (*Geophaps*), a genus of *Columbidæ* or doves belonging to Australia, and in some respects appearing to unite the characters of the two birds whose names they bear. They are sometimes named 'Bronze-wings,' from their plumage. The upper parts are brown, the breast being of a paler tint, and the abdomen grey. A familiar species is the *G.* or *Phaps, Chalcoptera*, which, when in good condition, may weigh 1 lb. Its flesh is highly esteemed. The P. P. appears to have a fondness for water, and may be found in large numbers in the vicinity of pools.

Partridge Wood. The trade names for the various woods imported into Europe have in many cases been so multiplied and confused that it is almost a hopeless task for the botanist to unravel the complicated mass of error. In the case of P. W. the name is applied to a timber introduced from S. America and the W. Indies, in plants of a reddish colour, beautifully streaked with lines of a darker shade, or sometimes marked so as to call to mind the plumage of a partridge. It is valued by cabinet-makers, and is also used in the manufacture of various fancy articles, such as parasol-sticks, &c. From the French name of *Pois perdrix*, corrupted into *Bois perdrix*, it has been stated by some to be the produce of *Heisteria coccinia*, but this is not the case, and though *Andira inermis*—the 'bastard cabbage-tree' of the W. Indies and Brazil—has been advanced with better claim, the actual source of the P. W. still remains unsettled.

Parts of Speech are the different classes into which the words of a language are arranged by grammarians. The principle of classification is that a word shall be named according to the office or function it discharges. If it denote a thing it is said to be a *noun*; if it mark some quality or attribute of the noun, it is called an *adjective*; if it express action, it is a *verb*; if it indicate the mode of action, it is an *adverb*; and so on. The same word is not always the same part of speech; *e.g.*, 'Sunshine' is usually a noun, but in the verse, 'on a sunshine holiday,' it is an adjective. The essential P. of S. are the Noun (q. v.), Adjective (q. v.), Pronoun (q. v.), Verb (q. v.), Adverb (q. v.), Preposition (q. v.), and Conjunction (q. v.). Some grammarians add the Article, without good reason so far as modern English is concerned (see ARTICLE). The right of the Interjection (q. v.) to be considered a part of *speech* in any tongue is also challenged.

Part-Song, a choral composition resembling a glee but designed for a greater number of voices, and differing from a madrigal by the modern and simple style of its harmony, and the absence of contrapuntal treatment. The composition is usually in four parts—if it is written for mixed voices—soprano, contralto, tenor, and bass; or if for male voices alone, alto, two tenor parts, and bass (in Germany two tenor and two bass parts). The music is frequently repeated without variation in each verse of the song. Solos are occasionally introduced. The P.-S. is of German origin, and of late years has become very popular in England. In this style of composition Mendelssohn has never been surpassed.

Parturi'tion. See MIDWIFERY.

Parvise' (Lat. *parvisum*) a church-porch, where lawyers could be seen, and specially that at Westminster. Readers of Chaucer will remember the

> 'Sergeant of lawe, war, and wys,
> That often hadde ben atte *parvys*.'

Pascagoula, a river of Mississippi, U.S., is formed by the confluence of the Leaf and Chickasawha, flows through the S.E. part of the State, and enters the Mississippi Sound by a beautiful bay of the same name. It is navigated for about 100 miles by small steamers, and sends down much fine timber to New Orleans. P. is also the name of a city and port of entry on an inlet of the Mexican Gulf, 40 miles from New Orleans by rail, with a large lumbering trade, some shipbuilding, and a pop. (1870) of 480.

Pas'cal, Blaise, an illustrious French thinker, was born at Clermont-Ferrand, in Auvergne, 19th June 1623. His father was president of the Court of Aids in that town. P. lost his mother when he was three years of age. In 1631, delighted with the symptoms of intellectual eagerness exhibited by his only son, the elder P. brought his family to Paris with

the intention of devoting himself to their education. Being a scholarly man and a fine mathematician, he was admirably qualified for the task. The boy early manifested a keen spirit of inquiry, and was never content without knowing—his sister, Madame Périer, writes in her life of him—'la raison de toutes choses.' Nor would he be put off with ignorant answers; 'nothing save exact knowledge satisfied him.' Afraid that the study of mathematics would turn the current of P.'s attention from the study of languages, the father forbade him to read books on the subject. His curiosity was, of course, thoroughly aroused by the prohibition, and having been informed of the general scope of mathematical science, he secretly applied himself to solving its problems for his own satisfaction. By the time his father had become acquainted with his furtive pursuit he was, says Mme. Périer, through his own unaided reasoning, as far advanced as the thirty-second proposition of the first book of Euclid. Being then allowed every facility for prosecuting the study, he produced in his sixteenth year a *Traité des Coniques*, which Descartes perused with astonishment; and when he was eighteen he invented a calculating machine (*Machine arithmétique*), which, though useless in practice, proved the possession of an extraordinary inventiveness by its author. But the pressure of mental pursuits, too earnestly followed out, broke his health, which he never afterwards recovered. Physical torture was more or less his companion all through life. In 1647, the experiments of Toricelli having suggested to him natural philosophy as a fresh field, he published *L'Equilibre des Liqueurs* and *Pesanteur de l'Air*. These publications made an epoch in the history of physics. About the same time, however, a course of reading in the theological literature of the Jansenists began to awaken in him some doubts about the prosecution of science as an aim in life. Science to Jansen (q. v.) was merely one of the lusts of the flesh, and P. shortly saw it in that light also. The first fruits of his new devotion were seen in recommending his sister Jacqueline to the nunnery of Port-Royal. Though he continued to move in society, and, as the practical result of his secular studies, invented, among other things, a dray and an omnibus, it was not long before he abandoned the world, and retired for the rest of his life among the scholars of Port-Royal-des-Champs. On the 23d of January 1656 appeared the first of his *Lettres écrites par Louis de Montalte à un Provincial de ses Amis*. The circumstance which gave rise to the series was the attitude of the Jesuits towards the followers of Jansen within the Catholic Church. St. Cyran, the chief of the Port-Royalists, was pursued with relentless rigour by the Jesuits, because he endeavoured to reduce to practice the Augustinian doctrines of Jansen. Arnauld (q. v.) was disputing with the Pope, the king, the chancellors, the clergy, the Sorbonne, and the universities, on the same side. The *Lettres* appeared in the heat of the struggle, and brought the discussion within universal comprehension. Their publication was extended to March 24, 1657. They are eighteen in number, and deal with Arnauld's dispute, the morals of the Jesuits, the maxims of the casuist, and the question of grace. The quarrel is now antiquated, but P.'s volume remains a classic. 'The first work,' says Voltaire, 'of genius which appeared in prose was the collection of the Provincial Letters. Examples of every species of eloquence may there be found. There is not a single word in it which, after a hundred years, has undergone the change to which all living languages are subject. We may refer to this work the era when our language became fixed.' P.'s mode of life increased in austerity as he grew older. Every pleasure he renounced, and even the common tokens of fraternal love he ceased to offer to his sisters, convinced that all they had to bestow of affection should be given to God. He gave generously of his means to the poor, and stinted himself. Self-mortification he carried to such an extent as to wear an iron girdle, whose sharp prongs he forced into his side when he became conscious of humiliating thoughts. But during these sombre experiences he was slowly thinking out the *Pensées*, a set of meditations which French critics characterise as an apology for the Christian religion. It is rather a broken series of contemplations upon man, God, and destiny, in which faith and scepticism appear and disappear according to the special fervour under which they were penned. P. does not, however, disparage the human intellect like most apologists for faith, though in confronting it with the mystery of the universe he proves its essential littleness. It has been said that the *Pensées* were penned with his heart's blood. The saying is true, for his thoughts are the revelation of an agony of spiritual research such as the world has but seldom witnessed. He was delivered from it all in his thirty-ninth year, having died at Paris, 19th August 1662. The *Œuvres Complètes* of P. were published by Bossuet (Par. 5 vols. 1779, and again in 6 vols. 1819), by De la Hure (Par. 2 vols. 1861). See Mme. Périer's *Vie de P.* (Par. 1715), Sainte-Beuve's *Port-Royal* (vols. ii., iii.), Cousin's *Des Pensées de P.* (Par. 1844), Prevost-Paradol's *Études sur les Moralistes Français* (Par. 1865), Havet's *Études sur P.* (new ed. 2 vols. 1867). An interesting sketch of P.'s life and work, by Principal Tulloch, forms one of Blackwood's series of *Foreign Classics for English Readers* (Edinb. 1878).

Pas'co. See CERRO DE PASCO.

Pas de Calais, a department in the N.W. of France, formed from parts of the old provinces of Artois and Picardy, is bounded on the N. and W. by the Straits from which it takes its name, on the S. by the Somme, and on the E. by Nord. Area 2550 sq. miles; pop. (1872) 761,158. It has a coast-line 80 miles in length, consisting alternately of sandy beach and lofty cliff. The country is flat, except where a range of low hills traverses it from S.E. to N.W., and is well watered, the chief rivers being the Authie, Canche, Scarpe, and Lys. The principal minerals obtained are coal, iron, lead, marble, and slate. The soil is exceedingly fertile, and, besides all the usual cereals, beet-root is extensively grown. Sugar, oil, beer, and tobacco are manufactured, and large quantities of cotton and linen goods are produced. The situation of the department opposite the British coast promotes a thriving commerce, which is carried on by means of a network of canals and railways. The capital is Arras, the largest town Boulogne; other places of importance are Calais, Bapaume, Béthune, St. Venant, St. Omer, and Montreuil.

Pasewalk, a town of Prussia, province of Pomerania, on the Ucker, 25 miles W.N.W. of Stettin by rail, has manufactures of spirits, tobacco, woollens, and leather, and a pop. (1875) of 8534.

Pash'a (Pers. *padishah*, from *pâd*, 'protector,' and *shah*, 'ruler'), the title of Turkish governors of provinces, and of military and naval commanders of high rank. The badge of a P. is the tail of a horse or yak, borne on a staff, which is crowned with a gilt ball. The three grades of pashas are indicated by the number of the horse-tails on their standards. The highest officers civil and military are pashas of three tails.

Pashmi'na, the trade name for the shawl-wool of Turkestan and Central Asia, which is exported to a considerable extent by native traders, to be woven in the towns of Cashmere and the Punjaub. In 1875–76 the registered imports into the Punjaub were valued at £204,000, showing a decrease on the preceding year; and it is officially stated that the trade is declining, owing to the absence of demand in Europe.

Paskev'itch, Ivan Fedorovitch, a Russian marshal, born May 19, 1782, at Poltava, was the son of an inferior Government official, became page to the Emperor Paul, and (1800) lieutenant in a regiment of the Guard. He distinguished himself at Austerlitz (1805), and afterwards in the war with Turkey, was appointed lieutenant-general after the battle of Leipsic (1813), and was at the siege in Paris in March 1814. In 1823 he became the Emperor's chief aide-de-camp. During the war with Persia in 1826–27 he took Erivan (for which he was surnamed 'Erivanski'), and forced the enemy to a peace highly favourable to Russia; in 1828–29 he fought with striking success against the Turks in Asia, took Erzeroum, and after the peace was made a field-marshal. On the death of Count Diebitch-Sabalkanskij (1831), P. received the supreme command against the Poles, took Warsaw, and repressed the revolution, for which he became 'Prince of Warsaw' and Vice-king of Poland. In this position he vigorously followed out the Emperor's system of compulsion, whose objects were to destroy the nationality of Poland, and make it a Russian province. In 1849 P. led the army that helped Austria against Hungary, and compelled Görgei to capitulate. In the Crimean War he had at first (1854) the chief command, but in consequence of a wound received at Silistria retired to Poland, where he died at Warsaw, February 1, 1856. See Tolstoï, *Essai Biographique et Historique sur le Feld-maréchal Prince de Varsovie* (Par. 1835). His son, **Fedor P.**, distinguished himself in the Hungarian and Crimean Wars, became general aide-de-camp in 1856, and in 1861 a lieu-

tenant-general, but was cashiered in 1866 owing to the opposition he showed to the government as a member of the convention of the nobility at St. Petersburg in that year.

Pas'palum is a large genus of grasses belonging to the tribe *Paniceæ*, and chiefly natives of tropical and sub-tropical countries. *P. distichum*, ranging from India to S. E. Australia, yields a good fodder, and growing in large hassocks, is useful as a swamp grass. *P. scorbiculatum*, widely dispersed in the tropics of the eastern hemisphere, is valuable in pastures, besides furnishing in India a grain crop similar to that procured from the allied genus *Panicum* (for which see MILLET). Of Central American species, *P. stoloniferum* and *P. dilitatum* are commended as fodder grasses, and *P. ciliatum* as a cereal. *P. purpureum* forms important pasturage in the arid coast districts of Peru. *P. exile* is the 'hungry rice' or Fundi (q. v.) of W. Africa.

Pasque Flower (Old Fr. *pasque:* Old Eng. *pasche:* Lat. and Gr. *pascha*, from the Heb. *pesach*, 'the passover'), is a pretty flower that takes its name from blossoming about Easter. Gerard (1599) terms it 'purple passeflower,' the words Pask, Passe, or Pase being all formerly applied to this festival of the Christian Church. Botanically it is called *Anemone Pulsatilla*, and is a native of Europe and N. Asia, occurring in Britain on chalk downs and in limestone pastures in several of the midland and eastern counties of England. After the solitary purple flowers are over, the peduncle lengthens, and the carpels bear a long feathery down, giving a handsome appearance to the head of fruit. Like other members of *Ranunculaceæ*, it contains an acrid essential oil, and though not included in modern materia medica, furnishes a medicine which is a favourite with homœopathists.

Pas'quinades, political or personal lampoons, so called after a witty Roman cobbler of the 15th c., whose shop stood near the Palazzo Breschi. On its site was afterwards erected a mutilated group of ancient statuary, representing Menelaus with the body of Patroclus, which group was dubbed with the cobbler's name. To it the Roman populace was in the habit of affixing scurrilous queries or epigrams, the answers to which were placarded on the Marforio, the statue of a river-god, which formerly faced the Carcer Mamertinus, and is now in the Capitoline Museum. Collections of these P. were published at Rome in 1510, 1512, 1513, and 1526, and at Basel in 1544. See Mary-Lafon, *Pasquin et Marforio* (Par. 1861).

Pass'age, or West Passage, a seaport of Ireland, in Cork county, on the W. side of Cork harbour, 6 miles by rail from Cork, of which it is a marine suburb and watering-place. It has a quay, a dockyard, and several shipbuilding yards, and the larger vessels bound for Cork lie off here. Pop. (1871) 3652.—**East P.**, a seaport with some trade, is on the W. side of Waterford Harbour, 6 miles E. by S. of Waterford, and has a pop. (1871) of 729.

Passaglia, Carlo, a Roman Catholic theologian, born at Pieve a San-Paolo, in Tuscany, May 2, 1812, was educated at Lucca, and, after 1827, in the Jesuit College at Rome, where, having taken orders, he rose by his diligence and oratory to be professor, first of canon law, and afterwards of dogmatic theology. On the expulsion of the Jesuits from Italy (1848), he retired to England, but returning to Rome in 1851, was a year later appointed president of the Commission which decided the dogma of the Immaculate Conception. P.'s declaration in favour of the national movement of 1859 was followed by his secession from the Jesuit Order, and by his withdrawal to Turin, where he founded the anti-papal *Mediatore* (1862), and received the chair of moral philosophy, a post which he still (1878) retains. He represented Montecchio in the first Italian Parliament (1863), and has actively promoted the cause of 'Liberal' Catholicism in Italy. Among his writings are *Per la Causa Italiana di Vescovi Cattolici* (Flor. 1859), *Della Scomunica* (Flor. 1861), an answer to Renan's *Vie de Jésus* (2 vols. Tur. 1864), &c.

Passaic, a river of New Jersey which flows into Newark Bay 3 miles from Newark, after a tortuous south-easterly course of about 100 miles. It is navigable for 13 miles from its mouth, and at Paterson it has a fall of 72 feet, supplying an immense water power, which is utilised by several factories.

Passamaquodd'y Bay, between the province of New Brunswick, Canada, and the State of Maine, is about 15 miles long, with an average breadth of 10 miles. Its shores are very irregular, and abound in good harbours. The bay, which contains numerous islands, receives several rivers, of which the St. Croix is the most important. The tide rises here 25 feet.

Pass'ant (Fr. 'walking'), in Heraldry, describes the attitude of any animal when walking. The Lion P. has three paws on the ground, while the fourth (the dexter forepaw) is raised, and the tail is curled over the back. See LEOPARD, THE.

Passar'owitz, or Posharewätz, a town of Servia, near the Austrian frontier, 7 miles S. of the Danube, and N.E. of the Morava, notable as the place where the treaty of 1718 was signed by Prince Eugene and the Grand Vizier, ending the war between the Turks and Venetians, and securing to Austria the Banat of Temesvar, the W. part of Wallachia, a part of Bosnia, and the town and territory of Belgrade.

Passau', a fortified town of Bavaria, at the confluence of the Inn and Ilz with the Danube, 105 miles E.N.E. of Munich by rail. It is a picturesquely-situated and finely-built town, on a rocky neck of land between the Inn, here 863 feet wide, and the Danube, 719 feet, and has an imposing appearance, rising like an amphitheatre from the Inn. It consists of Altstadt, Innstadt, Illstadt, and Neumarkt with Anger, and is protected by the fortress of the Oberhaus (built 1219), on a rock 426 feet high, and connected with the Unterhaus, and by 10 detached forts. The most interesting buildings are the Cathedral (founded 1284, and restored after a fire 1662–80), and the Post-Office, where the Treaty of P., which first established religious toleration, was signed by the Emperor Karl V. and Moritz of Saxony, 31st July 1552. P. has a gymnasium, an industrial school, and a Jesuit College, and is the seat of a bishop and of a court of appeal. The manufactures are various and important, including leather, tobacco, porcelain, earthenware, and beer; and there is some shipbuilding for the river trade. Pop., almost exclusively Roman Catholic (1875) 14,757. P. occupies the site of the Roman *Castra Batavia* (a name corrupted first into *Patavium*, and finally into P.), and was formerly the capital of a bishopric founded in 739, secularised in 1803, and wholly incorporated with Bavaria in 1805. See Erhard, *Geschichte der Stadt P.* (2 vols. Passau, 1862–64).

Pass'enger Pigeon (*Ectopistes migratorius*), a species of *Columbidæ*, or pigeon, belonging to N. America, and noted for its habit of migrating from one part of the continent to another in flocks numbering many thousand birds. It attains a size equal to that of the common pigeon. Its colour above is a general slate blue, exquisitely varied by a metallic lustre and green gloss. The abdomen is white, and the lower part of the breast pale red. The tail is long and pointed, its two central feathers black, and the remaining ones white. The beak is black. The average length of the P. P. is 16 inches, the female bird being smaller than the male. Its food consists chiefly of beech-mast, but it also feeds on rice and other grains, on berries, and similar substances. Its grain-eating propensity is a serious matter for the American farmer. Wilson calculated that a flock observed by him extended for 240 miles, and included at least 2,230,272,000 birds. The daily food-supply of this enormous multitude he estimated at 17,424,000 bushels of grain. Audubon calculated that 8,712,000 bushels of grain would be required daily to feed a flock numbering 1,115,000,000 birds. The P. P. flies with great rapidity, and birds with undigested rice in their crops—rice obtained from Georgia and Carolina rice-fields—have been killed near New York. This fact seems to prove that the P. P. can fly a distance of from 300 to 400 miles in about six hours. Some specimens have been killed in Britain; one in Fife, in 1825. The young are hatched in about sixteen days, and the female lays two eggs of a white colour. Both sexes perform the work of incubation.

Passengers by Land or Sea. Power to inspect railways and to control their construction is under statutes vested in the Board of Trade; before whom copies of the bye-laws of every company must be laid, otherwise they are void; and the Board of Trade may disallow any proposed bye-law. Every railway and canal company is required to make arrangements for receiving and forwarding P. and goods without unreasonable delay, and without partiality or preference. The general rule of law that masters are responsible for the acts of their servants

done in their official capacity holds good with regard to railway companies and coach proprietors and their servants; hence, any passenger injured in travelling by public conveyance, by fault of the carrier, has a just claim for compensation against the owner; and if any one be so killed, the right of claim falls to his or her wife, or husband, or children. The legal presumption in the case of injury or death to a passenger is always in favour of fault on the part of the carrier. Railways are bound to afford reasonable accommodation to the public; but they are not bound to accommodate extraordinary numbers. There are various statutes which regulate the duties of carriers by sea towards their P. Diet must be wholesome and sufficient. See under CARRIERS—*Carriers*, *Wharfingers*, and *Warehousemen*.

Pass'eres, Pass'erine Birds. See INSESSORES.

Passing Bell is a bell tolled in Catholic countries during the solemn moments when the spirit is 'passing' from the body, with the intention of inviting those that hear it to join in the prayers ordered for the dying.

Pass'ing-Notes (in Music). Notes not essential to harmony, used in passing from one essential note to another.

Pass'ion Flower, or technically *Passiflora*, is the type genus of *Passifloraceæ*, a natural order of dicotyledons, chiefly natives of tropical America, and in addition to the above includes such genera as *Paropsia*, *Smeathmannia*, *Tasconia*, and *Malesherbia*. The beautiful plants united under P. F. number about 200 described species, consisting for the most part of climbing herbs or shrubs provided with tendrils, but a few are small erect trees, without the tendrils. Their curious flowers have given rise to considerable botanical discussion, and authorities are still at variance as to the true nature of the different parts. Many of the species have edible fruits known under the names Granadilla (q. v.), those for *P. quadrangularis*, *P. alata*, &c.; water lemon of the W. Indies (*P. laurifolia*); conch apple or sweet calabash (*P. maliformis*). The part eaten is the fleshy aril attached to the seeds, or the juicy pulp in which they are embedded—the taste varying from a pleasant to a mawkish flavour. Occasionally, as the produce of home culture, the fruits of the better descriptions are seen in the European markets. Of *P. macrocarpa*, fruit weighing 8 lbs. have been grown in Australia. Medicinal properties are ascribed to several species; *e.g.*, the root of *P. quadrangulum* is narcotic; that of *P. contrayerva* and *P. normalis* are reported to be poison antidotes; from *P. rubra* a tincture is obtained called Dutchman's laudanum; the leaves of *P. fœtida* are employed as poultices, and those of *P. laurifolia* as anthelmintics. Of the numerous species, varieties, and hybrids cultivated for ornamental purposes, *P. cærulea* is the most hardy. The name P. F. was given from the points of fancied analogy presented by the plant to the memorable events at Calvary; thus the three stigmas represent the three nails, the five anthers the five wounds, the filamentous processes of the corona the crown of thorns, &c.

Pass'ionists is a name given to the priests of the Order of the Holy Cross and the Passion of Christ, or *Congregatio Clericorum excalceatorum S.S. Crucis et Passionis*, which was founded by Paolo Francisco de Danei, born at Ovado in Sardinia, 3d January 1694. Paolo assumed the name 'della Croce' in 1720, occupied a cell on Mount Argentaro at Rome, and received from Pope Benedict XIII. the privilege of founding an order of missionaries, with the object of preaching the love of Christ as displayed in his Passion. He and his brother Giovanni were ordained priests in 1727. Paolo died on the very day (18th October 1775) on which he received a bull from Pope Pius VI. establishing the order, was beatified in 1852, and canonised in 1867. In 1782 P. were employed as missionaries to Bulgaria and Wallachia, and subsequently missions of the order have been sent, with more or less success, to other countries, Belgium, Great Britain and Ireland, Australia, &c. See *Abregé de la Vie du B. Paul de la Croix* (Tournai, 1857), and Father Pius' *Life of S. Paul of the Cross* (Dubl. 1867).

Passion Music is music illustrative of the Passion of Our Lord as narrated in the Gospels. In the Roman Catholic Church from an early period it was usual to assign the recital of the Gospel of the Passion during Holy Week to a number of different priests who intoned the words of Jesus, Pilate, the High Priest, &c., and the words of the people (turbae) to the congregation or choir. From this custom the Passion-plays, so popular during the Middle Ages, and the German P. M., seem alike to have sprung. After the Reformation, original compositions were introduced into the P. M. of the Lutheran Church instead of the traditional church tones, and such pieces of music were made suitable for performances at other times and places than at particular services in the church. The oldest known version of P. M., printed at Wittenberg in 1573, with recitatives and four-part choruses, has been attributed to Antonio Scandell. Heinrich Schütz was the inventor of the feature of a reflective chorus, and Johann Sebastian (about 1672) introduced orchestral instead of organ accompaniments. At the beginning of the 18th c. Keiser utilised original libretti instead of the Gospel narratives for his P. M., *Der Blutige und Sterbende Jesus*, &c.; and adopted the 'soliloquia,' a frequent reflective and recitative passage, in which he was followed by Telemann, Handel, and Johann Sebastian Bach. The last-named great master in his two works on the Passion according to St. Matthew and St. John, the most sublime compositions of this kind, made effectual use of the chorale; and selecting simple hymn tunes as his basis, which he grandly harmonised, pressed into his service the voices of the entire congregation. The harmony of the small choir was enforced with the accompaniment of organ and orchestra. It is not customary now, however, in Germany, for the congregation to take any part in the music; and, in the London performances of Bach's works, the singing of the chorales by the choirs, without any instrumental accompaniment, has been found admirable and effective.

Passion Plays, religious dramas, representing the Passion of Christ, were probably developments of the Good Friday processions, and date from an early period. The earliest that has come down to us, *Ludus Paschalis sive de Passione Domini* (printed in Schmeller's *Carmina Burana*, Stuttg. 1847), belongs to the 12th c., and is half Latin, half German. The first wholly German passion play, composed in the 13th c., is only preserved in fragments, as also is the *Marien-Klage*, but we have numerous perfect specimens, dating from the 14th and 15th centuries in Mone's *Schauspiele des Mittelalters* (Karls. 1846). These plays lasted occasionally through seven days, and employed between two and three hundred performers. Their popularity waned at the Reformation, but they still survive in Spain and Southern Germany, the most famous passion play of modern times being that of Ober-Ammergau (q. v.). See MYSTERIES.

Passion Week is the week before Easter (q. v.), so called because in it took place the Passion and death of Christ. In the early Church it was called the Great Week, and was distinguished, even above the rest of Lent (q. v.), by greater rigour of fasting, greater liberality in almsgiving, by rest and liberty granted to slaves, a release of all prisoners, and the closing of the law-courts. On the Thursday, the day on which our Lord instituted the Supper, and was betrayed, the communion was administered in some churches in the evening after supper. (For other customs observed at a later period see MAUNDY THURSDAY.) On the Friday, absolution was granted to all who observed the day with fasting, prayer, and true contrition, including public penitents whose term of penance was completed. The Saturday, or Great Sabbath of the Jews, was the one Sabbath throughout the year which the Greek churches, and some of the Western, observed as a fast.

